Lee Stovall is a rising junior here at the University of Rochester. Raised as a southern gentleman in his hometown of Savannah, Georgia, Lee found his way up here to Rochester after extensive searching for the perfect school. Other than his newfound love for snow, Lee also enjoys the many academic and research opportunities here at the University. Aside from being an orientation leader this summer, he also is undergoing research in data analytics as well as holding a job in the Rochester Medical Center. His major in computer science keeps him very busy, but his love for the field keeps him motivated. Lee is also on the varsity swim team and serves as a teaching assistant for lower-level computer science classes. He is also affiliated with the Sigma Phi Epsilon fraternity here on campus. “This school was and is my number one choice. I can’t wait to show the new incoming student body how the next four years of their lives here will be their absolute best!”

Natalie Ziegler is a junior from the lovely Akron, Ohio. She is majoring in anthropology and comparative literature and minorin international relations. She is a member of Students’ Association Government and a sister of Phi Sigma Sigma, and she works at Goergen Athletic Center on campus. When she is not in Robbins Library or the stacks of Rush Rhees writing papers, she can usually be found in Wilson Commons working on student government projects or at work in the gym. In her free time, however, Natalie enjoys reading books or exercising by running through the urban yet scenic setting surrounding campus. She also loves getting off campus with friends for coffee at Java’s and a movie at the Little Theatre downtown. She is excited to welcome a new class of Yellow Jackets to their new home, and she looks forward to helping the incoming students, transfer students, and their families through the transition process.
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The College at the University of Rochester is unlike any other college in the world. Here we believe that your education belongs to you, and that your interests, passions, curiosity, and goals—above all else—should drive your learning. We know as a research faculty that you will do your best work and have the most fun in your studies if you learn what you love and love what you learn.

Experience teaches us that people do not learn in isolation. We learn from others and with others. At Rochester, people learn together by living and working together. Studying with those who share your interests and curiosity helps keep your learning alive. Being challenged by others who ask unexpected questions opens up new interests and passions. The possibilities for learning here are unbounded. The campus offers nearly unlimited opportunities for you—both in and out of class—to sharpen your skills and develop new interests.

Welcome to college. Everything in this Freshman Academic Handbook is designed to help make your education your own. Have the time of your life!

The Rochester Curriculum
Three features central to faculty learning are the hallmarks of the Rochester Curriculum: curiosity, competence, and community. With abundant and committed guidance, students plan for broad and free experimentation with ideas and subjects, discover or sharpen their interests, and come to understand their intellectual strengths and weaknesses. Students learn through sustained and integrated study in varied fields about a range of subjects and acquire the complex problem-solving and analytical skills needed for a lifetime of learning. Students pursue at least one major in one of the three great divisions of learning (humanities, social sciences, natural sciences and engineering) and complete at least a cluster in each of the other two areas. The choice of subject matter and the level of concentration (major, minor, cluster) in each division is the student’s, but through that choice, students take part in three different intellectual communities and in three different sustained conversations about learning and ideas.

These three different intellectual communities are the academic divisions of the College. Scholars in each division tend to know different things and to know them in different ways.

The natural sciences and engineering are concerned with natural phenomena ranging from the nature of numbers and logic to those of the cosmos and our Earth, through those of creature, organ, cell, and gene, and on to those of the fundamental phenomena of energy and existence.

The social sciences focus on natural phenomena that involve social interactions, human behavior, and the ways in which individuals create and maintain social groups and shape societies. Social scientists conduct research that is both quantitative and qualitative.

The humanities investigate humanity’s meaningful past and present through analysis of our symbolic and creative expressions. They explore how individuals and groups define and understand themselves and others with the ultimate goal of learning what it means to be human.

Students need to complete a major in one of these three divisions, and unless they choose an additional major or a minor, an authorized “divisional cluster” in each of the other two areas outside the area of the major. The following list of undergraduate degree programs (majors) offered by the College is divided into these three academic divisions:

### NATURAL SCIENCES AND ENGINEERING
- Applied Mathematics
- Audio and Music Engineering
- Biological Sciences  
  - Biochemistry
  - Cell and Developmental Biology
  - Computational Biology
  - Ecology and Evolutionary Biology
  - Microbiology
  - Molecular Genetics
  - Neuroscience
- Biology
- Biomedical Engineering*
- Brain and Cognitive Sciences
- Chemical Engineering*
- Chemistry
- Computer Science
- Data Science
- Earth and Environmental Sciences  
  - Environmental Science
  - Environmental Studies
  - Geological Sciences
- Electrical and Computer Engineering*
- Engineering Science
- Engineering and Applied Sciences
- Environmental Health
- Geological Sciences
- Geomechanics
- Mathematics
- Mathematics-Statistics
- Mechanical Engineering*
- Optical Engineering*
- Optics*
- Physics
- Physics and Astronomy Statistics

### SOCIAL SCIENCES
- Anthropology
- Business
- Economics
- Epidemiology
- Financial Economics
- Health, Behavior and Society
- Health Policy
- History
- International Relations
- Linguistics
- Political Science
- Psychology

### HUMANITIES
- American Sign Language
- Art and Art History  
  - Art History
  - Studio Arts
- Bioethics
- English
- Film and Media Studies
- Modern Languages and Cultures  
  - Comparative Literature
  - French
  - German
  - Japanese
  - Russian
  - Spanish
- Music
- Philosophy
- Religion and Classics  
  - Classics
  - Religion

### INTERDISCIPLINARY MAJORS
- African and African-American Studies
- American Studies
- Archeology, Technology and Historical Structures
- East Asian Studies
- Digital Media Studies
- Interdepartmental Studies
- Russian Studies
- Women’s Studies

**NOTE: A LIST OF APPROVED MINORS APPEARS ON PAGE 103.**

*Students in these programs may complete somewhat modified clusters.*
Clusters are officially authorized sets of related courses comprising at least twelve credit hours (normally equivalent to three courses). Most students find that their interests coincide with some of the more than 250 clusters that appear in the Cluster Search Engine on the Web at www.rochester.edu/college/ccas/clusters. Students may request unique modifications of these authorized clusters through the sponsoring department and may even propose individualized interdepartmental clusters. Each of the clusters in the Search Engine includes a brief description and the requirements for completion. The database is searchable by course (e.g., BCS 110), by division or department (e.g., music), and by concept (e.g., cognition). You can learn more of what you need to know by clicking "Cluster Policies."

Primary Writing Requirement: In addition to completing a major, minor, or cluster in each of the three divisions, students are required to fulfill the Primary Writing Requirement. The Primary Writing Requirement is the College's first step in drawing students into our community of researchers and writers. Typically, the Primary Writing Requirement is satisfied by passing Reasoning and Writing in the College (WRT 105, WRT 105E, or the combined WRT 105A and WRT 105B) with a grade of "C" or better. To be prepared for the upper-level writing requirement in the majors, students should satisfy the Primary Writing Requirement by the end of the first year of study.

The Writing, Speaking, and Argument Program offers three versions of Reasoning and Writing in the College. WRT 105 (4 credits). The extended version of this same course, WRT 105E (4 credits), and the two-semester version, WRT 105A (2 credits) and WRT 105B (2 credits) have been developed for students needing more support and/or more time to meet the demands of college-level writing. All versions of WRT 105 grow out of a single course description, but individual sections have unique discipline-specific content and themes designed by each instructor with students' interests in mind. Students will find a wide range of topics from a variety of disciplines, such as "Truth, Justice, and the 'American' Way? Comic Books and the Rhetoric of Nationalism," "Being Homo Sapiens Sapiens: The Brain, The Mind, The Heart, and Full Catastrophe Living," and "Web-Wide World: The Ethics of Virtual Connection." Section themes are indicated through subtitles and descriptions, which, along with CRN numbers and section times, are available on the Writing, Speaking, and Argument Program's web page: http://writing.rochester.edu/.

The Writing, Speaking, and Argument Program encourages 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.

International students are encouraged to register for U.S. Life: Customs and Practices (CAS 170) during the fall or spring semester of the first year. The class is limited in size to create an interactive and personalized experience. The innovative curriculum is designed to assist students in their transition to college through the study of American culture and values and successful study practices. Readings and short assignments are supplemented by on- and off-campus field trips, guest speakers, group activities, and discussion of current issues. The course carries two credits and may be combined with four additional full-credit courses.

Learning across the Divisions
A great deal of the College's innovative teaching and research takes place outside the confines of traditional departments, divisions, or even schools. As the list of interdisciplinary majors on page 4 shows, students can study new fields that have developed at the crossroads of existing disciplines (see also the list of approved minors on page 100). Cutting-edge work in public health--area studies, digital media studies, business, and other domains requires students to have in-depth knowledge in a blend of science, humanities, and social sciences fields. Sometimes students will take courses from multiple departments in the construction of their major; other times, the work they do in individual courses will represent a variety of disciplines.

Many of the college's newest majors are interdisciplinary. In the business major, for example, students take courses in economics, marketing, statistics, and accounting. In digital media studies, they pursue work in computer science, art, optics, and film and media studies. Majors in American studies take courses in the humanities and social sciences in departments such as art history, English, history, and political science. East Asian studies majors work in language, anthropology, literature, and history, whereas audio music engineering requires students to study electrical and computer engineering, math and physics, music theory, and computer science.

In addition, many individual courses take advantage of an interdisciplinary format. In some, students learn how to program computers while studying media history and theory; in others, they study musicianship and the art and science of sound recording.

Academic Honesty
As freshmen, you are joining a university community committed to the pursuit of excellence in learning, teaching, creativity, and research. Academic honesty is the cornerstone of that academic excellence, as it creates the necessary conditions of mutual trust and open communication that make intellectual inquiry and growth possible. The AS&E Academic Honesty Policy recognizes our shared obligation to promote academic honesty, establishes high standards of academic conduct, and requires each student to meet those standards.

Academic honesty means acting with truthfulness and sincerity in carrying out all aspects of our individual and collaborative work, maintaining ownership over our work, and acknowledging our debt to the work of others. Students should complete their work through their own honest efforts and expect and encourage honesty among their peers. Students can learn more about the academic honesty policy and test their self-knowledge with quizzes on the academic honesty website, www.rochester.edu/college/honesty/index.html.
\textbf{IN SUMMARY, you will complete for your degree:}\n
- a major with an average grade of C or better;
- a divisional cluster in each of the two divisions outside the area of the major with an average grade of C or better (although you may substitute a second major or a minor for a cluster in either or both of these two divisions);
- the primary writing requirement (normally WRT 105, WRT 105E, or WRT 105A and WRT 105B) with a grade of C or better;
- the upper-level writing requirement (integrated into the requirements for your major);
- eight semesters of approved course work (32 four-credit courses or 128 credit hours) with an average grade of C or better*

*Note: While most students maintain enrollment for a total of eight semesters, the College’s Enrollment Policy expects students to maintain full time enrollment during the fall or spring semester for no less than seven semesters. Therefore, students may not accelerate their graduation by more than one semester. For further information, visit http://rochester.edu/college/CCAS/AdviserHandbook/enrollment.html.

**FRESHMAN ACADEMIC HANDBOOK**

**CHOOSING YOUR COURSES**

The Rochester Curriculum is uniquely designed to allow you to own your education. We do not tell you which subjects to study—that choice is fully yours. Here you may safely explore courses of interest and not worry about having enough time to complete your academic program. This is true whether you select a major with 10 required courses or 20. To see how true this is, consider what might be possible if you decide on one of the most time-consuming programs, a BS major in the biological sciences: you’ll complete “Reasoning and Writing in the College” and, as required by the major, a maximum of 11 biology courses, two semesters of calculus, four semesters of chemistry, two semesters of physics, and one course in a field related to biology, for a total of 21 courses. This leaves 11 courses for exploration, some of which will lead to fulfilling clusters. Many of you will choose majors with fewer requirements, leaving plenty of time for a cluster of particular interest to grow into a minor or second major.

Beginning on page 12 of this handbook, you’ll find advice from each department that will help you select courses that match your interests and skill levels. Your choices will depend on several factors, including your initial ideas about possible majors, your comfort with exploring unknown subjects (give it a try!), departmental placement recommendations, and course availability (although this is not typically a problem). Here are some opportunities to consider as you read through this handbook and jot down courses you might take:

- \textbf{Small, interactive courses}, which allow you to work closely with faculty and meet other students with similar interests. We strongly recommend taking at least one small course your first semester. WRT 105, CAS 142, and language courses are examples of small courses, though there are many others as well.

- \textbf{Interesting courses} outside potential major(s), which offer a gateway to new interests. Read through the course descriptions in this handbook and choose three that you find especially interesting. We challenge you to take at least one your first semester. (You have plenty of time!)

- \textbf{Courses for potential major(s)}, which allow you to delve into your area(s) of interest. Be sure to read “Departmental Advice for Freshmen” included in this handbook to identify the courses you will need to take during your first year, along with those that might be postponed.

- \textbf{Courses that coincide with your academic strengths}, which provide a boost of confidence while allowing you to delve deeper into an area of study.

- \textbf{Most importantly}, your choices should grow out of your interests, your curiosity, and your goals.

When selecting your courses, keep in mind that some are offered only once each academic year. While MTH 141 and 161 are offered each semester, courses such as CHM 131 and most introductory (101) language courses are offered only in the fall semester.

\textbf{Academic Advising:} The University of Rochester believes that academic advising is critical to student success. While it is up to you to select your courses, we also provide you with as much help as you need during the registration process and throughout your years of undergraduate study. Your premajor advisor, the freshman class dean, the advisors in the College Center for Advising Services, faculty in every department and program, and many others are here to help you. During Orientation, you’ll meet with your premajor advisor to talk about your interests and complete the selection of your courses for registration. You will also have the opportunity to meet with faculty from across the College. After registration, some of you may choose to meet just a few times with your premajor advisor to talk about how your first semester is going, and others may decide to arrange five or six more meetings with your advisor. Ideally, you will schedule at least one appointment each semester with an academic advisor to discuss your academic goals.

\textbf{Pre-health Advising:} Students interested in an area of the health professions (i.e., medicine/dentistry, nursing, pharmacy) require specialized academic planning. Health Professions Advisors are available to assist students with their academic choices, with particular attention given to prerequisite courses. Students are encouraged to connect with Health Professions Advising early as their freshman year and can request to receive the Health Professions Advising Newsletter by sending an email with the subject line “listserv” to urhealthprofessions@ur.rochester.edu. Please see page 98 for more details and information on prerequisites.
Courses I am interested in:


Courses for the major(s) I am currently considering: (Spend some time reading the departmental advice for freshmen for the major(s) you’re contemplating. List the courses you’ll need to take during your freshman year.)


Advanced Placement and International Baccalaureate Exams: AP and IB award criteria, as you may have noticed, appear with the departmental information. Students are notified of credit by the College Center for Advising Services. Those wishing to discuss either AP or IB credit should contact that office. If you have taken any AP or IB courses, please list the subject and grade that you received on each exam (if known). Then, look up and record the placement information below.

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<th>AP or IB Exam</th>
<th>Score</th>
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(Note: The records of students with AP credit that is contingent upon the completion of a Rochester course are reviewed each summer so that credit may be awarded appropriately.)
College-level transfer credit: For the sake of coherence and uniformity of instruction, the College prefers that its entering freshman students take all their courses, basic and advanced, from its own faculty as much as possible. With the exception of CEEB Advanced Placement and International Baccalaureate work, the College does not recognize nor grant college credit for secondary school coursework or for courses taught in a secondary school by the secondary school’s own faculty for college credit.

Credit may be granted to entering students for prior coursework taught on the campus of an accredited college or university and completed with a grade of “C” or higher. Upon receipt of the official transcript, the coursework will be evaluated to determine if it is equivalent in level and/or content to coursework at the University of Rochester. Please note that transfer credit for a writing course does not, in itself, satisfy the primary writing requirement; see Course Placement Methods, Primary Writing Requirement and Placement, page 9. Note as well that students may apply transfer credit toward their graduation requirements. However, the College’s enrollment policy does not permit students to accelerate their graduation by more than one semester.

Students should have an official transcript sent to the College Center for Advising Services, 312 Lattimore Hall, University of Rochester, P.O. Box 270402, Rochester, NY 14627-0402. Please indicate below any anticipated college-level transfer credit.

Credit for courses taken at the University of Rochester: Students who have taken credit-bearing courses here while in high school, through the Taste of College program or otherwise, should be aware of the following. Grades for these courses will be factored into the cumulative grade point average, and credit will count toward undergraduate degree requirements. Students have the option of requesting that these courses be treated as if they were transfer courses, in which case the grade will be removed from the average, and credit will be counted toward degree requirements as long as the grade was a “C” or better. Petitions should be submitted to the College Center for Advising Services.

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<th>Name of college/university where course was taken</th>
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Course Placement Methods

Biology
Students interested in biology who do not have AP credits should enroll in the BIO 110 Principles of Biology I (fall and spring) and BIO 111 Principles of Biology II (spring) introductory course sequence.

Students with AP biology credit who received a 4 or 5 on their AP exam or an IB score of 7 may register for BIO 112 Perspectives in Biology I (fall) and BIO 113 Perspectives in Biology II (spring).

Students wishing to discuss their choices should attend the “Q & A” sessions and/or go to the biology table at the Academic Open House during Orientation or contact the instructor directly.

For more information on the similarities and differences between the BIO 110/111 and the BIO 112/113 intro biology course series, go to www.rochester.edu/college/BIO/UPBM/FreshmanAdvising.pdf.

To look up biology course instructor information, visit www.rochester.edu/College/BIO/UPBM/upbmcourses.htm.

Chemistry
Students interested in chemistry who do not have AP credit should select CHM 131. Students who have received a 4 or 5 on the AP exam are entitled to credit for CHM 131 and have several options available. Students may take the chemistry course in organic chemistry, CHM 171/173, or they may accept the credit and not take chemistry in the fall semester, with subsequent enrollment in CHM 132 in the spring semester, or they may waive the credit and enroll in CHM 131.

The department expects that some students will select each of these options, depending on their preparation in chemistry and their future interests.

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 or WRT 105A and B, versions 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. The substitute course may not also be used to fulfill the Upper-Level Writing Requirement. Transfer students who have completed a WRT 105 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/requirements/enteringfreshmen.html.

Students admitted to the College through the English for Academic Purposes Program fulfill the requirement by earning a grade of “C” or higher in WRT 103, EAPP Critical Reading, Reasoning, and Writing, and WRT 104, EAPP Research, Reading, and Writing. For more information on EAPP placement and courses, please refer to writing.rochester.edu/EAPP.

Foreign Languages
Modern language students with no previous exposure to a language should begin with the 101 course. Students with previous exposure to a language should check the language placement page provided through online orientation forms for instructions about taking a placement exam. For languages for which there is no online exam available, students should contact an advisor in the Department of Modern Languages and Cultures (Japanese), the Skalny Center (Polish), or the Department of Religion and Classics (Arabic, Greek, Hebrew, or Latin) 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 101–200, students are not permitted to register for a lower-numbered course after successfully completing a higher-numbered course. Students do not place themselves.

Mathematics
One of the primary factors conducive to success in mathematics is placement in the appropriate course. The Department of Mathematics uses a combination of SAT and ACT scores, AP calculus exam scores, and high school records to place students. Advanced Placement credit rules take precedence over SATs and ACTs. See the mathematics section of this handbook for more details on AP scores and placement.

For students placed in either MTH 140 or MTH 141 who wish to enroll in a higher course there will be a placement test offered at the beginning of the semester. See the placement web page www.math.rochester.edu/undergraduate/placement for more information regarding placement guidelines. Students believing they have special circumstances pertaining to their placement should fill out a petition form found at the placement web page. In case of discrepancy or questions, students are encouraged to speak with a representative of the mathematics department at the academic open house during Orientation.

Music
Students interested in registering for a music theory course should take the Theory Placement Exam given during Orientation. Results will guide the music faculty in determining appropriate placement into MUR 110 or MUR 111. Students who have taken theory courses previously, including AP courses, should make this known at the time of the placement exam.

Psychology
A score of 4 or 5 on the AP psychology test will result in 4.0 semester hours of credit and waiving of the requirement for Introduction to Psychology. To earn transfer credit, an introductory course must be taught at a college by regular college faculty. Courses taught in the high school will not be granted transfer credit.
Putting It All Together

Review what you’ve done so far and make a list here of the courses you want to consider this fall. Then, using the online Fall 2016 Course Schedule available at https://cdcs.ur.rochester.edu/ together with the Course Planning Form, begin building a few possible schedules that appeal to you, both in content and in structure. We recommend that you use a pencil, so you can easily change your mind and your schedule. Then, when you are ready, complete the online Course Planning Form and submit it with your other Orientation forms. (Remember, there will be many opportunities to discuss, clarify, and change courses at Orientation, but if you want help sooner, give us a call.) Most students register for four full-credit courses during their first semester, typically totaling 16–19 credits. In addition, first-semester students may choose to register for up to three additional credits of coursework.

Fall 2016

Preferred courses:

1. 
2. 
3. 
4. 

Other courses that interest you:

1. 
2. 
3. 
4. 
5. 
6. 

If you have any questions at all, please feel free to contact the College Center for Advising Services at (585) 275-2354, Monday through Friday, 9 a.m. to 5 p.m. or email us at cascas@rochester.edu. An advisor will be happy to answer any questions you may have. Please refer to our website at www.rochester.edu/college/ccas.
Once in college, you may at first feel that you have an extraordinary amount of time on a day-to-day basis. In fact, you do have a great deal of unscheduled time. The challenge is filling that schedule in a balanced and productive way. Just what will you have time for?

**A. Class time:** Please consider the amount of time that your coursework will require.

You will be in class an average of 12–18 hours per week. For every one hour in class, expect to spend two to three hours reading, reviewing lecture notes, doing library or lab-based research, writing essays or lab reports, working on problems, etc. That equals a time commitment of 36 to 72 hours per week—more than a full-time job!

**B. Co- and extracurricular activities:** Involvement in activities such as the arts, athletics, clubs, and cultural activities is an important part of a college experience. Look at the list of more than 230 clubs and organizations available online at the Campus Community Connection, ccc.rochester.edu, and list some activities that interest you. You should also plan to attend the Student Activities Fair offered during the first week of classes.

**C. Additional time commitments:** How many hours a week do you think you will spend in the following areas during your first semester?

- paid employment
- volunteering
- socializing
- commuting
- family obligations
- sleeping
- eating
- other

There are 168 hours in a week. How many have you accounted for?

A. Study and class  
B. Co- and extracurricular  
C. Additional

Total Time Commitments

(If you think you might be overwhelmed, we are here to help you. Assistance is available from your premajor advisor and, among other campus resources, the people in the College Center for Advising Services and the Center for Excellence in Teaching and Learning.)

**Your Orientation Materials**

Now you’re ready to complete and submit your orientation materials. All forms and information are available online at learn.rochester.edu. If you are having difficulties accessing the forms online, please contact the Orientation office at (585) 275-4414 or email orientation@rochester.edu.

**Have Any Questions?**

All of us who work with the orientation program are glad that you chose the University of Rochester. We look forward to working with you. Please use this space to write down questions you would like answered during orientation.
AFRICAN AND AFRICAN-AMERICAN STUDIES

“Conscience is to the individual soul and to society what the law of gravitation is to the universe.”
—Frederick Douglass
Rochester, New York (1850)

Information about the Program

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 education, advanced research, and scholarly exchange within the University community and beyond; it is the University’s focal point for African and African-American Studies, a scholarly field that speaks uniquely to the issues of diversity, diaspora, citizenship, race, and identity that continue to be among the most important faced by our nation and our world.

The undergraduate concentration in African and African-American studies (AAS) provides an interdisciplinary program of studies that includes a variety of disciplinary approaches 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. Courses are cross-listed in anthropology, economics, English, history, modern languages and cultures, political science, religion and classics, art history, women’s studies, dance, and chemical engineering. Students follow a rigorous and closely monitored concentration designed to provide both broad exposure to and in-depth knowledge of the field.

The AAS concentration—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, discipline-specific majors who find it an attractive, complementary option. Students majoring in engineering or the natural sciences may find a concentration in African and African-American studies an enriching opportunity as well.

Clusters

African-American Politics (S1AAS002)
This cluster is designed to deepen the knowledge of students concerning the African and African-American aspects of political science.

Aspects of History (S1AAS001)
This cluster is designed to help deepen the knowledge of students concerning African and African-American aspects of the discipline of history.

Economics and the African Diaspora (S1AAS003)
This cluster has been constructed to help deepen the knowledge of students concerning theoretical and empirical issues of development over time in economics, with special reference to African and African-American economic development.

Global and African Diasporic Studies (S1AAS005)
An exploration of topics and issues that are relevant to the knowledge of Africa and the African Diaspora (defined as peoples who can claim Africa as an important reference in their genealogy). This cluster emphasizes approaches that bridge existing gaps among different cultures, communities, and countries that make up the African Diaspora.

Race and Social Issues (S1AAS004)
This cluster looks at issues from a double racial and social approach, emphasizing the need to consider race and class status as fundamental reading parameters in exploring texts, films, and cultures.

Representation and Leadership (S1AAS006)
This cluster explores emblematic figures who inspire social and political movements in the United States, Africa, and the African Diaspora.

Visual and Literary Arts of the Diaspora (H1AAS001)
This cluster seeks to educate students about the significance of visual arts and literature in the lived experience of the African Diaspora.

Note: Unless otherwise noted, all clusters require at least 12 credits.

Courses

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

AAS 106 Colonial and Contemporary Africa. This course takes a broad view of African history from the late 19th century to the present. Themes covered include the nature of European colonial domination, African resistance, the neocolonial state, and the World Bank’s agenda for the continent before and after the end of the Cold War. Through movies and novels, students also explore such developments as transformations in gender, peasants and the cash-crop revolution, and the emergence of a new working class. Same as ANT 248 and HIS 106. (Fall)
AAS 110 Introduction to African-American Studies. Drawing on the disciplines of history, anthropology, and psychology, this course introduces students to the interdisciplinary approach to the examination of the black experience in America. Same as HIS 110. (Spring)

AAS 122 History of Jazz. This study of jazz as an American musical art form is structured around the lives and music of jazz musicians across a range of instrumental, vocal, and ensemble genres. Less a strictly chronological approach, this course focuses first on jazz titans, those individuals and musical groups distinguished by their seminal and permanent influences, either with long tenures such as Louis Armstrong, Miles Davis, or Coleman Hawkins or with shorter but intense careers, such as Charlie Parker. Integrated with the jazz titans is consideration of the music of other important jazz musicians whose contributions are essential to helping shape and inform the vast jazz landscape of the 20th century. Blues, ragtime, swing, bebop, cool, progressive, and free jazz are landmark terms that help define that landscape. The influence of jazz on composers in European "classical" traditions also is considered. And, finally, study of the musical history is enhanced by considerations from sociological, linguistic, and philosophical perspectives. This course is designed for students with little or no musical training; simple, technical musical vocabulary and concepts are provided. Prerequisites: none. Same as HIS 179 and MUR 122. (Fall)

AAS 141 African-American History I. This course considers the cultural and political development of Africans in America from the 17th century to the end of the 19th century. Same as HIS 165. (Fall)

AAS 151 The Blues. The course is about the history and influence of the music known as "the Blues." The course covers development of the blues from the earliest practitioners to recent developments. Same as REL 151. (Spring)

AAS 157 Introduction to African Religions of the Diaspora. This course introduces students to the development of African religions in the Americas, Caribbean, and Canada. Religious traditions such as Africanized Christianity, Santería, Candomblé, Vodun, and Spiritual Baptists are explored. The course not only provides students with a historical overview of each tradition, but it also explores theological frameworks, doctrinal principles, and ritual activities related to each tradition. Class format includes lectures, discussions, and films. Same as REL 156.

AAS 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, and music of the praise-and-worship genre. Students may register for credit or simply sing as choir participants. (1 credit) Same as MUR 158. (Fall and Spring)

AAS 168 West African Drumming Advanced. At least one semester of previous enrollment in the Introduction to West African Percussion Ensemble. In this course, students work on expanding their repertory of rhythms from Guinea, West Africa, and on improving their playing technique on the djembe, dunun, sangban, and kenkeni. In particular, we concentrate on learning extended solo sequences for the djembe and more advanced arrangements played on the dunun, sangban, and kenkeni. Students also work on developing skills specific to performance, adding choreographed onstage movement to complement their drumming. Prerequisite: at least one semester of previous enrollment in the Introduction to West African Percussion Ensemble. Same as MUR 168. (Fall)

AAS 170 Religion and Hip Hop Culture. This course considers an often overlooked element in the study of hip hop culture—religion. Specifically, the course offers students the opportunity to examine the variety of ways that religion finds expression in the dynamic cultural medium of hip hop. Class format includes lectures, discussions, films, and video/music presentations. Same as REL 170. (Fall)

AAS 175 Environment and Food Security in Africa. This course introduces key issues in the relationship between the environment and food security in Africa. Topics include population pressure, land alienation, cash-crop agriculture, new markets, and their impact on the ability of African farmers to manage their ecosystems. Same as HIS 175. (Spring)

AAS 185 African-American Religious History. Historical survey of religions as practiced by people of African descent living in North America. Christianity, Islam, and African-derived religions are examined. Through its canvassing of doctrinal and ritual frameworks, students are afforded an opportunity to view the diverse and complex terrain of African-American religion. Class format includes lectures, discussions, and film/music.

AAS 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. Same as HIS 201. (Spring)

AAS 210 American Culture. At the heart of this course is the question: What are some of the critical debates that dominate American culture? The course focuses on major debates that occupy American public life in areas such as politics, religion, health, and the media. Using anthropology's cross-cultural perspective, we explore some core cultural principles that underlie current debates in various spheres of public life. Same as ANT 245. (Spring)

AAS 216 Topics in African and African-American Life and Culture. The primary goal of this course is to provide an introduction to the interdisciplinary approach to the study of issues in African and African-American life and culture. Students attend talks given by visiting speakers, meet, discuss, and respond to issues raised. (Spring)

AAS 221 Birth and Death I: Vital Events in Our Personal Lives. How do human beings experience, make sense of, cope with, and shape birth 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. Same as ANT 218, WST 217, PM 407. Permission of instructor required for freshmen. (Fall)
AAS 222 Music, Ethnography, and HIV/AIDS. Addressing the devastating effects of HIV/AIDS in the United States, United Kingdom, Tanzania, Zimbabwe, Uganda, Haiti, and elsewhere, this uniquely interdisciplinary course incorporates insights from the fields of public health, medical anthropology, and ethnomusicology. Studying the HIV/AIDS epidemic through the lens of musical expression, we ask how individuals and communities affected by HIV/AIDS have mobilized musical sound in response to the disease. Topics addressed within the class include musical representations of HIV/AIDS within queer communities; the use of music in public health campaigns to raise awareness about the disease; and the mobilization of musical performance within grassroots support groups for individuals affected by HIV/AIDS. (Spring)

AAS 228 Race and Ethnic Politics. In this course, we examine the key role played by race and ethnicity across various facets of American political life. We explore the distinct political and social identities of African Americans, Latinos, Asian Americans, and others and how these identities translate into contrasting political beliefs and different political actions. Other topics include the interaction between race and ethnicity and employment, health policy, access to criminal justice, and educational inequalities. Readings draw upon political science, law, economics, sociology, and public health. (Spring)

AAS 232 Post-conflict Justice. This course explores critically how societies use a variety of legal mechanisms to achieve justice in the wake of political violence. We use anthropological approaches to explore critically the ideology behind these “transitional justice” mechanisms and their diverse impacts in specific contexts around the world, focusing particularly in Africa. What is the relationship among rule of law, political stability, and peace? How do legal solutions balance local realities, cultural norms, and customary law with universal standards of law and human rights? How do legal solutions define peace and justice, truth and punishment, and manage tensions between them? Whose voices are valorized or silenced in these debates? (Spring)

AAS 239 Spiritualism in America. The primary aim of this course is to explore the historical development and structural make-up of modern American Spiritualism. This course offers students a historical narrative that ranges from the early development of modern Spiritualism in upstate New York to current forms, such as African-American Spiritual churches of New Orleans. In addition to this historical survey, the course examines major principles making up the framework of modern Spiritualism in America. Class format includes lectures, discussions, films, and field trips. Same as REL 239. (Fall)

AAS 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 of 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. Same as FR 243. (Fall)

AAS 246 Cry Freedom. The principal ideas of various liberation theologians—Latin American, Asian, African, Afro-American, and feminist. We 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. Same as REL 234. (Fall)

AAS 252 Economics and Society of Latin America and the Caribbean Since 1492.* The main thrust of the course is an attempt to provide an historical explanation for the general problem of material poverty and the attendant socio-political 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 postcolonial period (which differs from one country to another) is examined in the context of the inherited socio-economic structures of the colonial period and the changing conditions in the evolving modern world system. Same as ECO 252, HIS 203. (Fall)

AAS 253 Economic and Social Conditions of African Americans in the 20th Century.* Study of selected topics concerning the conditions of African Americans in the United States during the 20th century. Topics include education, incomes, housing, family patterns, etc. Same as ECO 253W, HIS 255. (Fall)

AAS 254 West African Dance Forms I. The objective of the course is to give students an experience in West African dance. We both dance and research the historical development of performing and cultural arts in postcolonial Ghana and Guinea. These cultural practices stem from a rich history pertaining to environment, identity, and cross-cultural perspectives. Aesthetic qualities of African dance are explored through video, readings, and performance. This course culminates in a final departmental showing that is choreographed during class. Same as DAN 181. (Fall)

AAS 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 19th-century Americans’ understanding of what it meant to be free and a citizen. Same as HIS 247. (Fall)

*Consultation with advisor and instructor strongly recommended for freshmen prior to registration for course.
AAS 280 Madness and Post-Colonial Literature. This course explores 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 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. Same as FR 472. (Spring)

For More Information
Please visit the African and African-American studies program website at www.rochester.edu/college/aas/ or contact the Frederick Douglass Institute at (585) 276-5744 or email fdi@mail.rochester.edu.

AMERICAN SIGN LANGUAGE

Without diversity of culture, language, and different ways of seeing the world, we would never have learned what we now know about the different ways that humans live. The linguistic and social lives of deaf people have provided us with unique and valuable ways of exploring the vast potential for human language and culture.

—Padden and Humphries
Inside Deaf Culture (2005)

Information about the Department
American Sign Language (ASL) is the native language of many Deaf Americans. It is a natural language that is at the core of a cultural and literary tradition. As a distinctive language, the study of ASL raises many important scientific questions about the true nature of all human languages.

The ASL Program offers a major and a minor in ASL, with courses in its literature and historical tradition as well as in the linguistics and psycholinguistics of signed and spoken languages. The BA degree in ASL provides an excellent educational foundation for diverse careers or for graduate study in a wide range of fields, including linguistic research, medicine, counseling, government administration, community service, deaf education, and interpreting.

Rochester’s large Deaf community offers students many opportunities to learn and use ASL outside of the classroom. Students can participate in the University of Rochester student-run ASL Club activities and attend theatrical events and lectures in the Rochester community.

Departmental Advice for Freshmen
Students planning to major in ASL should take ASL 101 and 102 in their freshman year, followed by ASL 105 and 106 in their sophomore year. As the ASL 106 class level is the prerequisite for the 200-level classes, the sooner a student begins taking ASL classes, the better. One or two elective classes, such as LIN 110, should also be completed in the first two years. We recommend taking ASL language courses in a continuous sequence, because a semester without using ASL can weaken students’ signing skills, making it difficult to advance to the next level.

Placement for Students with Existing ASL Skills
Students entering the program who have previously studied ASL should contact the ASL Program Office (273-5165 or asl@rochester.edu) to set up an ASL skills evaluation. This is an informal meeting with one of our senior lecturers, who will assess your language skills and recommend the class that will best fit your needs.

Clusters
The ASL program’s most popular cluster is Humanities Cluster H1ASL001, Basic Proficiency in American Sign Language, which includes ASL 101, Beginning ASL I; ASL 102, Beginning ASL II; and ASL 105, Intermediate ASL I.

The ASL program offers two other clusters that require advanced ASL skills.

Courses
ASL 105 Intermediate American Sign Language I. The third in a sequence of courses, this course focuses on further development of conversational skills in ASL. Students acquire and expand different conversational strategies and increase ASL vocabulary. Grammatical principles and functions are emphasized. Appropriate cultural behaviors and conversational regulators in ASL continue to be an important part of class. Information on Deaf Culture/history is expanded. Experience with the local Deaf community is required. Prerequisite: ASL 102 in the immediately preceding semester or permission of the instructor. (Fall, Spring)

ASL 106 Intermediate American Sign Language II. The fourth in a sequence of courses, this course focuses on further development of conversational and narrative skills in ASL. Students learn and expand different conversational strategies and increase ASL vocabulary. An introduction to analysis of grammatical principles and
functions is included. Appropriate cultural behaviors and conversa-
tional regulators in ASL continue to be an important part of class.
Experience with the local Deaf community is required. Prerequisite:
ASL 105 with a grade of B or better in the immediately preceding
semester or permission of the instructor. (Fall, Spring)

ASL 203 Advanced ASL. The fifth in a sequence of courses,
this course is designed for the advanced study of ASL. It provides
students with the opportunity to increase their ASL expressive
competence and to use ASL in a variety of discourse and narrative
settings. Skills to be developed are storytelling, semantic awareness
analysis, indepth exploration of ASL grammar and complex uses of
space, ways of making transitions between ideas, use of classifiers,
and determining appropriate perspective in specific texts. Experience
with the local Deaf community through interviews is required.
Satisfies the upper-level writing requirement. Prerequisite: ASL 106
with a grade of B or better in the immediately preceding semester or
permission of the instructor. (Fall)

ASL 205 Art of Translation: ASL and English. This course
explores the meaning of translation, practices various translation
methods, and analyzes both written English and recorded ASL texts,
with a focus on the analysis of English texts and the development of
ASL translations. Extensive discussion of various types of texts and
the factors that must be considered when preparing an accurate ASL
or English translation contribute to students’ translation work. Satis-
fies the upper-level writing requirement. Prerequisite: ASL 106
with a grade of B or better or permission of the instructor. (Spring)

For More Information
Please visit the American Sign Language program website at
www.asl.rochester.edu.

AMERICAN STUDIES
(MULTIDISCIPLINARY STUDIES CENTER)

American Studies is a great choice for anyone interested in a broad
education in the humanities and social sciences.

Information about the Program

The American studies program offers students the opportunity to
examine American history, culture, and social life within an inter-
disciplinary framework. This approach, drawing on faculty members
in departments such as English, art and art history, political science,
classics, religion, 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 institu-
tions 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. Students may also minor in
American studies.

Program Advice for Freshmen

Freshmen should be aware that American studies is a very flexible
major, allowing students to count toward its requirements virtually
all of the courses in the College that deal with the United States. The
courses fit into three tracks: the Arts in American Culture, Identity
and the American Nation, and American Thought and Institutions.
In many of the participating disciplines, freshmen need not be lim-
ited to 100-level courses; students should check with departmental
advisors and individual instructors or consult the program director
to find out if a particular 200-level course is appropriate for them.
The courses listed below do not exhaust the list of possibilities for
freshmen. All American studies students receive close advising from
the program director and the Multidisciplinary Studies Center to
ensure a personalized course of study.

Courses

REQUIRED SEMINAR

AMS 200 Idea of America. What is America? A country? A
continent? A political ideal? A culture? This course traces the
development of ideas about America, from its historical beginnings
to our own time, from European fantasies about the New World and
its possibilities to the experiences of settlers and citizens facing its
realities. We explore the competing and even contending narratives
of America in a wide variety of cultural documents, from orations,
sermons, and political tracts to novels, poems, photographs, and
films. The course is open to all interested students and required for
all American studies majors. (Spring)

SPECIALIZATION TRACKS

The Arts in American Culture

MUR 122A/AAS 122/HIS 172 History of Jazz. This study of jazz
as an American musical art form is 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, and Coleman
Hawkins—or by short, 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 of jazz is 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 are provided. Reading, listening assignments, brief written assignments, and two exams. Prerequisites: none. (Fall)

**Identity and the American Nation**

**REL 170/AAS 170/MUR 140 Religion and Hip Hop Culture.**
This course considers an often-overlooked element in the study of hip hop culture: religion. Specifically, the course offers students the opportunity to examine the variety of ways that religion finds expression in the dynamic cultural medium of hip hop. Class format includes lectures, discussions, films, and video/music presentations. (Fall)

**WST 105/HIS 188/REL 115 Sex and Power.** This course is an introduction to the interdisciplinary scholarship of gender, sexuality, and women's studies. As a survey course, this class is designed to give students from diverse backgrounds and disciplines a basic understanding of debates and perspectives discussed in the field. We use gender as a critical lens to examine some of the social, cultural, economic, scientific, and political practices that organize our lives. We explore a multitude of feminist perspectives on the intersections of sex, gender, sexuality, race, ethnicity, class, religion, and other categories of identity. In this course, we interrogate these categories as socially constructed while acknowledging that these constructions have real effects in subordinating groups, marking bodies, and creating structural, intersectional inequalities. (Fall)

**American Thought and Institutions**

**HIS 160 United States History to 1865.** A survey of the history of the North American continent from its peopling and colonial rivalry to the founding of the United States, its development, and eventual Civil War. Topics include international competition, economic growth, the role of slavery, and political conflict. (Fall)

Many departments that contribute to the interdisciplinary American studies major offer courses that are appropriate for first-year students. Students should check with departments if they are interested in 200-level courses not listed here.

**Spring Semester**

For further information on spring course offerings, please visit the American studies web page.

**For More Information**

Please visit the American studies program website at www.rochester.edu/college/msc/americanstudies.html.

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**ANTHROPOLOGY**

“Never doubt that a small group of thoughtful, committed citizens can change the world: Indeed, it is the only thing that ever has.”

—Margaret Mead

**Information about the Department**

Anthropology is the comparative study of humanity. The Department of Anthropology at the University of Rochester specializes in cultural anthropology, which specifically examines the diverse languages, social relations, and cultural meanings that humans have developed. Anthropology courses explore the concepts and methods that anthropologists use to understand contemporary social issues and cross-cultural variations in human experience. Students address questions of race, class, and gender and engage with current thinking about the future of cultural diversity in a globalizing world.

No two students have the same experience in the anthropology concentration. Undergraduate majors are encouraged to develop their own special interests through a broad selection of electives, independent study, internships, community research, summer field schools, and study abroad. Many courses include opportunity for hands-on research. Faculty members have conducted fieldwork in Brazil, China, Honduras, India, Indonesia, Israel, South Korea, Nepal, the Philippines, Papua New Guinea, Rwanda, and the United States—providing a vast range of experience and expertise for students to utilize.

**Departmental Advice for Freshmen**

Cultural Anthropology (ANT 101) provides an overview of the discipline and is the most common starting point for students interested in the program. The department also offers several introductory courses intended primarily for freshmen and sophomores in addition to a variety of electives that are open to first-year students. Students considering a concentration in anthropology should take ANT 101 during their freshman year, followed by ANT 201 in the spring of the freshman or sophomore year.

Anthropology is one of the most flexible social science degrees there is. Common careers for majors include nonprofit and NGO work, advertising, market research, and consulting. Many others enter graduate programs in medicine, law, or public health. Because anthropology majors build generalizable skills like critical
thinking and analysis, cross-cultural and interdisciplinary comparision, and the ability to design and conduct research, they are suited to successfully pursue a variety of careers—wherever interests may lie or develop.

**International Baccalaureate (IB)**

Social Anthropology—Students who receive a higher-level exam score of 6 or higher are awarded credit for ANT 101 after completion of any other course with a grade of C or better. No credit is granted for subsidiary-level exams.

**Clusters**

The department offers four different clusters: Interpretation of Culture, Social Analysis, Anthropology of Globalization, and Medical Anthropology.

**Courses**

**Introductory Courses**

**ANT 101 Cultural Anthropology.** This course introduces students to the distinctive ways in which cultural anthropologists do field research and write about it. Students are asked to think critically and comparatively about matters such as kinship, politics, and religion, and to consider the fate and value of cultural diversity in a world connected by global movements of people, money, media, and technologies. This class is required for the anthropology concentration. (Fall and Spring)

**ANT 102 Introduction to Medical Anthropology.** This course explores anthropological interpretation, research, and writing on the ways different peoples understand and deal with issues of illness and disease. (Fall)

**ANT 104 Contemporary Issues and Anthropology.** This course explores the complex interrelation 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. (Irregularly)

**Electives Open to First-Year Students**

Below is a sampling of electives offered in Fall 2016. Elective offerings change every semester. More cross-listed electives are available through other departments.

**ANT 235 The Black Body: Intersecting Intimacies.** In the United States, popular cultural understandings of race have often located blackness within the body: in DNA, in blood, in skin, in hair texture, in facial features. How does race get mapped onto the body? In this interdisciplinary course on race and embodiment, students will think critically about how black bodies “matter” in the contemporary United States and explore how blackness intersects with other social categories, such as gender and sexuality, at the site of the body—all while investigating how these categories are socially constructed and can and should be troubled, blurred, and contested in the practice of social life.

**ANT 246 Anthropological Approaches to Gender and Sexuality.** This course examines gender as a key component of social, economic, and political life. How are economic processes, political discussions, and intimate practices constrained by cultural ideas about gender and sex? How does gender intersect with race, class, and ethnicity? How is gender related to sexuality, bodies, and selves? While many of our discussions are focused on the United States, we also examine several ethnographic examples from outside the contemporary western world that challenge the universality of our conceptions of gender and sexuality.

**ANT 257 Chinese Society After Mao.** This course adopts an anthropological approach toward understanding the dramatic socio-cultural transformations that have followed in the wake of China’s post-Mao economic reforms. What happens when a society officially committed to economic and gender equality witnesses the rise of stark social divisions? Such issues as the creation of a market economy, the rise of new social classes, rural to urban migration, changing ideologies of gender and sexuality, new attitudes toward education and work, transformations in family life, religious revival and conversion, and the influences of global popular culture and mass consumption are examined, with an eye toward identifying both continuities and departures from the Maoist era. Throughout our discussions we consider the implications of these changes for China’s political, social, and economic futures.

**ANT 284 Anthropology of Tourism.** The anthropology of tourism explores travel as a cultural practice and the impacts of tourism on both host and guest communities. The course examines these issues through ethnographic case studies and practical examples as well as readings on the major theoretical frameworks for the study of tourism.

**Core Courses**

These courses comprise the theoretical foundations of anthropology, and each is usually offered once per academic year. Majors must take ANT 201 and at least two others.

**ANT 201 Theory and Method in Anthropology.** A survey of major developments in anthropological thought. This class explores the relationship between sociocultural theory and the methodologies used by anthropologists to conduct ethnographic research—such as participant observation (fieldwork), interviewing, and various writing strategies. Prerequisite: ANT 101 (Spring)

**ANT 202 Modern Social Theory: Key Texts and Issues.** A close textual analysis of four authors who established the framework of modern social theory—Adam Smith, Karl Marx, Max Weber, and Sigmund Freud—and how contemporary social scientists use their work. (Fall)

**ANT 203 Ritual, Myth, and Cosmology.** A survey of the major anthropological approaches to the study of life-cycle rituals, origin myths, witchcraft accusations, animism, and altered states of consciousness, such as spirit possession and shamanism. The course culminates with a critical examination of the recent “ontological turn” in anthropology.
ANT 204 Ethnographic Themes. This course is a critical study of the role ethnographic texts play in posing and answering questions about human culture and society. This study may take the form of intensive readings on a particular society or area, or an extensive survey of ethnographic “classics” and their critics. (Fall)

ANT 205 Theories and Debates in Anthropology. This course is an examination of contemporary and historical debates that have shaped theory and method in cultural anthropology.

For More Information
Please visit the anthropology program website at www.rochester.edu/college/ant/.

ARCHAEOLOGY, TECHNOLOGY AND HISTORICAL STRUCTURES
(MULTIDISCIPLINARY STUDIES CENTER)

Octagonal room of Nero’s Domus Aurea, Rome (A.D. 64–68)
Results of the engineering structural analysis of the concrete dome are superimposed to the interior view of the room.

Information about the Program
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 BC to the 18th century. A prominent feature of the program is optional undergraduate research under the aegis of both the University of Rochester and prestigious foreign academic institutions to address issues of interpretation, conservation, and restoration of the world’s cultural heritage.

Program Advice for Freshmen
This program is designed for undergraduate students interested in the humanities (archaeology, architecture, art history, classics, history) with a desire for critical insight into the material culture and technology of preindustrial societies; in mathematics or natural sciences with a desire to study the impact of technology on ancient and preindustrial cultures; or in an interdisciplinary engineering field emphasizing technology, design, materials, structures, and architecture in the context of historical monuments. Students may pursue Track A, a course-based path requiring 11 courses, or Track B, a research-based path comprising nine courses plus an 8-credit senior project (subject to faculty approval). The major offers pathways in (1) engineering, (2) archaeology and architecture, (3) history, and (4) science, technology, and society. Foundation courses provide basic competencies in engineering structural analysis, archaeology, and architectural history common to all pathways. Depending on course selection, the major may be designed to satisfy any of the three divisions of the College: Humanities, Social Sciences, or Natural Sciences/Engineering as well as to prepare students for graduate studies in archaeology, architecture, civil or mechanical engineering, art history, classics, or history. This is not a professional program in engineering or in architecture and does not prepare graduates for licensure in either of those professional areas.

Courses

Fall Semester

Foundation Courses
ME 104 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 in 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.

AH 188 Cities and Urbanism in Pre-Columbian Mesoamerica and the Andes. The discipline of archaeology can make unique contributions to our understanding of urbanism and daily life given its ability to examine long-term processes of development and change. The goal of this course is to provide an introduction and overview of urbanism as exemplified by the indigenous cities of the New World (e.g., Mesoamerica and South America). While regional differences are discussed, we focus mainly on identifying the theoretical issues that intersect all of the regions we study.
**Core Courses**

**AH 114 Creating Architecture.** Buildings are among the most public, visible, and long-lived artifacts that a culture creates. The built environment both serves as a repository of cultural information and exerts an influence that extends beyond the society that created it. This introductory course explores a visual survey of architecture from ancient times to the present day using a slide lecture and discussion format that invites each student to participate in the discourse of the class. The studio portion of this course provides students an opportunity to create their own structures from sketch to three-dimensional pieces exploring basic design elements and materials. No prior studio experience is necessary. Students are expected to purchase basic tools used in this course. A materials supply list is provided at the first class. Students are expected to pay the $50 studio fee to cover the use of shared supplies and equipment. To be added to the wait list, please email stephanie.ashenfelder@rochester.edu.

**AH 251 Prehistory of Ancient Peru: The Incas and Their Ancestors.** From Machu Picchu to the geoglyphs on the Nasca Desert, the Andean region of South America has a long and rich pre-Columbian history. This course surveys the archaeological approaches to understanding the development of Andean cultures that range from hunter-gatherers to the Inca Empire. Some of the prehistoric cultures we examine include Caral, Chavin, Nasca, Wari, and the Inca. This course also discusses plant and animal domestication, inequality, gender, ceramics, urbanization, and the rise and fall of states and empires.

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

**HIS 102 The West and the World to 1500.** While exploring the history of Europe and its neighbors from the ancient to the medieval period, this course focuses on how people borrowed from, adapted, and reconciled various ideas to suit their own needs to form, over time, a coherent set of cultural values. To this end, we consider several themes throughout the semester, including changing models of political organization, ideas of individual rights and responsibilities, attitudes towards women and “outsiders,” and understandings of nature and of divine power.

**HIS 180 History of Technology.** This course surveys the history of technology and its impacts on agriculture, communication, transportation, housing, health, war, and society. Technology has been used not only to build empires and improve human societies but also to destroy, enslave, and censor. Today we face limits on technology as well as new and seemingly boundless opportunities for the future. The unifying theme of the course is exploring and understanding the impact of technology on individuals.

**Spring Semester**

**Foundation Courses**

**CLA 221 Classical Archaeology: Roman Art and Archaeology.** This course examines 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. Covering a span of time from the ninth century BC through the fifth century AD, we first look at the Etruscan background to Roman civilization; we then trace the development of art and architecture in the city of Rome, with a particular emphasis on the monuments in the city during the period in which Rome was the capital of a vast empire. Along the way, we also examine evidence from other sites around the Roman Empire, such as Ostia, Pompeii, and Constantinople.

**Core Courses**

**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 preindustrial world drawing material from case studies of relevant monuments mainly from the classical world, medieval Europe and pre-Hispanic America. Prerequisites: either ME104Q or ME106 or permission of the instructor.

**For More Information**

Please visit the archaeology, technology and historical structures program website at www.rochester.edu/college/ATHS/index.html.

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**ART AND ART HISTORY**

“... in denying artists their rightful place in the public consciousness, we are in fact negating the most creative part of ourselves individually and collectively and in so doing are also damming our future to one without experimentation and the vision needed to give it meaning.”

—Carol Becker (1997)

“The Artist As Public Intellectual”
**Department Overview**

The Department of Art and Art History is dedicated to liberal education in the creation and historical study of the visual arts. Our offerings combine theory and practice and deploy interdisciplinary historical and conceptual frameworks across a wide range of interpretative techniques and forms. Undergraduate majors, minors, and concentrations in art history, visual studies, and studio art are available.

Through our undergraduate degree program in studio arts, students explore form, space, and function using traditional media and new technologies. Studio students may take courses in a variety of media, including painting, printmaking, sculpture, photography, and video.

Art history and visual studies students pursue courses in history and theory across visual media. In art history, students study the history of painting, sculpture, architecture, and other art forms from antiquity to the present covering a wide range of traditions and geographical regions across the world.

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.

**Studio Arts Program**

The studio arts program of the Department of Art and Art History focuses on the production, exhibition, and analysis of art. The facilities in Sage Art Center provide access to all the materials, supportive resources, faculty, and staff necessary for a rich studio experience. Our program is focused on contemporary approaches to art production and strives to produce technically adept students with an understanding of art’s place in the world. Our program of study invites, accommodates, and engages individuals with little or no previous art experience. It also provides a rich environment for thoroughly intensive study.

Studio art majors are vital participants in the activities of the department and the art community in general. Majors are expected to establish a presence at Sage Art Center that promotes an environment conducive to rich, creative art production. By the senior year, majors should be seen as valuable resources for the students in all introductory-level courses. While our introductory-level courses provide a foundation built on more prevalent art media—such as photography, painting, sculpture, video, collage, and drawing—the advanced-level courses make available the experimental and interdisciplinary approaches often utilized in contemporary art production.

**Departmental Advice for Freshmen**

At Sage Art Center, our 100-level courses provide a foundation for art media such as photography, painting, sculpture, video, and drawing, our 200-level courses make available the experimental and interdisciplinary approaches often utilized in contemporary art production. Advanced studio courses focus on interdisciplinary approaches, allowing students to expand their artistic expression to incorporate other interests and disciplines. Because studio class size is limited, first-year students should contact the department to enroll in courses.

Courses in art history are designed to give students an understanding and appreciation of works of art, individually, in relation to each other, and in their social and historical contexts. Introductory courses cover broad historical periods and serve to introduce the methods and problems of art history. They are useful to both first-year and upper-class students who want a general overview.

Sophomores, juniors, and seniors, as well as first-year students who have had a course in art history or some other relevant preparation, may begin taking art history courses at the 200 level, as well as the 100 level. The 200-level courses offer similar introductions but in much more defined areas. These are useful cognate courses for those students studying a specific period or culture in another discipline and are also the building blocks for any major or minor within the department. Seminars are indicated by the 300 level and are open to advanced students from other disciplines as well as to art history majors.

**International Baccalaureate (IB)**

Visual Arts—Students who receive a higher-level exam score of 6 or 7 are awarded up to four credits in studio arts upon completion of a 100-level course with a “B” or better.

**Advanced Placement (AP)**

If students receive a score of 4 or 5 on the Art History AP exam, credit is awarded after consultation with the department. Four advanced placement credit hours (with a score of 4 or 5) can be granted if a “B” or higher is earned in any 100-level studio course.

**Clusters**

Students whose major is in the social sciences or natural sciences and engineering divisions are invited to pursue a cluster in art and art
history. A brochure of our clusters is available in the departmental office. All studio and art history courses are included in at least one cluster. Be sure to check with the department directly.

Courses

Art History
For course updates, go to www.rochester.edu/college/aah/courses/ah.html.

Studio Art
(A supplies fee of $50 is charged for each course.)
For course updates, go to www.rochester.edu/college/aah/courses/sa.html.

For More Information
Please visit the art and art history program website at www.rochester.edu/college/aah/.

AUDI0 AND MUSIC ENGINEERING

“Imagine. Explore. Create.”

Information about the Major

The audio and music engineering (AME) major combines studies in engineering and applied sciences with music and audio production to give students a technically rigorous, design-based education in the field of audio, music, and sonic engineering. The curriculum is built on a foundation of basic math and science and integrates elements of music, audio content production, acoustics, fundamental engineering science, signal processing hardware and software, electronics, and software engineering. Through a series of design and project courses integrated with their other coursework, students build a project portfolio throughout their studies capped by a senior design project. The bachelor of science in AME (BS AME) is offered.

Departmental Advice for Freshmen

The major requires completion of courses and portfolio projects in five subject areas: recording arts and sound design, acoustics, audio electronics, signal processing, and software design. The curriculum provides a broad education in the basics of audio and music engineering as well as in-depth studies and design experiences. Once completing the baccalaureate degree, our graduates are prepared to enter the field or pursue further study at the graduate level. Entering students with an interest in pursuing the AME program are assigned faculty advisors to help with academic program planning throughout their four years of studies.

Typical Freshman Year Program

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<td>MTH 161 or MTH 141</td>
<td>MTH 162</td>
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<tr>
<td>WRT 105</td>
<td>ECE 114</td>
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<tr>
<td>AME 140</td>
<td>PHY 121</td>
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<tr>
<td>Elective (cluster or Natural Science)</td>
<td>AME 191</td>
</tr>
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Courses

AME 140/EAS 103 Introduction to Audio and Music Engineering. The course provides an introduction to the science and technology of audio. Students learn about the vibration of strings, musical tuning systems, overtones and timbre, and modes of oscillation through the concept of a guitar. Fourier analysis, transducers, passive electrical components, and circuits are introduced when discussing amps and audio components. The class utilizes hands-on projects to introduce the fundamental concepts of electronics, including voltage, current, resistance and impedance, basic circuit analysis, ac circuits, impedance matching, and analog signals. The course then moves on to introduce basic digital signal processing concepts using Arduinos and Pure Data to learn about conversion of sound to digital format, frequency analysis, digital filtering and signal processing, and musical sound synthesis.

For More Information
Please visit the electrical and computer engineering website at www.ece.rochester.edu/major-minor-major_ame.html.
“Biology was the glamour science of the second half of the 20th century, just as physics was the glamour science of the first half. What is glamour science? It is one that captures the public interest and serves it well. No other science has contributed as much to our understanding of ourselves (evolution and development), our relationship to our planet (ecology), or offers more promise for improving the quality of human life in the 21st (genetics, molecular medicine, genetic engineering).”

—Martin A. Gorovsky
Rush Rhees Professor of Biology

BIOLOGY AND BIOLOGICAL SCIENCES

“Biology was the glamour science of the second half of the 20th century, just as physics was the glamour science of the first half. What is glamour science? It is one that captures the public interest and serves it well. No other science has contributed as much to our understanding of ourselves (evolution and development), our relationship to our planet (ecology), or offers more promise for improving the quality of human life in the 21st (genetics, molecular medicine, genetic engineering).”

—Martin A. Gorovsky
Rush Rhees Professor of Biology

Information about the Department

Through direct observation and experimentation, biologists study living systems and how organisms interact. An exciting program in the biological sciences is available to undergraduate students at the University of Rochester. This program in the College and the School of Medicine and Dentistry provides more than 64 courses for undergraduate students, including lectures, laboratories, specialty seminars, and teaching and research experiences.

The BS in biological sciences, with seven tracks available in modern areas of biology, makes it possible for students to concentrate in specialized fields of study, including biochemistry, cell and developmental biology, computational biology, ecology and evolutionary biology, microbiology, molecular genetics, and neuroscience. For more information on specific major requirements, visit www.rochester.edu/college/bio/undergraduate/academics/majors.html. In addition, there are many opportunities for undergraduates to become directly involved in biological research with well over 200 faculty located on the River Campus and in the Medical Center. For more information on how to get involved in research, visit www.rochester.edu/college/bio/undergraduate/research/index.html.

Departmental Advice for Freshmen

The BA in biology and the seven BS curricula offered by the Undergraduate Program in Biology and Medicine require the same introductory coursework:

- BIO 110 Principles of Biology I or BIO 112 Perspectives in Biology I
- BIO 111 Principles of Biology II or BIO 113 Perspectives in Biology II or BIO 115 Intro to Organismal Evolutionary Biology
- BIO 190 The Human Genome or BIO 198 Principles of Genetics

Undergraduates preparing to major within the biological sciences would normally start this sequence in their freshman year by registering for BIO 110 or 112 in the fall, BIO 111 or 113 or 115 during the spring semester, and then taking either BIO 190 or BIO 198 in the fall of sophomore year.

Intended biology majors usually begin their required coursework in chemistry in addition to their biology coursework during the fall semester of freshman year. Calculus courses may be delayed for one or two semesters if a freshman feels that three courses in science may be too intensive.

Please note that BIO 110 is offered both in the fall and spring semesters. Intended biology majors are advised to take BIO 110 in the fall of freshman year, while sophomores, juniors, seniors, and biomedical engineering (BME) students are encouraged to take BIO 110 in the spring. If planning a spring BIO 110 enrollment, please note: the CHM 131 pre/corequisite is still required.

A typical course plan for the first four semesters is available online at www.rochester.edu/College/BIO/UPBM/upbmcurricular.htm for students who are getting started in biology.

For more information about specific major requirements, visit www.rochester.edu/College/BIO/UPBM/upbmmajmin.html.

Students who do not intend to major within the biological sciences but want an introduction to the major areas of current interest and investigation in biology should consider taking BIO 101 Genes, Germs, and Genomics or BIO 104K Ecosystem Conservation and Human Society in the fall semester. BIO 101 or 104K may be applied to the following natural science clusters: Biological Principles (N1BIO002), Understanding the Biological World (N1BIO003), Chemistry and Life Science (N1CHM0003), and Life on Earth (N1NT015).

For more information on the similarities and differences between BIO 110/111 and BIO 112/113 introductory courses, visit www.rochester.edu/college/bio/undergraduate/advising.html.

Advanced Placement (AP)

Students interested in biology who do not have AP credits should enroll in the BIO 110/111 Principles of Biology I and II introductory course series.

Students with an AP Biology score of 4 or 5 will receive general college credit. This credit may not be used to satisfy introductory course requirements for any of the UPBM majors. Students retain these general college credits regardless of the biology courses they have taken.

Students with AP credit are eligible to register for the BIO 112/113 Perspectives in Biology I and II introductory course series, which covers the material at a greater depth than the BIO 110/111
Principles of Biology I and II introductory course series. BIO 112/113 are designed for students with a strong biology background.

For more information on the similarities and differences between BIO 110/111 and BIO 112/113 introductory courses, visit www.rochester.edu/college/bio/undergraduate/advising.html.

Students who would like to discuss their choices should attend the “Q & A” sessions and/or go to the biology table at the Academic Open House during orientation or contact the instructor directly. To look up biology course instructor information, visit https://cdcs.ur.rochester.edu/.

International Baccalaureate (IB)

Biology—Students who receive a higher-level exam score of 5 or better will receive four general college credits but not credit toward the biology major. Students retain these general elective credits regardless of the biology courses they take. No credit is granted for subsidiary-level exams. This credit may not be used to satisfy introductory course requirements for any of the UPBM majors. Students retain these general college credits regardless of the biology courses they have taken.

Students with IB credit who scored a 7 or higher are eligible to register for the BIO 112/113 Perspectives in Biology introductory courses, which cover the material at a greater depth than the BIO 110/111 Principles of Biology introductory series. BIO 112/113 are designed for students with a strong biology background.

For more information on the similarities and differences between BIO 110/111 and BIO 112/113 introductory courses, visit www.rochester.edu/college/bio/undergraduate/advising.html.

Courses

Fall Semester

BIO 101 Genes, Germs, and Genomics: An Introduction to Modern Biology. An introduction to selected principles of the biological sciences, explored through current topics in biology. Areas of study include the organization of life, the scientific method, and understanding data. Biological and biomedical topics of contemporary interest to be discussed may include but are not limited to cancer, aging, stem cells, genetic engineering, genetic counseling, the genetic basis of human disease, personal genomics, and the human microbiome. Classes involve lectures and workshop-style cooperative learning, which requires students’ active participation. This course is designed for the non-science students. It is not suitable for students interested in going to medical school or other health-related professions. BIO 101 can be used in the following natural science clusters: “Biological Principles” (N1BIO002), “Chemistry and Life Science” (N1CHM0003), and “Life on Earth” (N1INT015). Prerequisites: none.

BIO 104 Ecosystem Conservation and Human Society. This course examines issues in conservation biology from a viewpoint of costs and benefits to human society. Topics include the services that ecosystems provide to human society, how the value of these services is determined, and how consideration of such services influences political policy at local, national, and international levels.

BIO 110 Principles of Biology I. The first semester of a yearlong introductory course sequence. Topics include biochemistry, cell and molecular biology, cell reproduction, and animal physiology. Emphasis is on quantitative learning, especially experimental approaches and data analysis. BIO 110 is designed for biology majors and all premedical school tracks and prepares students for upper-level biology courses. Prerequisites: completion or concurrent enrollment in CHM 131 or equivalent. Intended biology majors usually follow up BIO 110 with BIO 111 Principles of Biology II in the spring semester. (Fall and Spring)

BIO 112 Perspectives in Biology I. The first semester of a yearlong introductory course sequence. Topics include biochemistry, molecular and cellular biology, cell reproduction, fundamentals of genetics, and molecular biology. This course differs from BIO 110 in that material is covered in greater depth, has a greater emphasis on experimental approaches, data analysis, and quantitative methods and includes additional readings of original research papers. BIO 112 is designed for freshmen with a strong biological sciences background (see prerequisites). Prerequisites: students with a score of 4 or 5 on the AP (Advanced Placement) Biology exam or a score of 7 on the IB (International Baccalaureate) exam. Completion or concurrent enrollment in CHM 131 or equivalent is required. Intended biology majors usually follow up BIO 112 with BIO 113 Perspectives in Biology II in the spring semester.

Spring Semester

BIO 111 Principles of Biology II. The second semester of the introductory sequence designed for biology majors and nonmajors. Topics include evolution from a genetic perspective, historical development and present patterns of biodiversity, physiology, and ecology. Emphasis is placed on hypothesis testing, data analysis, and other critical approaches to biological problems. Concurrent enrollment in BIO 111P is not required but is strongly recommended for current or prospective biology majors. Prerequisites: none.

BIO 111P Introductory Biology Laboratory. This is the lab course that accompanies the lecture course Principles of Biology II. The main focus of the course is to encourage students to understand the process that is used in science to develop and test scientific predictions and hypotheses. Emphasis is placed on problem solving, critical thinking, and experimental design using problems ranging from plant and animal diversity, the biology of protista, animal behavior, bioinformatics, and physiology. While this course is designed to accompany BIO 111, students taking BIO 111 or BIO113 are not required to register concurrently for BIO 111P. BIO 111P is strongly recommended for current or prospective biology majors. Prerequisite: past or concurrent enrollment in BIO 111.

BIO 113 Perspectives in Biology II. Second semester of a two-course introductory sequence for students with a strong background and interest in science. Topics include evolution, organismal diversity, ecology, and functional biology. This course differs from BIO 111 in that there is greater emphasis on experimental approaches, data analysis, and quantitative methods and includes reading original papers. Note: both BIO 111 and BIO 113 are designed to prepare students who intend to major in biology. Open only to freshman prospective majors or by permission of instructor. Concurrent enrollment in BIO 113P is not required but is strongly recom-
mended for current or prospective biology majors and is required for biology majors. The laboratory course is also recommended for those intending to apply to medical school. Prerequisite: BIO 112 or AP Biology score of 4 or 5 or IB score of 7.

**BIO 115 Introduction to Organismal Evolutionary Biology.**
This is an introductory class to organismal and evolutionary biology that is designed for students intending to be biology majors. Topics include evolution (natural and sexual selection, population genetics, speciation, origin of life), biodiversity, behavioral ecology, ecology, and conservation biology. Concurrent enrollment in BIO 117P is required. Due to the significant overlap between them, students may only earn degree credit for one of the following courses: BIO 115, 111, or 113.

**Similarities and Differences between Introductory Biology courses BIO 110 and 112**

**Similarities**
- Both courses are designed for majors and minors in biology as well as all premedical tracks.
- Both courses employ problem-based, peer-led small group workshops.
- Both courses emphasize “experimental” approaches and the quantitative skills needed to understand biological research.

**Differences**
- BIO 110 Principles is designed for freshmen to provide a fundamental understanding of basic biological and chemical concepts in preparation for their upper-level courses in biology.
- BIO 112 Perspectives is designed for freshmen who have demonstrated knowledge of some basic biological and chemical concepts. This prior knowledge enables topics to be covered in greater depth and provides the opportunity to cover additional current biological topics and to read original research papers.

For More Information
Please visit the biology program website at www.rochester.edu/college/bio/undergraduate/index.html.

**BIOMEDICAL ENGINEERING**

“Engineering is not merely knowing and being knowledgeable, like a walking encyclopedia; engineering is not merely analysis; engineering is not merely the possession of the capacity to get elegant solutions to nonexistent engineering problems; engineering is practicing the art of the organizing forces of technological change. . . . Engineers operate at the interface between science and society.” —Gordon Stanley Brown

**Information about the Department**
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 industrial or clinical settings. 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 Advice for Freshmen**
The interdisciplinary nature of biomedical engineering requires expertise in both the biological and engineering sciences. The University of Rochester offers several avenues of academic study in biomedical engineering, each of which can be structured to satisfy premedical or predental requirements. The minor in biomedical engineering (24 credits) provides opportunities for students majoring in other disciplines to obtain substantive exposure to the field of biomedical engineering.

The Bachelor of Science degree program in biomedical engineering is accredited by the Engineering Accreditation commission of ABET, www.abet.org. Our 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 biomedical engineering students provides a solid foundation in engineering principles relevant to biomedical engineering practice. To ensure in-depth training, 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.
All students interested in pursuing a BS in biomedical engineering are assigned a biomedical engineering faculty advisor.

**Typical Freshman Year Program**

**Fall Semester**
- MTH 161 or MTH 141
- CHM 131
- EAS 10X (EAS 101/BME101 strongly recommended)
- WRT 105 or elective

**Spring Semester**
- MTH 162 or MTH 142
- CHM 132
- PHY 121
- WRT 105 or elective

**Courses**

**BME 101/EAS 101 Introduction to Biomedical Engineering.**
The course provides an introductory overview of the multidisciplinary field of biomedical engineering. Students learn about the application of elementary engineering principles to the analysis of physiological systems and are provided with a basic introduction to the use of computers as tools for solving engineering problems. Course topics include biomechanics, cell and tissue engineering, biosignals and bioinstrumentation, medical imaging, medical optics, and bioethics. This course is included in three clusters: Biomechanics, Biomedical Engineering, and General Science. (Fall) **Strongly recommended for BME majors.**

**For More Information**
Please contact Taimi Marple in the Biomedical Engineering Undergraduate Office (206 Goergen Hall or via email to taimi.marple@rochester.edu) or visit our program website at www.bme.rochester.edu.

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**BRAIN AND COGNITIVE SCIENCES**

“. . . know that from nothing else but the brain come joy, delight, laughter, and sport; and sorrow, grief, despondency, and lamentation. And by this, in an especial manner, we acquire wisdom and knowledge.”

—Hippocrates

“On the Sacred Disease” (fourth century B.C.)

**Information about the Department**

Members of the Department of Brain and Cognitive Sciences 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. We also study how these abilities develop, and how the brain matures to become able to organize such complex behavior. In order to understand these complex mental functions, we study not only the behaviors themselves but also the neural and computational processes that underlie them. Brain and cognitive sciences is an inherently interdisciplinary field that applies behavioral, neuroscientific, and computational methods to create new knowledge about the mind and brain. Teaching and research in our department reflect this interdisciplinary focus and span a large domain that touches on behavioral, neural, and computational sciences.

The BA and BS programs in the Department of Brain and Cognitive Sciences offer rigorous but accessible natural science concentrations for students interested in the brain and how it enables us to behave the way we do. The programs have two aims: 1) to provide sound intellectual training that will benefit students in a wide range of career paths; and 2) to provide basic disciplinary qualification 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 to learn how to reason critically; they also provide unique opportunities to engage in research that is at the frontiers of our current knowledge.

The BA curriculum consists of two foundation courses; three core courses built on these foundations; a statistics course; a laboratory methods course; four upper-level electives organized around a theme chosen by each student; and a senior seminar. The BS curriculum includes all of the requirements for the BA degree in BCS and also incorporates foundational and advanced work in allied fields, including biology, computer science, math, music theory, and lin-
pragmatics. The Honors Program consists of an independent research project leading to a senior thesis, which is presented in the Honors Seminar. For students majoring in other fields, the department offers a minor and a number of clusters (see below) that allow students to study inherently interesting questions such as: How do we recognize sounds and learn our native language? How do we read a book, recognize a face, or reach for a pencil? How do we remember what happened yesterday or during our childhood? How do these remarkable abilities develop? How does the brain become organized to perform tasks that thus far exceed the capacity of modern computers?

Clusters
Clusters are either broad—covering the basics in all parts of the discipline—or deep—focusing on a particular subpart of the domain. The department offers nine clusters: Mind and Brain; Perception and Development; Language and Cognition; Mind, Brain, and Development; Language and Cognitive Development; The Senses; Biology and Behavior; Neurobiology; and Neuropsychology.

Departmental Advice for Freshmen
Students trying to determine if they’re interested in BCS may begin with BCS 110 (recommended), BCS 111, BCS 172, or BCS 183. Students planning to pursue a BA degree should complete at least the following by the end of their sophomore year: BCS 110, BCS 111, one or more of the 3 core courses (BCS 151, BCS 152, BCS 153), plus STT 212 (statistics), if possible.

Courses
The foundation courses (BCS 110 and 111) are entries into many of the clusters offered by the department, but students can also begin clusters by taking one of the 100-level electives (BCS 172 or 183).

BCS 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. Prerequisites: none. (Fall and Spring, one of the two foundation courses)

BCS 111 Foundations of Cognitive Science. Introduces the organization of mental processes underlying cognition and behavior. Topics include perception, language processing, learning, and memory. Integrates knowledge of cognition generated from the fields of cognitive psychology, artificial intelligence, neuroscience, linguistics, and philosophy. Prerequisites: none. (Fall and Spring, the second foundation course)

BCS 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. Prerequisites: BCS 110 or BCS 111 or equivalent background. (Fall, a core course)

BCS 152 Language and Psycholinguistics. An overview of 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. Prerequisites: BCS 110 or BCS 111 or LIN 110. (Fall, a core course)

BCS 153 Cognition. Considers human cognitive processes, including behavioral, computational, and neuroscience 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; and how we reason and solve problems. Prerequisites: BCS 110 required; BCS 111 recommended. (Spring, a core course)

BCS 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. Prerequisites: none. (Spring)

BCS 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. Prerequisites: none. (Fall)

BCS 185 Social Cognition. Social cognition combines classic social psychology with methods and theories from cognitive psychology and neuroscience to study how people make sense of each other and the social world. We examine how the social environment influences cognitive processes such as attention, heuristics, and appraisals and how these processes in turn affect decisions, behaviors, and health. We critically evaluate research on a variety of topics, such as emotion regulation, stereotyping and prejudice, and stress and decision making. Prerequisite: PSY 101.

For More Information
Please visit the brain and cognitive sciences program website at www.bcs.rochester.edu/.
Information about the Program

The College, in conjunction with the Simon Business School, offers both a BA and a BS in business that build upon the curriculum and coursework found in the Department of Economics while allowing undergraduates to take advantage of the many opportunities offered at the Simon School. The majors are based 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 majors provide an analytical approach for addressing current as well as future opportunities and problems in either for-profit or not-for-profit organizations. Students will also be well prepared to pursue graduate work to deepen their preparation in specific disciplines. The BS consists of 15 courses and is intended for students interested in studying a business discipline in greater depth. The BA consists of 11 courses, requires students to complete a second major (either a BA, BM, or BS degree), and is designed for those who have a strong interest in another discipline and wish to pursue studies in that discipline as well as in business. Both the BS and the BA satisfy the College's social science distribution area.

The undergraduate business minor is offered by the Simon Business School for undergraduates in the College. It is aimed at building core business skills. It contains five courses consisting of three core courses and two electives. Students may use the business minor to fulfill the social science distribution area if they complete, in addition to ECO 108 or ECO 207, two social science courses from the list of business minor electives: ECO 211; ECO 217; ECO 394/Internship; CSP/PSY 264; PSC 238.

Program Advice for Freshmen

The business major requires that students satisfactorily complete one year of calculus before declaring the major (MTH 141–143 or MTH 161–162 sequences are acceptable). Students planning to major in business should complete the following courses by the end of their sophomore year: prerequisite calculus sequence; one acceptable statistics course (ECO 230 or equivalent STT 213 or STT/MTH 203 are preferred as they are prerequisites for ECO 231 Econometrics; also acceptable STT 211, STT 212, STT 216, PSY/CSP 211, PSC 200, or PSC 201); and ECO 108 Principles of Economics. Prior to declaring the business minor, students must complete two prerequisite courses: one acceptable statistics course (same as acceptable business major statistics course; see above) and either ECO 108 Principles of Economics, or ECO 207 Intermediate Microeconomics. AP credit is acceptable for the math prerequisite, depending on the grade obtained. If AP credit is awarded for ECO 108, students must take an additional higher-level economics course.

Courses

MTH 141–143; Calculus I, II, III. This sequence covers the material of MTH 161–162 (see below) in three semesters. The same text is used in both 141–143 and 161–162. Placement is made by the Department of Mathematics. (All three offered Fall, Spring, and Summer)

MTH 161–162; Calculus IA, IIA. The first semester, MTH161, covers differentiation techniques and applications; the second semester, MTH162, covers integration and applications and additional differentiation techniques. Placement is made by the Department of Mathematics. (Both offered Fall and Spring)

ECO 108 Principles of Economics. This course is an introduction to the fundamental concepts of both microeconomic theory (supply and demand, cost and production, prices in markets for individual commodities) and macroeconomic theory (national income, unemployment, and inflation) with applications of theory. It gives a student preparation for subsequent economics courses. (Fall and Spring)

ECO 207 Intermediate Microeconomics. This course develops the fundamental building blocks of economic theory, enabling the student to gain an understanding of how economists evaluate economic problems and policies. The focus throughout is on how economic agents make choices and how prices serve as a key mechanism in the allocation of resources. Topics include competition, monopoly, taxes, subsidies, etc. Prerequisites: ECO 108 or equivalent. (Fall and Spring)

ECO 230 Economic Statistics. (For equivalent statistics course; see program advice for freshmen) This course provides an introduction to basic probability and statistical theory for estimation and hypothesis testing with emphasis on issues that arise when dealing with economic data. In the process, data analysis methods through the use of computer software are introduced. (Fall and Spring)

ACC 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 covers 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 is given to the failure of financial reports to fully incorporate the economic condition of an organization and the reason for this. (Fall and Spring)
CHEMICAL ENGINEERING

“And in the future, even more than in the present, will the secrets of power be in his keeping, and more and more will be a leader and benefactor of men. That his place in the esteem of his fellows and of the world will keep pace with his growing capacity and widening achievement is as certain as that effect will follow cause.” —Robert Moore

Information about the Department

Chemical engineers apply their fundamental knowledge of the chemical and physical sciences to the solution of engineering problems that are of interest to society. They find employment in various modern industries, including microelectronics processing, biotechnology, and chemical manufacturing facilities. They may also use their engineering backgrounds as a starting point for a wide variety of other occupations, including law and medicine. For example, chemical engineers often enter the field of patent law, where their technical background can be put to useful effect, and their training in the chemical and physical sciences is invaluable for pursuing careers in medicine and/or biomedical research.

The Bachelor of Science degree in chemical engineering prepares graduates for immediately useful and rewarding industrial positions. Currently about 50 to 60 percent of chemical engineering graduates follow this route. The others elect to obtain professional training in an allied field such as law or business or choose to go on to a doctorate degree before embarking upon industrial research or academic employment. An increasing number of students are choosing to remain at the University for a fifth year of study, either to broaden their education through the University’s Take Five Scholars program or to earn an MS degree. Even those who enter the workforce upon graduation eventually continue their education. Most acquire further training at the Master of Science level on a part-time basis, often through an employer-sponsored tuition benefits program.

Departmental Advice for Freshmen

Chemical engineers need a strong foundation in chemistry, physics, and mathematics. Moreover, because the solutions to society’s problems frequently involve questions that transcend technical considerations, the curriculum includes a balance of humanities and social science courses as well.

Courses in chemical engineering are coordinated with separate chemical engineering laboratory courses in the junior and senior years. In these lab courses, students explore fundamental concepts learned in lectures and gain experience in problem definition and experiment design in a project format. All laboratories make extensive use of microcomputers for data acquisition and analysis, complementing their use for computation in other courses.

The department provides new students with a better understanding of what chemical engineers do by organizing several informal meetings throughout the school year in conjunction with the student chapter of the American Institute of Chemical Engineers (AIChE). Further information is available from the chemical engineering faculty advisors. Faculty advisors generally remain with assigned students during their entire undergraduate career and should be consulted for advice about programs and courses.

Typical Freshman Year Program

Fall Semester
CHM 131
MTH 161 or MTH 141
WRT 105
CHE 150/EAS 10X
(Spring Semester
CHM 132
MTH 162 or MTH 142
PHY 121
HUM/SS Elective

Undergraduate Research

The chemical engineering faculty are actively engaged in research projects through the PhD program as well as a graduate program leading to the Master of Science degree. Undergraduates enjoy the benefit of this dimension of the department through participation in a wide variety of undergraduate research and independent study projects. Some examples of recent undergraduate projects are studies of computer control of processes, interfacial oxygen transport, analysis of techniques of pollution abatement, nucleation of small particles, polymer applications in electro-optics, electrochemical processes, and biomedical problems such as bone marrow cell culture. Students usually become involved in such activities after their sophomore year.

Courses

CHE 150/EAS 102 Green Energy. This course provides an introduction to basic chemical engineering concepts and focuses on renewable energy production, conversion, and utilization. Fundamental topics include energy and power metrics, material and energy balances and the fundamental laws of thermodynamics. The second half of the course focuses on traditional and alternative energy sources, energy distribution, and energy utilization. Course activities include in-class demonstrations, homework assignments, exams, and a project. This course is included in two clusters: Energy and Sustainability, and Green Engineering. (Fall)
CHEMISTRY

“The most sensuous and exciting of sciences, chemistry... a chemical laboratory is the most fascinating place in the world to those lucky enough to possess strong curiosity...”

—William Bolitho

Information about the Department

The Department of Chemistry offers both BA and BS degrees. The BS degree is intended for students who want to specialize in chemistry at the undergraduate level. The BA degree offers more flexibility in planning a program and enables a student to pursue extra work in the biological, environmental, physical, and earth sciences. This course of study is sound preparation for the study of medicine or dentistry or for a career in business, law, industry, government, etc., through careful attention in the choice of courses. The BA can also be suitable preparation for graduate and professional work in chemistry.

Departmental Advice for Freshmen

A typical first-semester BA or BS program consists of CHM 131 or CHM 171, depending on the student’s interest and preparation; MTH 161, with advice from the mathematics department; a writing course as recommended by the College Writing Program; and an elective from a chosen cluster. Students anticipating a major in chemistry are encouraged to meet with a faculty advisor from the department during freshman year in order to explore the individual student’s needs and tactics for preparation for a possible major in chemistry.

Advanced Placement (AP)

Students who have received a score of 4 or 5 on the AP exam are entitled to credit for CHM 131 and have several options available. Students may accept the credit and not take chemistry in the fall semester, with subsequent enrollment in CHM 132 in the spring semester; or they may waive this credit and enroll in CHM 131. The department expects that some students will select each of these options, depending on their preparation in chemistry and their future interests.

International Baccalaureate (IB)

Chemistry—Students who receive a higher-level exam score of 6 or better are awarded credit for CHM 131 and are eligible to apply for admission to enroll in CHM 171. No credit is granted for subsidiary level exams. Students with an IB score of 6 or higher have the same options as described for students with an AP score of 4 or 5.

Courses

The chemistry department offers three courses for entering freshmen during the first semester: CHM 131, CHM 137, and CHM 171. CHM 131 is part one of a two-semester sequence in general chemistry. Two sections of CHM 131 are offered in the fall, and both sections are of comparable difficulty and cover the same general topics. CHM 171 is an honors course on organic chemistry that is available to students with AP scores of 4 or 5 or IB score of 6 or higher. CHM 131 and CHM 171 are appropriate for students majoring in chemistry or related sciences. CHM 137 is a one-semester introduction to general chemistry specifically for engineering students. Students should select the course that most closely supports their particular interests.

Both the BA and BS chemistry degrees require only two courses in physics, Physics 121–123, or 113–114. However, chemistry majors pursuing a BS degree are strongly encouraged to take the Physics 121–123 sequence and begin during the spring semester of the first year. All chemistry majors should continue with their mathematics sequence in the spring semester.

CHM 131 Chemical Concepts, Systems, and Practices I.

This course serves as an introduction to the concepts of chemistry for science and 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 theme of energy and the environment. Topics include stoichiometry, atoms and molecules, properties of gases, thermodynamics, chemical equilibrium, acids and bases, solubility equilibria, and oxidation-reduction reactions. These topics are discussed in the context of the following energy and environment-related issues: elemental resources of our planet, energy production and utilization, what makes a good fuel, and aqueous resources. There are three 50-minute (M, W, F) or two 75-minute (T, R) lectures per week. In addition, there is a three-hour laboratory in alternate weeks, a 50-minute laboratory lecture, and a 75-minute workshop. Students register for the lecture, one of the two lab lectures, and a laboratory section prior to the start of the semester. Workshop sections are assigned in the main lecture during the first week of classes. Exams: three exams and a final. (Fall)

CHM 132 Chemical Concepts, Systems, and Practices II.

A continuation of Chemical Concepts, Systems, and Practices I, emphasizing energy and the environment. Topics include chemical kinetics, electrochemistry, thermodynamics, properties of atoms, atomic structure, and chemical bonding. These topics are discussed
from the perspective of the efficiency of energy utilization; what makes processes spontaneous; the kinetics of ozone depletion; and how energy is extracted from nuclei, atoms, and molecules. There are three 50-minute (M, W, F) or two 75-minute (T, R) lectures per week. In addition, there is a three-hour laboratory each week, a 50-minute laboratory lecture, and a 50-minute workshop. Students register for the lecture, one of the two lab lectures, and a laboratory section prior to the start of the semester. Workshop sections are assigned in the main lecture during the first week of classes. Exams: three exams and a final. Prerequisite: CHM 131. (Spring)

**CHM 173 (Fall) and 172/210 (Spring)**

Freshman Organic Chemistry. These courses constitute 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 with 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. Honors Organic Chemistry is designed for first-year students with good preparation in chemistry (e.g., two years of general chemistry and AP score of 4 or 5, or equivalent preparation). Please note: CHM 171 (Fall) and 172 (Spring) are each four-credit courses that individually meet for three separate lectures and one two-hour workshop each week. CHM 173 (Fall) meets for one lab afternoon per week (1 credit). CHM 172 has a required companion lab, CHM 210 (2 credits) (Spring). This sequence will meet all of the requirements for a year of organic chemistry with lab and prepares students to enter upper-level chemistry courses.

**Course Placement Methods**

Students interested in chemistry who do not have AP credit should select CHM 131. Students who have received a 4 or 5 on the AP exam are entitled to credit for CHM 131 and have several options available. Students may accept the credit and not take chemistry in the fall semester, with subsequent enrollment in CHM 132 in the spring semester, or they may waive this credit and enroll in CHM 131. The department expects that some students will select both of these options, depending on their preparation in chemistry and their future interests.

**For More Information**

Please visit the chemistry program website at www.chem.rochester.edu or contact Deb Contestabile, undergraduate program coordinator, Department of Chemistry, Hutchison Hall 404D, (585) 276-3663, or email ugradadm@chem.rochester.edu.

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**CLASSICS**

"I would make all learn English: and then I would let the clever ones learn Latin as an honour, and Greek as a treat."
—Winston Churchill

"To read the Latin and Greek authors in their original is a sublime luxury . . . I thank on my knees him who directed my early education for having in my possession this rich source of delight."
—Thomas Jefferson

The classical civilizations of Greece and Rome have influenced all successive western societies, leaving a legacy that includes ideas about democracy, empire, myth, society, race, gender, and philosophy. The study of the ancient worlds of Greece and Rome at Rochester is not merely a matter of antiquarian interest; rather our courses enable students to explore the past in ways that allow them to understand the present and imagine the future. Students study the foundational texts and significant artifacts of the western world in order to understand them on their own terms and in their ancient contexts as well as to develop a deeper awareness of the ways in which classical antiquity has shaped and continues to influence contemporary society.

The concentration in classics is language centered, emphasizing ancient history, art and archaeology, literature, and philosophy. In addition to developing a solid foundation in Greek and Latin language, students may select from courses in ancient literature, drama, mythology, or poetry; courses in the study of culture and history of ancient Greece and Rome; and courses in ancient philosophy.

The classics program offers several study abroad courses in which students can participate (one does not need to be a classics major to participate in these programs). Every summer, the classics department runs an archaeological dig in Italy in which students not only learn about ancient Roman history and material culture but also develop their skills in field methods of archaeology. The department also offers a spring break program in which students study Latin epigraphy in Rome. Finally, students can take a course called Sacred Spaces in Greece, which culminates with a two-week trip to Greece so that students can visit sites they have studied and present their research on location.
In addition to the major concentration in classics, the department offers minors in classical civilization, Greek, and Latin. Recent graduates of the department have an excellent record of admission to graduate school as well as to medical school or law school. The classics program is housed in the Department of Religion and Classics.

Introductory Language Courses
Language courses numbered 101 are introductory and have no prerequisite. They are intended for students with little or no experience of the language. Students who are considering entering the sequence at a higher level than 101 in Arabic, Greek, Hebrew, or Latin are strongly encouraged to consult the instructor as soon as possible. Students are not permitted to register for or receive credit for a language course if they have already achieved proficiency at the level of that course.

Advanced Placement (AP)
A score of 4 or 5 on the Latin examination will earn credit for LAT 102. Students who complete a second Latin AP examination with a score of 4 or 5 may earn credit for LAT 208 upon completion of a Latin course numbered 103 or above with a minimum grade of "B."

International Baccalaureate (IB)
Latin—Students who receive a score of 5 or above on the higher-level exam are awarded credit for LAT 102.

Courses

Fall Semester

Classics
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 140 Classical and Scriptural Background. Homer, Virgil, and Ovid. Greek tragedy and comedy: Aeschylus, Sophocles, Euripides, and Aristophanes. The Hebrew Bible—Abraham and Isaac, Moses and Pharaoh, Esther and Judith—and Christianity’s New Testament. The two great traditions studied in this introductory course—classical and Biblical—have been pondered by generations of writers and artists for thousands of years. A great deal of literary history is the story of intricately rewriting and adapting the core texts of these traditions; it has been said that the European philosophical tradition is a series of footnotes to Plato. While doing justice to any one of these authors or traditions in a single semester would be a challenge, the goal of this class is to read as much as possible of the classical and scriptural tradition in the short time we have, giving you a solid introduction to some of the key stories and ideas that have generated so much thought, conflict, and human creativity over the past two dozen centuries. Freshmen welcome.

CLA 224 Sacred Spaces in Greece. In this course, students learn about the society and culture of the ancient Greek world by studying sacred sites and sacred spaces. In addition to learning about many aspects of ancient Greek religion, including the mystery religions and early Christianity, students study ancient theater and drama, medicine and healing, and athletics and sport. Students develop their written and oral presentations skills as well as their knowledge of the digital humanities.

Greek
CGR 101 New Testament and Classical Greek I. This course provides an introduction to ancient Greek, the language used by classical Attic authors as well as the writers of the New Testament and other early Christian texts.

CGR 103 Intermediate Greek. This course offers an intensive review of Greek grammar combined with readings in Greek prose in order to strengthen students’ knowledge of classical Greek and improve translation skills. We translate and discuss Xenophon’s Memorabilia, a dialogue about Socrates.

Latin
LAT 102 Elementary Latin II. This course completes Latin 101’s introduction to Latin grammar and introduces the reading of continuous Latin prose.

Spring Semester


LAT 101 Elementary Latin I. An introduction to the Latin language based on the ancient authors and designed to prepare students for the reading of classical and medieval texts.

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.

For More Information
Please visit the religion and classics program website at www.rochester.edu/college/rel/.
Information about the Department
The Department of Computer Science (CSC) at the University of Rochester is well known for its research production and collegial atmosphere. Degrees offered include an elite undergraduate major and an intense program leading to the doctor of philosophy. Particular emphasis is placed on computer vision and robotics, human-computer interaction, natural language understanding and knowledge representation, machine learning, systems and architecture, data analytics, and theory of computation.

Departmental Advice for Freshmen
Students have the option of completing a BS, a BA, or a minor in computer science. Many students in other fields also find courses in computing both interesting and useful. Those who major in the humanities and social sciences may choose to take a cluster in CSC. Of the two bachelor’s degrees, the BS requires a larger number of upper-level courses in computer science and is appropriate for students who aspire to achieve a high-level research and development position in the computer industry, those who plan to go on to earn an MS or PhD, or those who simply wish to have the broadest and deepest knowledge of the field. The BA curriculum is highly flexible and can be customized to support students interested in the intersection of computer science with other disciplines, such as computational linguistics, studio arts, computational biology, digital media, etc. The typical entry point for the BS program is CSC 171. The typical entry point for the BA is CSC 161. Freshmen planning to complete the BS should also register for MTH 150 in the fall; many BA students choose to do so as well. Other courses available to freshmen (CSC 170 or CSC 175 series) stress creativity and problem solving with no prerequisites.

Advanced Placement (AP)
Students who have passed the AP Computer Science test with a 4 or a 5 may be placed in CSC 172. Credit will be awarded for CSC 171 upon completion of CSC 172 with a grade of B- or better.

International Baccalaureate (IB)
Computer Science—Students who receive a higher-level exam score of 5 or better may be placed in CSC 172. Credit will be awarded for CSC 171 upon completion of CSC 172 with a grade of B- or better.

Clusters
For non-majors, there are eight natural science/computer science clusters to choose from.

Courses
CSC 108 Technical Literacy. An introduction to the most important tools used in industry for describing, explaining, and persuading with technology. This course focuses on computer applications and the associated data. Topics covered include the basics of digital data and how it is used in spreadsheets, presentations, data processing tools. Also, two-dimensional (images) and three-dimensional (geometry) data structures and the tools for data visualization. Extensions of these data sets into the time domain in the form of movies and animation are presented, including video and audio editing tools. In learning these applications, students are introduced to topics such as computer graphics, file compression, and animation. A brief introduction into the Python programming language in preparation for advanced CS classes. Not open to computer science majors. Leads into the following clusters: Business Computing, Computer Science and Art, Computing for the Social Sciences. (Fall and Spring)

CSC 161 Introduction to 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 using Python as a way to develop these skills, as basis for further CS study, and for application to other fields. Lab required. Prerequisite: none. Leads into the following clusters: Business Computing, Computational Problem Solving, Human Computer Interaction, Computer Science and Art, and Computing for the Social Sciences. (Fall and Spring)

CSC 170 Web Design and Development. An introduction to Internet and web technologies. Topics include Internet transport protocols, HTML5 and CSS3, web page design, and website publishing. Emphasis is on fundamentals, design concepts, and industry standards. Additional topics include the user experience, mobile design issues, and copyright/intellectual property considerations. (Fall and Spring)

CSC 171 Introduction to Computer Science. 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. With advisor’s approval, AP credit or prior experience can substitute for this course. Small-group problem-solving workshops are an integral part of this course. Lab and workshop required. This is the first course in the pre-major sequence for the BS. (Fall)
CSC 172 Data Structures and Algorithms. 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). Small-group problem-solving workshops are an integral part of this course. Lab and workshop required. Prerequisites: CSC 171 or equivalent, MTH 150. (Fall and Spring)

CSC 173 Computation and Formal Systems. We investigate several formal systems integral to computer science (including Turing machines and simpler automata; the Chomsky hierarchy of formal grammars; the lambda calculus; propositional and predicate logic; logical circuits; and some practical programming languages, such as C, Scheme, Prolog, and SQL), their relations to each other including the Church-Turing thesis), and some of their applications (in scanners, parsers, and data-base access, for example). Prerequisites: CSC 172. (Fall)

CSC 175 Creative Computing. Quick! How much would a tunnel under Lake Ontario cost? How many people probably touched that orange you just bought at Wegmans? Can the military’s satellites really read your license plate from orbit? Explores the creative use of computational mechanisms and information sources to obtain rough estimates and feasibility analyses for interesting questions and practical problems and looks at the technological basis of the art of measurement. Prerequisites: none.

For More Information
Please visit the computer science program website at www.cs.rochester.edu/ or contact the undergraduate liaison at (585) 275-4506.

DANCE

Information about the Program
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 our 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; creative process; critical 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 sponsors a guest artist series, which features performances, lecture-demonstrations, and workshops by internationally and nationally acclaimed dance artists and educators who share their passion for the arts with the University and the surrounding community. An annual inspireDANCE Festival also takes place over six days in January or February and features more than 25 master classes and workshops including faculty instructors and guest artists in various forms of dance, a featured concert by a professional dance company, student performances, and an inspireJAM bboy and bgirl battle. These opportunities for students to interact closely with professional artists and faculty encourage discussion, stimulate the imagination, provide bridges between artistic and other disciplines, and foster an inclusive and transdisciplinary learning environment.

Through study in the Program of Dance and Movement, students will have the potential for participation in and an understanding of a dance-related career including but not limited to performance, teaching, arts management, choreography, dance criticism, creative arts therapies, and dance/movement science. Regardless of a student’s career path, study in our program will help foster educated audiences and participants in the field of dance and movement in culture. Our diverse courses and faculty promote a sense of community within which discussions take place about cultural identity, about gender, about dance as art, about art as a voice and mirror for not only personal expression but also for society, politics, social change, and current issues. The courses simultaneously emphasize sharing, cooperation, and self-reliance. Students are encouraged to be open minded and to engage in intellectual, emotional, artistic, intuitive, spiritual, and pragmatic practice. The program provides groundwork for students to become confident, articulate, highly creative, and compassionate leaders. Together, the academic and cocurricular components of the Program of Dance and Movement give a foundation for ongoing learning and creative responsiveness throughout life.

The program seeks to encourage embodied knowledge of culture, dance, and movement forms. Through a combination of experiential investigation, technique, and theory; performance, lecture, and theory-based discussion; reading, writing, and physical practice that has an emphasis on mindfulness, the program aims to support the development of effective communication through the ability to listen to self and others, the ability to self-assess and to critically think, and the ability to access and trust creative or artistic expression. Dance appreciation, movement for health, and connectedness of body and mind are at the heart of our purpose in educating students in dance and movement studies as scholarly endeavors.
Clusters
The program offers four clusters; each provides an in-depth view of a different area:

**Improvisation and Creative Process (H1DAN006)**
This cluster encourages students to discover the potential of their own creativity. Through reading, attending lecture-demonstrations and live performances discussion, and improvisation, students engage in the creative process.

**Movement and Culture (H1DAN007)**
In this cluster, students have the opportunity to investigate movement and dance from different cultures and communities around the world, both theoretically and experientially. By expanding knowledge and understanding of the rich and varied roles of movement and dance forms, students learn to appreciate culture in an embodied manner.

**Mind-Body/Somatics (H1DAN009)**
This cluster involves an in-depth study of the mind-body-spirit relationship, focusing on finding connections between the inner physical world and the external environment.

**Dance and Performance (H1DAN010)**
This cluster is designed for the student interested in the art of dance and performance. Through the study of dance technique and theory as well as the context within which dance exists in the field, students have opportunities to experience, view, and discuss the art of dance, performance, and creative expression.

Courses

**DAN 102 Fundamentals of Movement.** This course explores movement through the use of technique and improvisation. It emphasizes spontaneity, joy in moving, and self-awareness and is based on experiential anatomy and developmental movement patterns. It provides a strong foundation for further study in dance, theater, or sports, or can be used as an introduction to movement and body awareness. No previous dance training is required. (Fall)

**DAN 104 Contact Improvisation I.** Contact Improvisation is rooted in dance, the martial arts, and studies of body development and awareness. It is a duet form where partners use weight, momentum, and inertia to move each other freely through space, finding support through skeletal structure rather than muscular effort. We explore solo and duet skills such as rolling, falling, balance, counterbalance, jumping, weight sharing, spirals, and attuning to sensory input. Skill work is combined with more open dancing in a supportive and focused environment. No previous dance training required. (Fall)

**DAN 110 Beginning Dance Techniques (Jazz, Ballet, and Modern).** This course serves as an introduction to dance technique, specifically in jazz, ballet, and contemporary modern dance. Emphasis is on the development of basic skills, patterns of body organization, alignment, continuity and connectivity, and rhythmic and bodily awareness. No prior training is necessary or expected. Students who have had prior training will be challenged individually. Within the three specified forms, students also explore dance improvisation, dance composition, and dance performance as both audience members and participants. (Spring)

**DAN 114 Introduction to Yoga.** Yoga is defined as “union,” the uniting of all aspects of ourselves—body, mind, heart, and spirit. This class introduces a hatha yoga method that integrates a dynamic and engaging approach to living through practicing “on and off the mat.” The goal of this class is to learn how to create a deeper, more enlivened relationship to one’s self through honoring one’s abilities and limitations while growing one’s skills and sensitivity in the supportive environment of the class community. Students engage with principles of attitude, alignment, and action in a full range of yoga poses, breathing techniques, readings on yoga philosophy, reflection, journaling, and discussion. Through this ongoing process, students are encouraged to cultivate a more expansive and clear perception of self and others. (Fall and Spring)

**DAN 116 Introduction to Somatic Ballet.** This course approaches ballet technique through the lens of somatic practices, placing an emphasis on dynamic alignment, movement efficiency, connectivity, articulation, phrasing, and breath support. While the primary focus is on an embodied practice, students can expect to develop an appreciation for aspects of the ballet aesthetic while considering theoretical aspects related to historical and sociocultural contexts. (Fall)

**DAN 130 Conditioning for the Dancer/Athlete.** Body conditioning aimed to develop and strengthen specific musculature as it pertains to physical demands of dancers, athletes, martial artists, as well as those who wish to explore a mindful, physical, and anatomically sound practice. Introduces fundamental strength training based in Pilates, hands-on bodywork, and basic movement sequences designed to help prevent injury as well as build core strength, endurance, coordination, and overall physical mobility and stability. (Fall)

**DAN 150 Beginning Contemporary Dance Technique.** Focus is on contemporary dance, a form that is an evolving exploration of expression through movement. The course blends the challenges of full-bodied, momentum-driven dancing with a sense of one’s own self-awareness and discovery. Through rigorous dancing, students move beyond not only physical but also artistic boundaries and dimensions. (Spring)

**DAN 160 Dance Improvisation.** This course is designed for those with some experience in dance who wish to explore mechanisms for generating movement and dance through improvisation. It works with theoretical concepts based in (but not limited to) Forsythe Improvisation Technologies, Anne Bogart’s Viewpoints, fundamentals of Laban Movement Analysis, and other cultural forms of performing arts in the pursuit to understand improvisation as practice, technique, conditioning, performance, and composition. Supporting inspiration and freedom for the exploration of artistic expression and development is at the forefront of this class. (Spring)

**DAN 171 Capoeira: Brazilian Art Movement.** An art form of self-defense with strong aerobic and dance elements that brings together a harmony of forces. Through the study of the history, movements, and culture behind Capoeira, students gain self-confidence, power, flexibility, endurance, and ultimately, the tools toward self-discovery. Capoeira is within the reach of anyone, regardless of age, sex, or athletic experience. In keeping with its strong traditions, Capoeira balances the body, mind, and soul and enables one to break through limits, revitalizing oneself for everyday life. (Fall and Spring)
DAN 181 West African Dance Forms I. Dynamic dance traditions of Guinea, West Africa. Accompanied by live music, students learn footwork and movements for several rhythms and acquire familiarity with the physical stance common to many styles of West African dance. Learn to execute movements together with the rhythmic foundation provided by our drummers and become familiar with the origins and cultural significance of each dance and the songs that accompany them. (Fall)

DAN 188 Hip Hop Culture and Breaking. Originated in the boroughs of New York City, hip hop has grown to become a global phenomenon, influencing the lives of countless individuals with the core ideals of peace, unity, love, and having fun. The class provides a look into the historical origins and social importance of hip hop culture. The main focus is on the original dance of hip hop culture—breaking (also known as bboying). The class format is geared toward physical movement along with lectures, videos, and opportunities to attend events in the community. (Fall)

DAN 195 World Dance: Movement as Culture. This course is an exploration of world cultures through dance. Students expand their dance literacy through movement and embodied dance history. The course, therefore, investigates the historical and anthropological significance of dance as well as provides an experience of the movement qualities of different world cultures. Students examine dance as a kaleidoscopic reflection of humanity's basic instinct to communicate and, by extension, as an expression of world perspectives through movement. (Spring)

DAN 209 Qi Gong: Chinese Way to Health. Qi Gong is a Chinese internal art and an early forerunner of Tai Chi. This course is a study of the cultural, lifestyle, and movement aspects of Qi Gong for health and fitness. Topics include concepts such as Yin-Yang theory, Five-Element theory, and Qi theory and the practice of the Eight Section Brocade, Six Healing Sounds, Five Animal Frolics, and Taiji 9 Forms. Qi Gong provides the dancer with training for relaxing the body, breathing, and mind and for awareness and mindfulness as well as and cultivating, harmonizing, and expressing energy. (Fall and Spring)

DAN 240 Tap Dance: Intermediate. Expand upon your tap dance foundation. Discover techniques essential for the study of rhythm tap dance, including subtle weight shifts, articulate footwork, and dynamics. Explore the physical interpretation of rhythm through the art of tap dance and the practice of improvisation. (Fall)

DAN 242 Design for Dance. This is an introductory design course aimed at giving students exposure to light as a medium, lighting design, lighting equipment, and visual storytelling for performance through class discussion and practical work. This is a 2-credit course and only meets a few times throughout the semester from 8 to 11 p.m. on dates that are TBD. The class is built around specific performance dates that provide the students with an opportunity to light a dance piece. (Fall)

DAN 245 Dance Therapy Foundations. Dance Therapy Foundations examines dance/movement therapy's integration of natural movement, formal elements of dance, music, creative processes, verbal expression, and concepts drawn from Asian approaches to healing, psychology, counseling, and neuroscience to treat a wide range of challenges (e.g., autism, anxiety, eating disorders, abuse, developmental challenges, and psychosis). The course also shows how one can use basic elements of dance to further personal, professional, and creative development. Experientials, creative dance, and videotapes of actual sessions highlight these concepts. Dress comfortably. Be prepared to move. (Fall)

DAN 290 Middle Eastern Dance: Orientale. Unveil the grace and beauty residing in the creative nature of Middle Eastern dance. Improve strength, flexibility, and self-awareness of the body. Class work includes meditative movement, dance technique, improvisation, and rhythm identification through music and drumming. Specific dance forms, such as Egyptian, Turkish, and American Tribal are taught. Traditional costuming is addressed and shown in class. History, art, and culture from these countries are explored and experienced. Discourse and research topics explore issues of gender, body image, historical perspectives, and Orientalism. No prior dance experience necessary. (Fall)

DAN 296 Art of Teaching Dance K–12. DAN 296 focuses on designing movement-based lessons for K–12 curriculum. Pedagogical areas of study include lesson and curriculum planning, teaching methods, assessment, alignment with state and national teaching standards, and formulating a teaching philosophy. Students have the opportunity to work directly with K–12 students developing, teaching, and evaluating lessons of their own design. Includes pedagogical theories such as Muska Mosston's Spectrum of Teaching Styles, Bloom's Taxonomy, Arthur L. Costa and Bena Kallick's Habits of Mind, and Howard Gardner’s Multiple Intelligences. This course is geared for the student interested both in arts in education and in teaching creative dance. (Fall)

DAN 378 Choreographic Voice: Dance and Social Justice. In this course, students study various choreographic works that address issues of social justice as thematic material, political activism, and historical reflection. Dialogue and readings on social justice and the social role and responsibility of the artist frame a creative process where students also develop their own socially conscious choreography that is presented and discussed. (Fall)

DAN 385 Dance Performance Workshop. Within a choreographic process, students take part in the creation of new work that interfaces with digital technology, choreographed by Missy Pfohl Smith in collaboration with the dancers, and with guest media artist W. Michelle Harris. Additional repertory may also be explored in order to draw on the unique artistry of each of the dancers. Experience a rehearsal process from beginning to end, addressing a variety of performance techniques and the unique and personal artistry that is yours alone. Students also carry out various production aspects of performance as well as performance itself in various public settings, most likely including the American College Dance Association Conference in winter 2017. Prerequisite: Permission of instructor or by audition on the first day of classes. (Fall)

For More Information
Please visit the dance program website at www.rochester.edu/college/dance.
DATA SCIENCE

"Data is the new science. Big Data holds the answers."
—Pat Gelsinger, Chief Executive Officer of VMware, Inc. and former Chief Operating Officer of EMC Corporation

Information about the Program
Data science has been called the defining discipline of the 21st century. It focuses on developing and applying computational methods for statistical analysis and discovery in large-scale data sets. There is extremely high demand in business, health care, technology, and government for data scientists. Students learn to be proficient in algorithms and programming, develop a deep understanding of statistical methods, and learn to apply their abilities to significant real-world problems. In addition to learning computing and mathematics, students delve deeply into an application area where data science methods can be applied. Application areas include biology; brain and cognitive sciences; computer science, statistics, and mathematics; earth and environmental science; physics, economics, and business; and political science. The data science BA and BS degrees prepare students for a variety of careers in data analytics and for graduate study in the physical, life, social, or computational sciences.

Program Advice for Freshmen
The interdisciplinary study of data science requires the ability to be highly analytical through the use and understanding of statistics, math, and computer science. It is recommended that you complete a set of prerequisite courses by the time you declare your major. Students should be aware that application area courses are at the 200-level or above and may require additional prerequisite courses in addition to the prerequisite courses for entering the data science major itself. All majors are required to take three courses within one application area. Students interested in a BS degree are required to take three additional supplementary courses that students declaring a BA degree are not required to take.

Advanced Placement (AP)
Students who wish to be awarded AP credit must check with the department that parents the course.

Courses
Following is a selection of the prerequisite and introductory courses for the major. Students thinking about majoring in data science should consider taking some of these courses during their freshman year.

**MTH 150 Discrete Mathematics.** Logic, functions, algorithms, mathematical reasoning, mathematical induction, recurrence relations, techniques of counting, equivalence relations, graphs, trees.

**MTH 161 Calculus I and MTH 162 Calculus II or MTH 141 Calculus I, MTH 142 Calculus II, and MTH 143 Calculus III.** Either calculus sequence may be taken for the major.

**CSC 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. With advisor’s approval, AP credit or prior experience can substitute for this course. Small-group problem-solving workshops are an integral part of this course. Lab required. There are no formal prerequisites, but prior programming experience is recommended (though not required). This is the first course in the pre-major sequence for the BS. Leads into the following clusters: Algorithms, Business Computing, Computational Problem Solving, Computer Systems, Human Computer Interaction, Computing for the Social Sciences, Computer Science and Art, and Foundations of Computer Science. (Fall)

**CSC 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). Small-group problem-solving workshops are an integral part of this course. Lab required. Prerequisite: CSC 171 or equivalent, MTH 150. Leads into the following clusters: Foundations of Computer Science and Computer Systems. (Fall and Spring)

**DSC 262 Computational Introduction to Statistics.** This course covers foundational concepts in probability and statistical inference, with an emphasis on topics of interest to computer scientists. Following an introduction to elementary probability theory, topics include applications of combinatorics, Markov chains, principles of statistical classification (Bayes’ rule, sensitivity and specificity, ROC curves), and random number generation. The theory of statistical estimation and hypothesis testing is introduced and applied to one- and two-sample inference for population means, proportions, variances, and correlations. Nonparametric procedures are discussed. Topics also include statistical modeling (ANOVA, simple, and multiple regression) and computational methods. Students are introduced to the R statistical computing environment. (Fall)

For More Information
Please visit the data science website at www.rochester.edu/data-science/degrees/undergraduate.html or contact the academic program manager at (585) 275-5288.
DIGITAL MEDIA STUDIES

“IT’S TECHNOLOGY MARRIED WITH LIBERAL ARTS, MARRIED WITH THE HUMANITIES THAT YIELDS US THE RESULTS THAT MAKES OUR HEART SING.”

—Steve Jobs

Information about the Program

Designed by faculty within Arts, Sciences & Engineering, the new digital media studies major provides students with the skills necessary to critically appraise and actively produce digital media. In a world of ubiquitous computing and constant digital connectivity, digital literacy and the ability to effectively communicate with and design for digital media users are valuable, marketable skills. This major blends theoretical and historical understandings of past and present medias with hands-on uses of emerging technologies, programming, and software. The ability to create digital media has become both more pervasive and increasingly inexpensive, but the number of rigorously trained digital media designers and producers falls woefully short of industry needs. This major is designed to supply this demand and prepare students to succeed in one of the biggest professional growth fields around today. A distinctive component of the major is the capstone project in which all students in the major collaborate on the design and production of a form of digital media of their choosing beginning in the spring of their junior year and continuing throughout their senior year. Much of the work in the digital media studies major takes place in Rettner Hall, a brand new facility designed to house the program.

Program Advice for Freshmen

Students interested in digital media studies are strongly urged to begin core DMS coursework with DMS 101, DMS 102, and/or DMS 103 in the fall and DMS 104 in the spring. Since these courses prepare students for the variety of upper-level courses that make up the major, students are encouraged to complete this core coursework before the end of their sophomore year. Because the major is flexibly designed, however, students can begin taking production courses while they are working on core courses. Thus, in the spring semester a student might take DMS 104 in conjunction with a course on digital art, for example, or one on machines and consciousness. In the sophomore year, students continue the core and production courses, begin advanced-level media history and theory work, and may enroll in the required Digital Portfolio course.

Courses

Core Courses

DMS 101 Introduction to Digital Media Studies. In this class we critically think about the creation, production, distribution, consumption, and reception of digital media. Readings and class discussions focus on the theory, history, and practice of digital media and its application in the humanities, social sciences, and our world. Students produce individual research in the form of written responses, as well as collaborative digital projects. The course’s goals are to prepare students to thoughtfully critique our digital world, create scholarly digital projects, and understand the multifaceted importance of media in today’s society. (Fall)

DMS 102 Introduction to Computing Multimedia. Students learn how to manipulate digital media including text, audio, graphics, and video using programming concepts. In parallel, students explore digital media studies through readings, discussions, and essays. Students are expected to spend a significant amount of time outside of class on projects, lab assignments, reading, and writing. No previous programming experience is required. (Fall)

DMS 103 The Essential Digital Media Toolkit. This course introduces students to current industry-standard software for creating, editing, and producing core digital media objects: photographs, video, vector images, 3D models, and video games. This fast-paced project-driven course invites experts in the fields of photography, video, graphic design, rapid prototyping, and gaming to share their knowledge and experience. Through finding creative solutions to problems posed by instructors, students manipulate photographs, edit a short video, design graphics, use a laser scanner and software to make and modify a 3D model, and create a small interactive videogame environment. The course culminates with students designing digital portfolios of the work they create in this course. (Fall)

DMS 104 Design in the Digital Age. Designing digital products and services requires a process of “interaction design,” which is a wholly new discipline that moves beyond previous fads of simply making digital things that look like physical world objects. Since there is no known formula for creating great UI/UX we explore the need to consider interactivity as a design process, moving from initial ethnographic research through ideation and design and the many steps that lead to final delivery and presentation. Mastery of this process prepares DMS students to undertake their senior capstone project as well as effectively develop other creative and entrepreneurial ideas/ventures. (Spring)

Technology/Production Courses

For relevant courses related to technology/production, please see the program website and/or the digital media studies program advisor.

For More Information

Please visit the digital media studies program website at www.rochester.edu/college/dms/.
EARTH AND ENVIRONMENTAL SCIENCES

"Mont Blanc yet gleams on high—the power is there,
The still and solemn power of many sights,
And many sounds, and much of life and death.
In the calm darkness of the moonless nights,
In the lone glare of day, the snows descend!
Upon that Mountain"

—Percy Bysshe Shelley

Information about the Department

The department offers courses leading to degrees in the geological and environmental sciences. In addition, minor programs and a number of clusters allow students in other fields to explore topics such as the formation of the Earth, the evolution of the solar system or past and current changes in the global climate. Undergraduates are strongly encouraged to take part in departmental research activities, and such experience is typically included in upper-level undergraduate courses. Research fields represented include geophysics, geochemistry, structural geology, sedimentology, environmental geology, oceanography and climate science. The department is equipped with several state-of-the-art research laboratories that complement active field-based programs. Undergraduate research provides an excellent opportunity for students to work closely with faculty and graduate students.

The department also considers field experience to be a valuable part of geological training, and field excursions are incorporated into the schedule of several undergraduate courses. Students in EES 101 use the local glacial geology as a guide to recent Earth evolution, whereas students in EES 102 explore the active geological processes that are shaping California. Opportunities for students to be involved with field-based research are also available. Recent examples include involvement of undergraduates in scientific expeditions to the Arctic, Tibet, East Africa, southern Africa, the Andes, and the western United States to study the Earth’s past climate and tectonic processes.

Departmental Advice for Freshmen

The Department of Earth and Environmental Sciences offers programs leading to a BS or BA degree. The BS programs include geology, environmental science, and geomechanics; BA programs are available in geology and environmental studies.

The BS program in geology is designed to give students a sound preparation for graduate studies and a professional career. It contains a greater proportion of related science courses than the BA program. A typical first semester program for a BS student would be chemistry, geology, calculus, and an elective. A special track within the major enables students to emphasize the relationships between biology and geology.

The BS in environmental science provides a broad basis in the natural sciences and their applications to processes and problems in the environment. This degree is intended for students who are interested in a career in environmental research. Students going through this program will be able to seek employment directly or to go on to programs that offer advanced degrees in environmental science. A typical first semester program includes calculus, chemistry and/or biology, and an elective.

The BS program in geomechanics is a joint offering of the Department of Earth and Environmental Sciences and the Department of Mechanical Engineering. A student majoring in this program may be well suited for employment or graduate study in areas such as geology, petroleum geology, engineering geology, or geophysics. A typical first semester for a BS student in geomechanics would be calculus, chemistry, geology, and an elective.

The BA program in geology offers students more freedom in selecting courses, especially in the social sciences and humanities, while providing them with the minimum background required for graduate studies. Freshmen interested in this program are not required to take certain courses for their first semester, but should take chemistry, geology, and mathematics during the first two years.

The BA in environmental studies combines natural science courses providing a basic understanding of environmental problems and social science courses that bear upon management of these problems. This program is intended for students who are interested in environmental policy and management. Students who complete this program typically go into fields such as environmental law or public policy. Students might take chemistry, calculus, economics, and an elective in the first semester.

The department also offers minors in geology and environmental geology to enable students majoring in other disciplines to develop an understanding of one area of geology.

Advanced Placement (AP)

Students who receive a 4 or 5 on the AP Environmental Science exam are awarded credit for EES 103.

International Baccalaureate (IB)

Geography—Students who receive a higher-level exam score of 5 or better are awarded credit for EES 101.
Courses

Fall Semester

EES 101 Introduction to Geological Sciences.* This introductory geology class provides a broad overview of 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 introduce the class with the unifying framework for earth science: plate tectonics. Throughout the semester, we look at the physical interactions between different realms on Earth, including the interior (core and mantle), the outer shell (termed lithosphere), oceans, and the atmosphere. We 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 discuss geologic problems that have a particular relevance to humans, such as energy and mineral resources, water resources, climate, and global change. Students are required to enroll in a lab section and are required to attend one field trip.

Spring Semester

EES 102 Earthquakes, Volcanoes, and Mountain Ranges in California. 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 learn to examine critically ideas on how Earth science systems work and how active processes affect society.

EES 103 Introduction to Environmental Science.* An introduction to the natural, physical, chemical, biological, and geological processes that shape conditions at the Earth's surface; their interrelationships; and the modification of these processes by human activity. Students learn to critically analyze scientific hypotheses and the data on which they are founded and to understand economic and policy strategies that can be implemented to reduce environmental damage. The content of this course is similar to that of the AP environmental science curriculum. This course may be used as an introductory core requirement for the environmental studies or science majors.

EES 105 Introduction to Climate Change. This course explores 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 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?

EES 201 Evolution of the Earth.* Historical geology encompasses the 1) dynamic history of the physical earth: the development of landforms, 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.

For More Information
Please visit the Earth and environmental sciences program website at www.ees.rochester.edu/.

EAST ASIAN STUDIES

Information about the Program
The East Asian studies major is an interdisciplinary approach to the languages, deep history, and uncommonly rich culture of this increasingly important part of the world. Students in this major study Chinese or Japanese for at least two full years, and they must take classes in at least three—and they can take classes in four—departments in order to achieve a broad and deep understanding of East Asia.

Students who complete the major in East Asian Studies will have a broad knowledge of the major historic developments, cultures, literary and artistic expressions, philosophies, religions, and economics and politics of the region. They will be able to synthesize their knowledge of the region across disciplinary perspectives, and they will have an intermediate-level proficiency in either Chinese or Japanese.

Program Advice for Freshmen
Students begin their study of East Asia by taking three introductory courses, arranged historically, on the literature, history, religions, visual culture, and other foundational aspects of the region. They also are encouraged to begin their prerequisite language studies.

*Courses that are part of clusters offered by the Department of Earth and Environmental Sciences.
Courses

Fall Semester

Prerequisite Language Courses

CHI 101 Elementary Chinese I. Students must register for both lecture and recitation. 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 is on developing listening and speaking skills as well as building a vocabulary based on 400 ideographic characters. (4 credits)

JPN 101 Elementary Japanese I. Students must register for both lecture and recitation. Designed to help beginners acquire a basic command of modern Japanese. The classes are conducted in English for the grammar lecture, the recitation in Japanese. In the beginning, students master Hiragana and Katakana writing systems. As the course progresses Kanji Chinese characters are also introduced. Classes emphasize reading, writing, listening, and speaking. Requirements include regular assignments, quizzes, lesson tests, and final exam. Textbooks: 1) Genki I: An Integrated Course in Elementary Japanese by Eri Banno Yutaka Ohno, et.al. (the Japan Times) and 2) Course Workbook by Shino. (6 credits)

Note: The following course may have appropriate content but has not been officially approved for the EST program. Please see one of the EST faculty advisors for approval.

KOR 101 Elementary Korean I. Students must register for both lecture and recitation. Korean is the official language of South Korea and North Korea. It is spoken by about 80 million people worldwide. This course is designed for beginners. It introduces students to the sounds, basic sentence structures, and the writing system of Korean. Emphasis is on developing listening and speaking skills as well as building a vocabulary. Cultural aspects of the language are emphasized also to enhance student’s understanding of the language. (4 credits)

Foundational Survey Courses

HIS 142 Traditional China. This course focuses on the history of traditional China from antiquity to the 18th century. Two thousand years of civilization, six thousand miles of the Great Wall, a silk road linking China to Rome, and seven maritime voyages sailing across the Pacific and Indian oceans. How have the notions of “China” and “Chinese” civilization transformed over time through cultural diffusion, commercial exchange, and military expansion? How does increased knowledge of Chinese history change our conceptions of Western civilization and the currents of world history? No prior knowledge of Chinese history or language is required for this course. Besides a standard textbook, one academic monograph (Mountain of Fame) and one Chinese classic (Dream of the Red Chamber) will anchor our readings throughout the course.

HIS 143 Modern China, 1600–Present. This class covers the search for modern China in the 20th century. We 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.

Note: The following course may have appropriate content but has not been officially approved for the EST program. Please see one of the EST faculty advisors for approval.

REL 175 Religion and Chinese Society. This course examines the complicated relationship between religion and society in China. It takes a sociological approach, emphasizing that religion should be studied as a social phenomena that closely interacts with the development of society at large. The focus is on contemporary times from the end of the 19th century through present. During this period of time, China experienced tremendous change. This course introduces how such change impacted and was expressed through religion, religiosity, and religious politics.

Spring Semester

Prerequisite Language Courses

CHI 102 Elementary Chinese II. Students must register for both lecture and recitation. 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. (6 credits)

JPN 102 Elementary Japanese II. Students must register for both lecture and recitation. 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. Although the main emphasis is still on speaking and listening, students have more opportunities for writing than in JPN 101. The classes are conducted in both Japanese and English. The students master, among other things, keigo (polite language), female versus male speech style, and “direct” style verbal. Textbooks: 1) Genki I: An Integrated Course in Elementary Japanese by Eri Banno Yutaka Ohno, et.al. (the Japan Times) and 2) Course Workbook by Shino. (6 credits)

Note: The following course may have appropriate content but has not been officially approved for the EST program. Please see one of the EST faculty advisors for approval.

KOR 102 Elementary Korean II. Students must register for both lecture and recitation. This course is the continuation of KOR 101. Focus is on developing listening and speaking skills for everyday personal communication and developing sociocultural knowledge for interactional competence in Korean. This course consists of lecture and recitation. The terms “lecture” and “recitation” conventionally used to identify the sections have a purely bureaucratic significance and do not reflect in any way the pedagogical approach of the course. (4 credits)

UNDERGRADUATE PROGRAMS

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FRESHMAN ACADEMIC HANDBOOK

For additional relevant spring course offerings, please visit the East Asian studies web page.

For More Information
Please visit the East Asian studies program website at www.rochester.edu/college/msc/east-asian.html.

ECONOMICS

“It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner but from their regard to their own interest.”

—Adam Smith

Information about the Department
The undergraduate program emphasizes the understanding of modern tools of economic analysis and their application to contemporary policy issues. Those concentrating in economics have the opportunity to pursue a BA degree in economics or financial economics. Students seeking more rigorous training have the opportunity to pursue an honors degree in economics. Graduates are prepared for positions in business and government; for professional schools of business administration, including the 3-2 MBA program with the William E. Simon Graduate School of Business Administration; for graduate work in economics or public policy; for law school; and for PhD programs in economics.

Departmental Advice for Freshmen
Students planning to major in economics should complete at least three of the following courses by the end of their sophomore year: ECO 108; ECO 207 or ECO 207H; ECO 209 or ECO 209H; a semester of statistics (ECO 230 is recommended; STT 213 or MTH 203 is acceptable). By the end of your sophomore year, you should complete at least one semester of the calculus sequence. One year of calculus is required to major in economics (161–162 is preferred; 141–143 is acceptable).

Courses

ECO 108 Principles of Economics. This course is an introduction to the fundamental concepts of both microeconomic theory (supply and demand, cost and production, prices in markets for individual commodities) and macroeconomic theory (national income, unemployment, and inflation), with applications of theory. Prerequisites: ECO 108 or equivalent. This course is required for an economics concentration and for all economics clusters. (Fall and Spring)

ECO 207 Intermediate Microeconomics. This course develops the fundamental building blocks of economic theory, enabling the student to gain an understanding of how economists evaluate economic problems and policies. The focus throughout is on how economic agents make choices and how prices serve as a key mechanism in the allocation of resources. Topics covered include competition, monopoly, taxes, subsidies, etc. Prerequisites: ECO 108 or equivalent. This course is required for an economics concentration and for all clusters. (Fall and Spring)

ECO 207H Honors Intermediate Microeconomics. Rigorous treatment of ECO 207 for students pursuing the honors degree and valuable for those students considering pursuing a PhD in economics. Prerequisites: one semester of calculus, excellent performance in ECO 108 or equivalent, instructor’s permission. (Spring)

ECO 230 Economic Statistics. This course provides an introduction to basic probability and statistical theory for estimation and hypothesis testing, with emphasis on issues that arise when dealing with economic data. In the process, data analysis methods through the use of computer software are introduced. This course fulfills the statistics requirement for economics majors and should be completed by the sophomore year. (Fall and Spring)

Advanced Placement (AP)
Students who have received a score of 4 or 5 on the AP exam in Microeconomics and a 3, 4, or 5 on the Macroeconomics examination will be given credit for ECO 108.

International Baccalaureate (IB)
Economics—Students who receive a higher-level exam score of 4 are placed into ECO 207. No credit is awarded. Students who receive a score of 5 or better on a higher-level exam are placed into ECO 207 and awarded credit for ECO 108. No credit is granted for subsidiary-level exams.

Clusters
The department offers clusters in a number of areas of economics, including macroeconomics, applied economics, and theoretical economics. For most students, ECO 108 is a required course for a cluster.

For More Information
Please visit the economics program website at www.econ.rochester.edu/.
ELECTRICAL AND COMPUTER ENGINEERING

“Few things are impossible to diligence and skill.”
—Samuel Johnson

Information about the Department

The Department of Electrical and Computer Engineering is home to programs making significant contributions to fields as diverse as health, energy, national security, information management, and even entertainment. In addition to their academic studies, students also have many opportunities to participate in department research programs as well as student-run projects such as the Solar Splash and Mini Baja teams.

Departmental Advice for Freshmen

The electrical and computer engineering curriculum is based upon a foundation of mathematics and the physical sciences with a total of five mathematics and three physical science courses required. Our department’s curriculum provides a broad education in the basics of electrical and computer engineering as well as in-depth studies and design experiences in one or more areas such as signals and communications, computer architecture, or electronics and integrated circuit design. Thus, after completing the baccalaureate degree, our graduates are prepared to enter the ECE profession directly or to pursue further study at the graduate level. The flexibility in the program also offers students the opportunity to prepare for careers in law, business, or medicine and other alternative career paths.

Entering students with an interest in pursuing the ECE program are assigned faculty advisors to help with academic program planning throughout their four years of studies.

Typical Freshman Year Program

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<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<td>MTH 161 or MTH 141</td>
<td>MTH 162 or MTH 142</td>
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<tr>
<td>WRT 105</td>
<td>PHY 121</td>
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<tr>
<td>EAS 10X (EAS 108 recommended)</td>
<td>ECE 114</td>
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<tr>
<td>Natural science or elective</td>
<td>Elective</td>
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Courses

EAS 108/ECE 101 Introduction to Electrical and Computer Engineering. A general, high-level understanding of workings of modern computing systems from circuit to computing system architecture to programming. ECE 101 is not a required course. Lecture materials are covered eventually in subsequent courses. It is intended to introduce you to (a subset of) principle topics in computer system designs. There is an emphasis on hands-on experience to give you a “feel” for the materials that are discussed in more depth later on.

For More Information

Please visit the electrical and computer engineering program website at www.ece.rochester.edu/undergraduate/major.html

ENGINEERING SCIENCE

“The opportunities of man are limited only by his imagination. But so few have imagination that there are ten thousand fiddlers to one composer.”
—Charles F. Kettering

Information for Interested Students

The world needs creative thinkers to enhance our understanding of complex global issues. Engineers are uniquely equipped to develop solutions to the world’s problems, such as global warming and the loss of biodiversity, securing cyberspace, clean water and shortages of healthy food, developing sustainable energy sources, preventing nuclear terror, widely advancing the spread of health information and better medical solutions, and broadening access to education for all humans. At its core, engineering is about deconstructing a problem, designing a solution, and tinkering with your solution until you have reached a desired outcome. Students taking courses at the Hajim School of Engineering and Applied Sciences are challenged to nurture their ingenuity and become technologically savvy problem solvers. Students majoring in engineering science achieve depth and breadth in the field, are able to function across disciplines, and graduate well prepared for advanced studies, as well as professional employment. The Bachelor of Arts degree in engineering science provides traditional liberal arts students with a multidisciplinary
major that emphasizes understanding and application of engineering, scientific, and mathematical principles.

Advice for Freshmen
Our introductory courses, EAS 10x, are accessible to engineering majors and nonmajors alike. These courses focus on the fun side of engineering, from designing your own video game to building bridges to making more energy-efficient devices. While completion of at least one EAS 10x course is required for most majors in the Hajim School, the engineering science major offers considerable flexibility and permits students to develop individual plans of study to meet their own educational goals. The EAS10X seminar/workshop is required for all students taking an EAS10X course for credit.

In addition to taking core courses in mathematics, physics, chemistry, and computer science, students study thermodynamics, fluid dynamics, optics, mechanics, signals, and circuits. Focus areas of study include but aren’t limited to biomedical, chemical, electrical, and computer, and mechanical engineering; optics; and computer science. Careers in patent law, technical writing, science consulting, and technical sales as well as science and engineering education are possible outcomes.

Typical Freshman Year Program

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<th>Fall Semester</th>
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<tr>
<td>MTH 141 or MTH 161</td>
<td>MTH 142 or MTH 162</td>
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<td>CHM 131, CHE 172, or CSC 171</td>
<td>PHY 113 or PHY 121</td>
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<td>WRT 105 or elective</td>
<td>CSC 160 or CHM 132</td>
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<tr>
<td>EAS 10X course</td>
<td>WRT 105 or elective</td>
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Courses

EAS 101/BME 101 Introduction to Biomedical Engineering. Students receive an overview of the multidisciplinary field of biomedical engineering, including application of elementary engineering principles to the analyses of physiological systems. By learning about topics such as biomechanics, cell and tissue engineering, biosignals, biosystems, bioinstrumentation, medical imaging, medical optics, and bioethics, freshmen will see the crucial role engineers play in the development of medical machinery. This course includes a weekly laboratory and an introduction to the use of computers as tools for solving engineering problems. (Fall)

EAS 102/CHE 150 Green Energy. Freshmen enrolled in this course study the issues of energy production, conversion, and utilization. The first half of the course covers energy and power metrics, material and energy balances, and the fundamental laws of thermodynamics. The remainder of the course examines traditional and alternative energy sources, energy distribution, and energy utilization. Course activities include weekly homework assignments, exams, and project. Emphasis is on assumption-based problem solving. (Fall)

EAS 103/AME 140 Introduction to Audio Music and Engineering. The course provides an introduction to the science and technology of audio. Students learn about the vibration of strings, musical tuning systems, overtones and timbre, and modes of oscillation through the concept of a guitar. Fourier analysis, transducers, and passive electrical components and circuits are introduced when discussing amps and audio components. Hands-on projects introduce the fundamental concepts of electronics, including voltage, current, resistance and impedance, basic circuit analysis, ac circuits, impedance matching, and analog signals. The course then introduces basic digital signal processing concepts, where they use Arduinos and Pure Data to learn about conversion of sound to digital format, frequency analysis, digital filtering and signal processing, and musical sound synthesis.

EAS 104/ME 104 The Engineering of Bridges. This course is 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. By studying 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 in teams, students use constructive experimental models as well as computer-aided programs to design, build, instrument, and test realistic bridge projects. (Fall)

EAS 105/OPT 101 Introduction to Optics. Starting with a discussion of the properties of light (refraction, imaging, diffraction, and interference), the course also reviews the development of the microscope, telescope, laser, Internet, information storage and display, and medical applications. While covering the fundamentals of optics and discussing engineering and applied sciences in the real world, this course also explores how optics interweaves with other Hajim School disciplines. (Fall)

EAS 108/ECE 101 Introduction of Computing Systems. This project-based course is designed to give students a general, high-level understanding of the workings of modern computing systems from circuit to computing system architecture to programming. It is intended to introduce students to (a subset of) principle topics in computer system design. There is an emphasis on hands-on experience to give a “feel” of the materials that will be discussed in more depth in subsequent ECE courses. (Fall)

EAS 141 Basic Mechanical Fabrication. This half-semester, two-credit course teaches students the safe and effective use of basic machine tools such as lathes, mills, band saws, and drill presses. Students complete a number of projects that utilize these principles. Grades are based on the successful completion of these projects. Read more about this course at www.hajim.rochester.edu/news/eas_141.html. (Spring)

For More Information
Please visit www.hajim.rochester.edu/options and join the Hajim School’s Facebook page.
ENGLISH

Tell all the truth but tell it slant—
Success in Circuit lies
Too bright for our infirm Delight
The Truth’s superb surprise
—Emily Dickinson

Information about the Department

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. We have richly varied offerings in creative writing, in the study of film and other media, and in journalism, rhetoric, and theater. Our 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 we maintain 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 for our students. 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. We also offer 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.

Departmental Advice for Freshmen

The English courses listed below are intended to introduce students to the study of literature, language, film, theater, and creative writing. They will allow students to discover the many ways of approaching imaginative works. Classes such as ENG 112, 113, 114, and 115 provide broad surveys of English and American literature—and their historical backgrounds—and are especially useful to those students considering the major in English literature or creative writing. Two of these classes are in fact required for these tracks in the major, and they can also be counted for requirements in the Theater and Language, Media and Communication tracks.

It’s important to note, however, that neither these nor any of the 100-level classes we offer are in any way prerequisites for upper-level courses. Freshmen should be aware that, in fact, the department has no hard and fast rules that prohibit them from taking most English courses at the 200 level, except for 200-level creative writing courses. If an upper-level course on, say, Shakespeare, the Victorian novel, modern poetry, post-Colonial literature, or contemporary film looks interesting, you should consider enrolling—although you might want to check with the professor if you have any questions about your preparedness.

For any additional questions about English courses or about the English majors, minors, and clusters, students should contact the director of Undergraduate Studies in English.

Advanced Placement (AP)

Students who have received a score of 4 or 5 on the AP exam in English Literature will be awarded 4 elective credits of English (not for use toward an English major) upon earning a “B” grade or better in an English literature course.

International Baccalaureate (IB)

English—Students who receive a higher-level exam score of 6 or better are awarded 4 hours of elective English credit (not for the major) after completion of an English literature course with a grade of C or better. No credit is granted for subsidiary level exams.

Theater Arts—Students who receive a higher-level exam score of 6 or better are awarded 4 hours of elective English credit (not for the major).

Clusters

American and African-American Studies; Creative Writing; Gender and Writing; Great Books, Great Authors; Literature and Cultural Identity; Language, Media, and Communication; Medieval Studies; Modern and Contemporary Literature; Novels; Plays, Playwrights, and Theater; Poems, Poetry, and Poetics; Theater Production and Performance.

Courses

Introductory and Gateway Courses

ENG 100 Great Books: Welcome to a Strange New Place.
Your homeward-bound ship is lost at sea. You tumble down a rabbit hole. You wake up one morning to find that you have turned into an enormous beetle. Many of the best (and best-loved) works of the imagination, from The Odyssey to the Alice books to Star Wars, begin with fantastic dislocations, weird transmutations, and unexpected journeys to strange new worlds. And these sudden metamorphoses of place and person provide vehicles for representing some of the profoundest experiences in life: coming-of-age, vocation, revela-
tion, exile, captivity, loving, aging, dying. In this Great Books course, we experience, ponder, and write about some of the most interesting and influential works of marvelous displacement in literature. Authors include Homer, Ovid, Shakespeare, Francis Bacon, Margaret Cavendish, Jonathan Swift, Daniel Defoe, Olaudah Equiano, Jane Austen, Lewis Carroll, Franz Kafka, Karen Blixen, and Ursula K. Le Guin. We also view films by Julie Taymor, the Coen Brothers, and Hayao Miyazaki. (Fall)

ENG 112/REL 140/CLA 140 Classical and Scriptural Backgrounds. Explores the great tradition, from Homer, Greek drama, Plato, and Virgil to the Bible and Dante. May count toward completion of the cluster in Medieval Studies and Great Books, Great Authors. (Fall)

ENG 113 British Literature I. An introductory study of early British literature, its forms and themes, and the development of our literary tradition. May count toward completion of the clusters in Medieval Studies and Great Books, Great Authors. (Fall)

ENG 114 British Literature II. Major themes and central ideas in British literature of the 18th, 19th, and 20th centuries are discussed. May count toward completion of the cluster in Great Books, Great Authors. (Spring)

ENG 115 American Literature: Beginnings to Civil War. Significant achievements by American writers of poetry, fiction, and other prose are covered. May count toward completion of the cluster in American and African-American Studies. (Spring)

**Film and Media Courses**

ENG 117/FMS 132/AH 136 Introduction to the Art of Film. This course presents 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. May count toward completion of the clusters in Language, Media, and Communication and Modern and Contemporary Literature. (Fall)

ENG 118/FMS 131/AH 102 Introduction to Media Studies. This course introduces students to the theory and practice of media studies. We look at a range of both media and historical tendencies related to the media, including manuscript culture, print, and the rise of the newspaper, novel, and modern nation-state; photography, film, television and their respective differences as visual mediums; important shifts in attitudes towards painting; the place of sound in the media of modernity; and the computerization of culture brought about by the computer, social networks, video games, and cell phones. (Spring)

**Creative Writing Courses**

ENG 121 Creative Writing: Fiction. Our goal in this introductory workshop is to strengthen writing skills and expand our sense of the possibilities of imaginative fiction. As you write and hone your own original fiction, we examine the components of narrative in stories by diverse modern and contemporary writers. In particular, we studying the strategic use of point of view and the ways individual voices are defined through monologue, dialogue, summary, and scene. (Fall and Spring)

ENG 122 Creative Writing: Poetry. An introductory course in the art of writing poetry. In addition to reading and writing poems, students learn about various essential elements of craft such as image, metaphor, line, syntax, rhyme, and meter. The course is conducted in a workshop format, and instructor permission is required. To apply, email the instructor three to five poems or a small prose piece (fiction or creative nonfiction). (Fall and Spring)

ENG 123 Playwriting. An introductory course devoted to the understanding and execution of dramatic writing that is unique to the theater. (Fall)

ENG 125 Speculative Fiction. A creative writing course dedicated to commercial and/or literary fiction with an emphasis on science fiction, fantasy, and magic realism. (Fall)

**Language, Media, and Communication Courses**

ENG 131 Reporting and Writing the News. A laboratory course (requiring typing) on the fundamentals of gathering, assessing, and writing news. May count toward completion of the cluster in Language, Media, and Communication. (Fall, two sections)

ENG 132 Feature Writing. The study and practice of longer, more complicated newspaper and magazine stories, such as investigations and profiles. Emphasis is on the consideration of the various techniques of nonfiction writing. (Spring)

ENG 134 Public Speaking. Basic public speaking is the focus of this course. Emphasis is placed on researching speeches, using appropriate language and delivery, and listening critically to oral presentations. ENG 134 contains two quizzes, a final exam, and four speeches to be given by the student. The speeches include a tribute, persuasive, explanatory, and problem-solving address. The course utilizes instructor Curt Smith's experience as a former White House presidential speechwriter. (Fall and Spring)

ENG 135 Introduction to Debate. The purpose of this course is to give students an appreciation for and knowledge of critical thinking and reasoned decision making through argumentation. Students research both sides of a topic, write argument briefs, and participate in formal and informal debates. Students also are exposed to the major paradigms used in judging debates. Applicable English cluster: Media, Culture, and Communication. (Fall)

ENG 138 Journalism Case Studies. 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, as well as interviews of experts and ordinary people with personal knowledge of the topic. Past projects have examined hunger in Rochester, the impact of the recession upon the residents of this area, and children's health issues. (Spring)

Freshmen are also welcome in 200-level ENG courses that do not require permission of instructor. Please see www.rochester.edu/college/eng for full ENG course listings.
The University of Rochester International Theatre Program produces four major productions annually as well as other events (including a student One Act Play Festival). The program also offers students classes in acting, voice and movement, playwriting, directing, and backstage/technical arts. Though there is no theater major, an English major with a concentration in theater and an English major with theater minor are available. Detailed information about the University of Rochester International Theatre Program can be found at www.rochester.edu/theatre.

**ENG 123 Playwriting.** An introductory course devoted to the understanding and execution of dramatic writing that is unique to the theater. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 170 Technical Theater.** An introductory course on the theories, methods, and practice of set construction, power tools, rigging, stage lighting, drafting, sound, and scene painting. Lab participation in theater program productions is required. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 172 Introduction to Stage Lighting and Sound.** The course undertakes to introduce students to the various elements of theater design. Lighting techniques, sound design, and set design are all covered from time to time. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 174 Acting Techniques I and Acting Lab.** Training in the techniques by which individual actors set forth the characters recorded in dramatic texts. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 176 Voice and Movement for the Actor.** An introductory course on voice and movement for the actor, concentrating on the ability of the actor to maximize the use of the body and voice to express emotion and character. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 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. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 290 Plays in Production.** Set building, prop and costume development, and publicity for current production. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 292/294 Plays in Performance.** For actors and stage managers working on the current production. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 296 Stage Management: Fall.** Students in stage management 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 are expected to serve as an assistant stage manager or production stage manager on one (or both) theater program productions in their registered semester. May count toward completion of the cluster in Theater Production and Performance. (Fall)

**ENG 298 Performance Lab: 1st Production.** Mandatory acting lab for students in ENG 291. A lab tutorial providing technical help for actors and stage managers in Plays in Performance (Eng 292/3/4/5). (Fall) (2 credits)

**ENG 398 Theater Internship: Public Relations and Marketing.** Students taking the PR Internship class help create all publicity materials for events in Todd Theater or events sponsored by the Theatre Program, including drafting press releases, planning marketing campaigns, etc. They distribute publicity materials both on and off campus. Finally, PR interns staff the box office during productions, interacting with the public and the theater personnel. The PR internship is an excellent way to get a hands-on introduction to all the basic elements of public relations and marketing. Students also interact with artists, directors, journalists, and public relations professionals as part of the internship. Interns should have good writing skills and be willing to work creatively. Skills in graphic design are a plus. (Fall and Spring)

For More Information
Please visit the English program website at www.rochester.edu/college/eng.
information about the program

The Film and Media Studies (FMS) Program offers an interdisciplinary concentration leading to a Bachelor of Arts degree. The FMS Program offers students an opportunity to explore motion pictures, television, and digital media as art forms and cultural phenomena. The major and minor consist of specific courses offered by participating departments and provide opportunities for screening and analysis of centrally important films and videos in the history of cinema from the FMS Special Collection.

Many students go on to film or television school, pursing graduate work in production, direction, screenwriting, cinematography, editing, acting and/or other creative aspects of media. Others choose to pursue 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. The major can also lead to careers in print and media journalism, arts and museum management, film preservation and curating, library science, and multimedia work.

The FMS Program enjoys a close relationship with the George Eastman Museum. All University students have free access to the museum and library with a student ID. Important film screenings and special events are offered several nights a week at the Dryden and Curtis Theatres at a discounted cost to students. The remarkable archival resources of the museum are also available to students for course work and special projects.

Departmental Advice for Freshmen

Students should take one of the two introductory core courses—FMS 131 Introduction to Media Studies or FMS 132 Introduction to the Art of Film—before going on to more advanced or specialized courses in film history, criticism, theory, and production. Majors are advised to take a film history course, also, before developing their special interests in advanced courses. Courses in art history, photography, painting, music, literature, anthropology, and history provide strong support for various film courses, and these should be explored during a student’s first two years. Freshmen are encouraged to acquaint themselves with the resources of the Film and Media Studies Program’s Special Collection and to enlarge their background knowledge of classical as well as popular films.

Courses

These first three introductory courses may lead into the film studies clusters.

FMS 132/ENG 117 Introduction to the Art of Film. This course presents the concepts of film form, aesthetics, and technique, while remaining attentive to the various ways in which cinema also involves an interaction with audiences and larger social structures. We closely examine the construction of a variety of film forms and styles—including the classic Hollywood style, new wave cinemas, experimental films, and contemporary independent and global cinemas. We also pay particular attention to the construction of film images, systems of film editing, film sound, and the various ways in which film systems can be organized (narrative, non-narrative, genres, etc.). Same as AH 136. (Fall)

FMS 131/ENG 118 Introduction to Media Studies. Discusses the cultural and economic history of visual media, with a focus on U.S. TV and questions of race, gender, and cultural identity. We cover histories of different types of media (telegraph, radio, audio recordings, television, film, Internet, etc.) as well as various theories and approaches to studying media. Same as AH 102. (Spring)

FMS 161/SA 161 Introductory 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 a video project. Video techniques are studied through screenings, group discussions, readings, practice sessions, and presentations of original video projects made during the course. (Fall and Spring)

FMS 162/SA 162 Concepts in Introductory Video and Sound Art. This course introduces the basic aesthetic and technical elements of video production while exploring specific topics through production, readings, research, presentations, and writing assignments. 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 a video project. Video techniques are studied through screenings, group discussions, readings, practice sessions, and presentations of original video projects made during the course. (Fall and Spring)

For More Information

Please visit the film and media studies program website at www.sas.rochester.edu/fms.
Information about the Program
A four-year Geomechanics Program is offered jointly with the Department of Earth and Environmental Sciences and the Department of Mechanical Engineering for students interested in the application of the field of mechanics to problems associated with the atmosphere; rivers, lakes, and oceans; and the solid earth. Students following this program should be well equipped for employment or graduate work in a variety of fields, including geophysics, hydrology, structural geology and rock mechanics, civil engineering, oceanography, meteorology, environmental sciences, engineering geology, limnology, geothermal and petroleum exploration and production, and coastal and marine geology.

The geomechanics degree is awarded by the College in either the School of Arts and Sciences or in the Hajim School of Engineering and Applied Sciences—the choice is made by the student. If the student chooses the School of Arts and Sciences, his or her major advisor will be in the Department of Earth and Environmental Sciences; if the degree is to be granted through the Hajim School, the major advisor will be in the Department of Mechanical Engineering. In each case, the student will also have a minor advisor in the other department.

Advice for Freshmen
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 geophysics; fluid dynamics; advanced mechanics; heat transfer; rheology; rock mechanics; materials science; hydrology; sedimentary processes; and computational, field; and laboratory studies.

Typical Freshman Year Program

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For More Information
Please visit the geomechanics information pages on the Earth and environmental sciences program website (www.ees.rochester.edu) or the mechanical engineering website (www.me.rochester.edu).

HISTORY

“He to whom the present is the only thing that is present, knows nothing of the age in which he lives.”
—Oscar Wilde

Information about the Department
The Department of History is a dynamic community of scholars interested in studying the origins and formation of the complex, multicultural, and interconnected world in which we live. Our distinguished faculty of teacher-scholars shares a commitment to excellence in teaching and working closely with students to develop historical literacy, critical thinking, writing, and research skills. We seek to use cutting-edge methods to connect the present with the past and consider human experience across time and space. Because an understanding of the past is crucial to a wide array of political, economic, literary, artistic, anthropological, and humanistic studies, taking history courses can also benefit students majoring in these disciplines.

The department offers programs of study leading to the BA degree, the BA degree with honors and (on the graduate level) masters and doctorate degrees. We also offer a minor in history. Non-majors are welcome in almost all history courses and often become enthusiastic, successful participants. The history concentration is valuable not only for those intent on becoming professional historians but also for those interested in pursuing careers in law, politics, second-
ary school teaching, museum studies, historic preservation, and communications, among other fields. The department also offers 15 clusters for non-majors to satisfy 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, Revolution, and Society) groupings. Students who wish to substitute a course in a cluster can consult the department’s director of Undergraduate Studies.

The department offers a wide range of undergraduate courses 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 background knowledge in history. In addition, the faculty offers 300-level seminars and courses designed for concentrators and students interested in exploring more specialized historical topics (200-level courses designated with a “W” and all 300W courses meet the college’s upper-level writing requirement). Each student concentrating in history will have a faculty advisor. The choice of that advisor will ideally match a student’s particular historical interests and will be made in consultation with the director of Undergraduate Studies. This advisor will help prospective majors plan their programs. In addition, advisors serve as a resource for selecting courses, making changes to a major program, alerting students to special opportunities in the major (research opportunities, honors, internships, etc.), and advice on further study and work after graduation. The first step in declaring a history major is to consult the department’s director of Undergraduate Studies. For the most current information about the history department and the faculty as well as requirements for a history major or minor, please visit our website, www.rochester.edu/College/HIS.

Advice to First-Year Students

The department recommends that incoming freshmen enroll in HIS 100 Gateway to History or one or more of the 100-level or 200-level regional survey courses. History 100 introduces students to the practice of history. Each section focuses on a specific topic offered by a professor specializing in this subject (for example, the Eastern Front in World War II or medieval France). The registrar’s course schedule lists the topic for each section. History majors are required to complete History 100 in their freshman or sophomore year, so prospective majors should consider taking this class early. However, History 100 is not a prerequisite for other 100- or 200-level history courses.

Most of our introductory courses also provide an excellent entry into a number of departmental clusters (see course list and applicable clusters below). As a discipline, history covers different cultures, multiple eras, and various approaches to a wide array of subjects. Consequently, history majors are required to take a diverse selection of courses covering time periods before and after 1800 and at least three different geographical areas of the world. Introductory courses meet this distribution requirement, as do more advanced courses.

Students who choose to double-major in history and another discipline or program in the humanities or the social sciences may, with the permission of the director of Undergraduate Studies, use one or two courses from the other major toward the fulfillment of the history major; double majors must, however, meet the geographical and chronological distribution requirements and the upper-level writing requirement with history courses.

Students with doubts about whether a given course is right for them are urged to discuss their selections with the course’s instructor or their freshman advisor. The director of Undergraduate Studies also welcomes visits from prospective students during office hours or by appointment. Other faculty are also available during their on-call advising hours.

Majors can pursue summer or semester-long public history internships (HIS 394) at a variety of local and regional museums, historic sites, archives, municipal agencies, and the Department of Rare Books and Special Collections in Rush Rhees Library. These internships provide valuable “hands-on” experience in a wide range of history-related careers.

Freshmen interested in history are also encouraged to join the Undergraduate History Council, which provides information about the department, sponsors lectures, and holds social events.

Advanced Placement (AP)

Advanced placement credit will be granted for scores of 5 on either the American History, European History, or World History exam. This credit is elective credit and may not be used to satisfy the geographical or chronological distribution requirements in the major or minor nor to satisfy the focus requirement in the major. A student may not receive more than a total of 4 elective credits for AP exams.

International Baccalaureate (IB)

International Baccalaureate credit will be granted in cases where students score 6 or better on their higher-level exam. No credit is granted for subsidiary-level exams. This credit is elective and may not be used to satisfy the geographical, chronological, or focus requirements of the major. A student may not receive more than a total of 4 elective credits for IB exams.

Clusters

Most courses offered by the history department can be used toward a social sciences cluster in history, and many can be used for clusters outside of the department. The history department’s clusters brochure is available at the department office in Room 364, Rush Rhees Library, or it can be viewed through the online cluster list/search engine at www.rochester.edu/college/ccas/clusters/cluster_directory7.html.

Introductory Courses (2016–17)

Fall Semester

HIS 100 Gateway to History: Abraham Lincoln’s America. Abraham Lincoln’s role in “freeing the slaves” has occupied much of the recent attention surrounding the nation’s 16th president and has overshadowed many of his other achievements. This course explores Lincoln’s contribution to a burgeoning American nationalism.

HIS 100 Gateway to History: Medieval France. This course provides an introduction to the study of history through an investigation of “the long 12th century” in France, using both primary and secondary source materials, discussion, analytic reading and good practice of the writing of history.
HIS 100 Gateway to History: Beijing through London Files. This course invites you to examine the history of 20th-century China based on declassified British Foreign Office files. Sources are the bloodline of historical research, and here at the University of Rochester we possess a digital archive of more than 10,000 confidential investigative reports on China drafted by London government agents from the 1910s to the 1980s. By way of this rich collection of primary documents, we learn and practice the historian’s craft: pick a specific and critical topic, compile and analyze significant data, relate your findings to the existing scholarship, write and rewrite, argue your thesis as forcefully and objectively as possible, and document your sources. At the end of the class, your original compositions are archived digitally at a brand new University “Beijing through London Files Project” and may even be published online.

HIS 102 The West and the World to 1500. While exploring the history of Europe and its neighbors from the ancient to the medieval period, this course focuses on how people borrowed from, adapted, and reconciled various ideas to suit their own needs to form, over time, a coherent set of cultural values. To this end, we consider several themes throughout the semester, including changing models of political organization, ideas of individual rights and responsibilities, attitudes toward women and “outsiders,” and understandings of nature and of divine power.

HIS 110 The Making of Modern Africa. This course uses film, novel, and historical studies to understand the transformation of African societies from the late 19th century to the present. The course walks students through some of the most dramatic and important moments in the continent’s modern history, when new national identities were forged, wage laborers created, agricultural work restructured, and the relations between the young and old disrupted. With the disruptions in intergenerational relations came new gender relations that defined the unequal participation African men and women in nationalist and national liberation movements as well as in the postcolonial challenges and opportunities presented by the HIV/AIDS pandemic, hunger, international debt, and engagement with a rising China.

HIS 125 Vikings. The Viking age lasted a few short centuries and ended a long time ago, approximately in 1100. Yet, the appeal of the Vikings has never waned. Their ocean-crossing travels, adventures of their gods, and their fighting and poetic skills continue to excite our imagination. But who were the Vikings? How did they live? What made them travel such vast distances? In this course we explore the world of the Vikings, their religious beliefs, family life, technology, law, and literature. We read their sagas and myths, listen to their music, and watch documentaries that bring to life their ships and villages.

HIS 150 Colonial Latin America. This introductory survey course focuses on the process of colonization that the indigenous societies of the Western Hemisphere experienced from the initial period of contact with Iberians to the Latin American independence movements. The ensuing influx of Europeans, Africans, Asians, and other displaced indigenous populations formed diverse, vibrant societies defined as much by their cultural mixture as by their inherent political, social, and economic inequality. Latin America was arguably the site of the most intense and unequal encounter of cultures, technologies, diseases, and religions during the late 15th and early 16th centuries. This course covers the ensuing three centuries of change, accommodation, and negotiation that defined the region.

HIS 160 United States History to 1865. A survey of the history of the North American continent from its peopling and colonial rivalry to the founding of the United States, its development, and eventual Civil War. Topics include international competition, economic growth, the role of slavery, and political conflict.

HIS 180 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 is examined.

HIS 187 Science, Magic, and the Occult from Antiquity to Newton. This course explores the early history of humans’ attempts to explain and control the cosmos, taking into account the real contributions made to early science by areas of inquiry now dismissed as magic or superstition, such as astrology, alchemy, and “natural magic.” One major theme of the course is the continuing way in which societies have policed the boundary between what they define as “magic” and what they dub legitimate “science.” What is legitimate knowledge about nature, and who gets to define what counts as legitimate? The course ends around 1700 with Newton and the so-called “Scientific Revolution” and the marginalization of astrology, alchemy, and similar fields of inquiry as “pseudo-sciences” or popular error.

HIS 209 Corruption and the Global Economy in Historical Perspective. This junior seminar offers students the opportunity to research and discuss the operation and consequences of widespread corruption in the global economy and the complex historical processes—economic, social, and political—which help to explain the phenomenon. To make the seminar a well-focused course, discussion focuses on country-case studies (with three selected individuals each in the United States and Nigeria and one selected individual each in China, Indonesia, and Peru) that help to demonstrate the general pattern of causes and effects. A major issue to consider, among other things, is the role of cutthroat competition among global corporations and the effects of their corrupt activities on the quality of governance.

HIS 223 War, Money, and Ordinary People: European History, 1492–1789. This course covers topics such as the changing nature of warfare and the lives of ordinary people and how the state attempted to control their private lives. It also looks at the global world that had emerged along with the growth of national feeling.

HIS 248 The Samurai. This course examines 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 includes readings on the history, literature, philosophy, and religion of the samurai class. Films treating the popular imagery of the samurai are projected in class. Various representations of the samurai are compared and contrasted.
HIS 252 Immigration and the Americas. Although the United States received the largest number of immigrants in the western hemisphere in the 19th and 20th centuries, the relative impact of immigrants was just as important in other countries such as Argentina and Brazil. This course explores the complex events, trends, and personal decisions that impacted migrants’ decisions. The course concentrates on transatlantic migration between 1860 and 1950. We seek to understand these patterns as a function of three essential questions: why do people migrate? who migrates? and how do they choose where they migrate? The course also highlights the different dimensions impacting the immigrant experience. The course incorporates a variety of materials, including letters, memoirs, monographs, and demographic studies. Students are involved in a hands-on discovery of Rochester’s own immigrant communities in comparison to other immigrant communities.

HIS 258 Women’s Lives and Letters, America 1830–1880. Students explore the historical themes contained in letters of women from upstate New York in the mid-19th century. Research projects draw on other primary sources in the University’s collections. Students each transcribe and annotate about ten letters, identifying people and places named in them, and learn text encoding in order to tag the letters for the Seward Family Archive website.

HIS 267 Music Made America. These seminars are centered on major figures in the history of American popular music, using their work as a way into the cultural history of their times.

HIS 274 History of Race in America. This course attempts to identify salient moments in the nation’s history when race was used as an organizing principle in the construction of American public and private institutions. Course readings and discussions investigate the influence of race on social structures such as work, religion, health, education, and leisure at particular historical moments: Europeans and early settlement, new nation and antebellum periods, reconstruction and retrogression, the Ku Klux Klan, and 100 percent Americanism. The primary goal of the course is twofold: to better understand the history of race in America and to proffer some workable solutions to the problem(s) of race in America.

HIS 100 Gateway to History: Chinese Americans: Bruce Lee and the Changing Face of a People. This gateway seminar explores a social and cultural history of Chinese migration to the United States from the 19th century until today. Together, we research how Chinese immigrants, in the process of becoming American, helped shape the landscape of this nation. From the impoverished “coolies” of the mid-1800s to the transnational icon Bruce Lee and beyond, Chinese Americans have changed with the changing faces of America. But who are Chinese Americans, why is Bruce Lee such a vital figure, and why are those questions intertwined with what it means to both Chinese and American? “Exotic”— “Inscrutable”—“Uncivilized”—“Diligent”—“Good at Math/ Kung Fu”—“Overeducated”—“un-American”—“Dangerous”—“Genius”—“Oriental”—we interrogate how such terms have been applied to Chinese Americans for more than 150 years as the people on the ground challenged the myths of the “inscrutable Asian,” the “Yellow Peril,” and the “Model Minority” plus other prevailing cultural stereotypes that continue into the 21st century.

HIS 100 Gateway to History: Rise and Fall of Apartheid. This introductory research seminar explores the relationship between the policy of apartheid, or legal segregation, and economic development in South Africa. Two hypotheses, drawn from two schools of thought that have dominated South African historical studies since the 1950s, guide our analysis. The first school holds apartheid as an impediment to economic development, while the second postulates legal segregation as a necessary condition for the country’s prosperity since World War II. Students have opportunities to interrogate the two contending hypotheses and to advance their own interpretations on the basis of secondary literature as well as documentary and oral primary sources.

For More Information
Please visit the history department website at www.rochester.edu/ College/HIS/ or contact Professor Laura Smoller, director of Undergraduate Studies (Laura.Smoller@rochester.edu).

Spring Semester
HIS 100 Gateway to History: The Eastern Front. In this course we examine the most gigantic, devastating war in world history—the Nazi-Soviet conflict of 1941–45. This was the central act of World War II in Europe. We focus on the Soviet experience of the war. It was the Red Army that came to grips with the German Wehrmacht in the heart of Russia and ripped its heart out. The course is devoted almost entirely to reading primary sources on the war, discussion, and four major written assignments (two papers, a bibliography, and a book review). We explore life on the Soviet home front, the Holocaust and life in the occupied territories, partisan warfare, the significance of Lend Lease for the Soviet war effort, soldiers’ experience of the war, and key battles. This last will include the Battle of Moscow in the winter of 1941–42, the first defeat inflicted on the Germans in World War II, and the Battle of Stalingrad, the great turning point of World War II in Europe.
"Courage is a special kind of knowledge: the knowledge of how to fear what ought to be feared and how not to fear what ought not to be feared."

—David Ben-Gurion

Information about the Program

The Jewish studies program enables students to study the history, literature, texts, traditions, and culture of Judaism throughout the past and in the present. The program offers courses in the study of biblical texts and the history of Judaism, the Jewish people, and Jewish thought and philosophy from antiquity to the medieval period to modernity. Students can take courses in which they explore the origins of anti-Semitism in the ancient Mediterranean world; the development of post-biblical forms of Judaism; Jewish philosophy; medieval Judaism; Judaism in America; the portrayal of Jews in modern media, film, and popular culture; the Holocaust; the history of conflict in Israel and the Middle East; Judaism as a lived religion in the contemporary world; and many aspects of Jewish practice, culture, and customs.

Additionally, the undergraduate program in Jewish studies is an integral part of the Center for Jewish Studies at the University of Rochester, which 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.

The program offers a minor in Jewish studies and a minor in Hebrew. There are three clusters: one in Jewish studies, one in Judaism, and one in Hebrew. Information on minors and clusters may be found on the Center for Jewish Studies web page. Students are encouraged to contact the director of Jewish studies with any questions.

Departmental Advice for Freshmen

Freshmen are encouraged to begin with a 100-level course such as REL 101 Introduction to the Hebrew Bible/Old Testament or REL 103 Introduction to Judaism. More detailed information about Hebrew language courses follows.

Hebrew Courses

Hebrew 101 is introductory and has no prerequisite. It is intended for students with little or no experience of the language. Students who are considering entering the sequence at a higher level than 101 are strongly encouraged to consult the instructor as soon as possible. Students who take HEB 103 are expected to have a good understanding of the structure and grammar of Hebrew. Freshmen should know that there is a lot of movement between language levels during the first couple weeks of class in all language classes, and they should not hesitate to speak with the course instructor about their placement.

Courses

Fall Semester

Judaism

JST 106 Introduction to the Old Testament. Examination of the texts of the Hebrew Bible (Old Testament for Christians) in their religious, historical, and literary contexts. Study of the texts of the Hebrew Bible (Old Testament) enable us to explore what we can know about ancient Israelite society and culture, the rise and fall of Israel as a nation-state, religious and theological debates about the role of God in shaping history, and the problem of suffering, as well as the writing of the biblical texts.

JST 154 Religion and the Race for the White House. This course addresses the diversity and depth of religious practice in the United States and its role in presidential politics. Taught thematically so that we may examine specific religious movements and questions in depth, attention is paid to those religions generally conceived to be “traditional” in the United States as well as those widely perceived as “nontraditional.” Themes considered include civil religion, millennialism, race and gender, and the dynamics of liberalism and conservatism.

REL 205 Nietzsche and the Nietzscheans: Nietzsche and the Jewish Questions. Friedrich Nietzsche continues to be one of the most influential modern philosophers, yet controversy surrounds almost every aspect of his life and work, specifically his relationship to both the Jewish people and Judaism. In this course we read the most relevant texts on Nietzsche’s view of the “Judeo-Christian” tradition as well as his remarks on the Jewish nation. From there, we read a number of Jewish writers who both avow and disavow Nietzsche’s influence on their work. Authors include Franz Kafka, Sigmund Freud, Sara Kaufman, Jacob Taubes, Jacques Derrida.

JST 219 The Holocaust in Film and Literature. How does one represent the unrepresentable? This is the key question we explore as we look at films and literature about the Holocaust. As we look at
fictional films, novels, documentaries, and memoirs, we 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.

**JST 253 Zionism and Its Discontents.** This course explores the emergence and developments of Zionist ideologies in the 19th and 20th centuries. Following this, we consider a number of recent explorations of Zionism in practice as well as Jewish and Palestinian critics of the Zionist project.

**Hebrew**

**HEB 101 Elementary Hebrew I.** Introduction to the structure of modern Hebrew. Practice in vocabulary, use, grammar, reading, and writing.

**HEB 103 Intermediate Hebrew.** Continuation of JST/HEB 102 with emphasis on enhancing reading comprehension, writing, and speaking skills. Students are expected to have a good understanding of the structure of Hebrew, including familiarity with verb forms.

**HEB 204 Hebrew through Media and Literature.** Designed to develop advanced reading and conversational skills using various materials including Israeli newspapers, Hebrew movies and songs, and texts from modern Hebrew literature (fiction and poetry). Writing skills are enhanced through a series of related home assignments. Review of Hebrew verbal system and syntactical structures and enrichment of vocabulary are also among the objectives of this course.

**Spring Semester**

**JST 113 Introduction to Judaism.** This course provides an overview of Jewish history, texts, traditions, practices, and beliefs and emphasizes Judaism as a living tradition, one that is subject to both continuity and change among its practitioners.

**HEB 102 Elementary Hebrew II.** Direct continuation of JST/HEB 101 with emphasis on enhancing reading, writing, and speaking skills.

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**LATIN AMERICAN STUDIES (MODERN LANGUAGES AND CULTURES)**

**Information about the Program**

The minor in Latin American studies is an interdisciplinary program of study that can serve to complement the student’s major field of concentration by giving him or her a broad view of Latin American cultures and their 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 one each (total of two) from two different related areas such as history, political science, religion, or anthropology.

**Program Advice for Freshmen**

The minor must be approved by the Spanish section in its beginning stages. Since many of the courses in the program are upper-level courses in the department involved, freshmen who are interested should consider study abroad in a Latin American country as they plan their eight semesters here.

**Clusters**

Students interested in Latin American studies may want to consider one of the following clusters:

- Latin American History and Culture (S1HIS019)
- Literature and Identity in Hispanic Societies (H1SP001)
- Hispanic Film and Popular Culture (H1SP003)

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**For More Information**

Please visit the modern languages and cultures website at www.rochester.edu/college/mlc/programs2.html.
LEGAL STUDIES
(MULTIDISCIPLINARY STUDIES CENTER)

Information about the Program
The minor in legal studies is an interdisciplinary program of study incorporating courses from the departments of anthropology, economics, English, philosophy, political science, and history. It gives students the opportunity to examine law from a variety of perspectives. The study of law is a humanistic enterprise and, while the minor should be useful for those who may be thinking of attending law school, it is not specifically a pre-law program, but rather a way for students with any sort of interest in law to give focus to their studies. The goals of the minor are to educate students in certain broadly relevant analytical skills, to introduce students to what it means to study a social phenomenon from a variety of perspectives, to help students obtain a better understanding of law and the multiple functions it plays in a variety of societies, and to encourage writing and the development of writing skills.

Program Advice for Freshmen
Since many of the courses in the program are upper-level courses in the departments involved, freshmen who are interested in the minor may wish to begin by taking appropriate introductory courses in some of the relevant departments. Most legal studies minors do not declare the minor until their sophomore or junior year. Students of any year who are interested in the legal studies minor are encouraged to consult a legal studies minor advisor.

Clusters
There are two clusters in legal studies, one in the humanities division and one in the social sciences division.

Courses
ENG 135 Introduction to Debate. The purpose of this course is to give students an appreciation for and knowledge of critical thinking and reasoned decision making through argumentation. Students research both sides of a topic, write argument briefs, and participate in formal and informal debates. Students are also exposed to the major paradigms used in judging debates. (Fall and Spring)

PHL 103 Moral Problems. An introduction to moral philosophy as applied to current topics. Some questions to be explored: Is torture morally permissible in the fight against terrorism? Is it okay to destroy embryos for stem cell research? Can abortion sometimes be justified? How? Is active euthanasia ever permissible? Is capital punishment justifiable in principle? In practice? How far does our moral duty to aid distant strangers extend? What sorts of political and socioeconomic principles are morally justifiable? Do animals have moral rights? How should we understand the meaning and value of life and death? We also explore related general questions: Is it always possible for a good enough end to justify bad means? What is the relation, if any, between morality and religion? Are there objective facts about right or wrong, or is morality ultimately subjective or relative to cultures or times? Are there situations in which every available action is wrong? (Spring)

PHL 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. (Fall)

PHL 110 Introductory Logic. Logic is the study of valid forms of argument. This course is an introduction to symbolic logic, a modern theory of logic that involves the construction of an artificial symbolic language within which the logical forms of sentences can be expressed and the validity of arguments can be proven. Students learn two logical systems: sentence logic and predicate logic. In addition to translating English arguments into symbolic form and constructing interpretations to demonstrate the invalidity of arguments, students also learn how to prove that an argument is valid using a set of rigorously defined implication rules for each logical system. (Fall)

Spring Semester
For information on spring course offerings, please visit the legal studies web page.

For More Information
Consult the legal studies program website at www.rochester.edu/college/msc/legal-studies.html.
The job of the linguist, like that of the biologist or the botanist, is not to tell us how nature should behave, or what its creations should look like, but to describe those creations in all their messy glory and try to figure out what they can teach us about life, the world, and, especially in the case of linguistics, the workings of the human mind.”

—Arika Okrent

Information about the Department

Language is among the most complex cognitive facilities we possess. Contemporary linguistics is the study of the formal aspects of language structure—what it is that we know when we know a language. For the most part, linguistic knowledge is tacit. We learn language; we are not taught it. Uncovering the structure of language is the work of formal linguistics.

The Department of Linguistics offers courses in the major areas of theoretical linguistics: phonetics, phonology, syntax, semantics, and pragmatics. In addition, we offer a number of 100-level non-technical courses in linguistics that focus on how language interacts with aspects of culture and society.

Linguistics courses offer students a unique combination of humanistic and scientific concerns and tend to draw interested students from a broad range of disciplines in the sciences and humanities, from biology and cognitive sciences to art and visual studies. The commonality is a deep intellectual curiosity about human languages.

Students find that linguistics gives them experience in approaching and analyzing complex empirical data in a systematic way, a skill useful in a variety of careers. Our graduates enter teaching, law, linguistics, speech pathology, and research, among others.

Departmental Advice for Freshmen

The 200-level courses are the courses of the major and minor and require LIN 110 Intro to Linguistic Analysis, which is the gateway course into the major.

The 100-level courses address contemporary issues with a perspective on language and society that is informed by contemporary linguistic analysis. The 100-level courses do not require technical background in linguistics. These courses are suitable for freshmen.

LIN 110 is one of the core courses for the major and the prerequisite for most of the 200-level courses. Freshmen with a strong interest in linguistics are advised to take LIN110. New courses may be added to reflect the interests of students. Please check the course listings in the undergraduate section of the department website.

Students with an interest in linguistics are encouraged to take courses in one or more languages in addition to their linguistics courses.

Clusters in linguistics satisfy the cluster requirements for social sciences.

Courses in 2016–17

Every term

LIN 110 Introduction to Linguistic Analysis. This course introduces students to the study of the structure of human language. We 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. Part of clusters S1LIN001, S1LIN002, S1LIN004, S1LIN005, and S1LIN007. (Fall and Spring) Please note: Students who take LIN 110 in the fall may be eligible to take 200-level courses in the spring.

Fall

LIN 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 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 confront a variety of common misperceptions about language. Each lecture has reading assignments drawn from the textbook and published articles. Class discussion is encouraged as much as possible. Part of cluster S1LIN006.

LIN 104 Language and Culture. This course investigates the relationship between language and culture at the interface of linguistics and anthropology. It examines the ways in which language reflects the perception of the world, ways of life, and beliefs of its speakers; creates rituals and maintains social ties; and is used by people of different ages, genders, social classes, and ethnicities. We discuss hypotheses that try to explain the nature of the relationship between language and culture and then turn to a wide variety of topics that are relevant for both linguists and anthropologists. These include, for instance, kinship systems and language, language of perception
Spring
LIN 102 Language and Social Identity. This course introduces how language is used and perceived to mark social and cultural characteristics of an individual or group of individuals. We examine how one’s social identity is constructed, which linguistic cues are used consciously to denote different social identities, and how most linguistic cues delineating social groupings are below conscious awareness. This course discusses topics on prescriptive and descriptive perspectives of language; standardization; dialects; accents; pidgins and creoles; social stratification; and social, racial, and linguistic profiling. Part of clusters S1LIN002 and S1LIN006.

LIN 105 Language and 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. Part of clusters S1LIN002, S1LIN006, S1MAS001, H1FMS001, and H1FMS002.

LIN 162 Modern African-American English. This course looks at the varieties of English used primarily by and among African Americans. We first explore and discuss the linguistic features (lexicon and grammar) of African American Vernacular English (AAVE)—also called African American English. We also investigate the ways in which AAVE is being utilized in popular culture. Additionally, we look at AAVE’s connection to African languages and creoles. Finally, this course looks at the issues connected to AAVE and attitudes toward this variety and its effects on teachers’ expectations and students’ progress as well as on linguistic profiling and discrimination in employment and housing. Part of cluster S1LIN006.

LIN 220 Introduction to Grammatical Systems. This introductory course examines the grammatical structure of sentences from the standpoint of transformational grammar. The course develops the basic techniques of syntactic analysis in order to develop a working grammar of (a fragment of) English. No syntax background is assumed. This course is intended for majors and non-majors alike. Prerequisite: LIN 110 (Fall). Part of clusters S1LIN002, S1LIN004, S1LIN007, S1MAS001.

For More Information
Please visit the linguistics program website at www.ling.rochester.edu.

MATHEMATICS

The universe is a grand book which cannot be read until one first learns to comprehend the language and become familiar with the characters in which it is composed. That language is mathematics.”
—Galileo Galilei

Information about the Department
The Department of Mathematics has several introductory sequences to suit students’ interests and goals. The sequence MTH 161–162 is the standard introductory calculus sequence for students who intend to major in mathematics, a physical science, engineering, or another technical field. The sequence MTH 141–143 covers the same material as MTH 161–162 but at a slower pace (in three semesters rather than two), using the same textbook. Students lacking the algebra or trigonometry background necessary to perform successfully in MTH 141 should take MTH 140, Foundations of Calculus. The department also offers the honors calculus sequence MTH 171–174 for talented students interested in mathematics or its theoretical applications to other fields. See below for more information on these sequences and AP credit rules.

One of the primary factors conducive to success in mathematics is placement in the appropriate course. The Department of Mathematics uses a combination of SAT and ACT scores, AP calculus exam scores, and high school records to place students. Advanced Placement credit rules take precedence over SATs and ACTs.

For students placed in either MTH 140 or MTH 141 who wish to enroll in a higher course, there will be a placement test offered
at the beginning of the semester. See the placement web page www.
math.rochester.edu/undergraduate/placement for more information
regarding placement guidelines. Students believing they have special
circumstances pertaining to their placement should fill out a peti-
tion form found at the placement web page. In case of discrepancy
or questions, students are encouraged to speak with a representative
of the mathematics department at the Academic Open House dur-
ing Orientation.

Advanced Placement (AP)
The Department of Mathematics gives credit and placement to stu-
dents who have taken the CEEB Advanced Placement examinations
in Mathematics (Calculus AB and Calculus BC) as follows:

Note: taking more than one MTH course per semester in the freshman
year is usually discouraged. Students wishing to do so should discuss
their plans with a departmental representative.

AP Calculus, AB exam:
Score of 4 or 5—Student will be placed in MTH 162 or 171
(after consultation with a mathematics faculty member) with one semester
advanced placement (MTH 161, 4 credits) granted.

AP Calculus, BC exam:
Score of 3—Student will be placed in MTH 162 or 171 (after
consultation with a mathematics faculty member) with one semester
advanced placement (MTH 161, 4 credits) granted.
Score of 4 or 5—Student will be granted two semesters of
advanced placement (8 credits) for MTH 161 and MTH 162, and
placed in MTH 164 or 165. Students interested in gaining a deeper
understanding of mathematics are encouraged to register instead
for MTH 171 and receive 4 credits of advanced placement. In rare
instances of exceptional preparation, students may register for MTH
173 in consultation with the instructor of that course and receive 8
credits of advanced placement for MTH 161 and MTH 162.

Students who receive AP credit for MTH 161 may register for
MTH 162 or 171. MTH 171 is particularly recommended for
students interested in mathematics, physics, computer science, or
theoretical engineering who would like to gain a deeper knowledge
of how and why calculus works so effectively.

There is no advanced placement in the 140 sequence.

Note: An "AB subscore" is reported along with the BC score. Place-
ment and credit should be the more generous of the two resulting from
using both the AB subscore and the BC score in the guidelines above.
However, if the difference between the AB subscore and the BC score
is greater than or equal to two, the student should be referred to the
mathematics table for further guidance.

International Baccalaureate (IB)
Mathematics—Students who score a 4 or better on a higher-level
exam are placed into MTH 162 and awarded credit for MTH 161
after completion of MTH 162 with a grade of C or better. No credit
is granted for subsidiary level exams.

Clusters
All of the following courses belong to various clusters in mathe-
metics. MTH 141 and 161 are also part of many clusters in the natural
sciences.

Courses
Traditionally, the different sections of the standard calculus sequences,
MTH 141–143 and MTH 161–162, are coordinated with each other.
They cover the same material, assign the same homework,
have common exams, and are graded on a common scale.

MTH 130 Excursions in Mathematics. The nature of math-
ematics and its application are discussed. Emphasis is on concepts
and understanding rather than techniques. This course is intended
mainly for concentrators in the humanities. (Spring)

MTH 140 Foundations of Calculus. This course covers precal-
culus material and is intended for students lacking the algebra and
trigonometry background necessary to perform successfully in
MTH 141. After completing this course, students are ready to take
MTH 141. MTH 140 is offered in the fall only and is open to all
incoming freshmen.

MTH 141–143 Calculus I, II, III. This sequence covers the same
material as MTH 161–162 (see below) but in three semesters rather
than two, using the same textbook. MTH 143 is an adequate pre-
requisite for MTH 164 and 165. Courses 141–143 must be taken in
sequence and are offered every fall and spring. MTH 141 is open to
all freshmen placed in MTH 141 or a higher-numbered course.

MTH 150 Discrete Mathematics. Logic, functions, algorithms,
mathematical reasoning, mathematical induction, recurrence rela-
tions, techniques of counting, equivalence relations, graphs, trees, as
well as specific questions given by the “Towers of Hanoi” and Euler’s
“Seven Bridges of Königsberg” problems. Required for computer
science majors. Open to all freshmen. (Fall and Spring).

MTH 150A Discrete Mathematics Module. This module course is
only available to students who are taking MTH 171 or MTH 173
and yields only 1 credit. Students do the exams in the regular MTH
150 course and may attend lectures if they wish. This module is pri-
marily for computer science majors who need MTH 150 credit for
their Spring Semester computer science courses but have no room in
their schedule for the regular 4-credit course.

MTH 161–162 Calculus I, II. The sequence 161, 162, is the
standard introductory calculus sequence for students who intend
to major in mathematics, a physical science, engineering, or another
technical field. Emphasis is on learning applications and techniques.
Courses 161–162 must be taken in sequence. (Fall and Spring)
MTH 161 is open to all freshmen placed in MTH 161 or a higher-
numbered course; MTH 162 is open to freshmen with advanced
placement credit.

MTH 164 Multidimensional Calculus. This extends the calculus
techniques to handle functions of more than one variable. It also
concentrates increasingly on the geometric aspect of calculus, which
is particularly important for applying calculus to problems in physical
sciences and engineering. This course is open to freshmen with
two semesters of advanced placement credit. Prerequisite: MTH
162. (Fall and Spring)
**MTH 165 Linear Algebra with Differential Equations.** This course provides an introduction to the basic concepts of linear algebra and ordinary differential equations. It spends about two thirds of the semester covering linear algebra up through eigenvalues and eigenvectors and one third of the semester covering elementary methods involved in solving linear differential equations and systems with constant coefficients. This course is open to freshmen with two semesters of advanced placement credit. Prerequisite: MTH 162. (Fall and Spring)

**MTH 171–174 Honors Calculus I; II; III; IV.** This sequence is an honors calculus sequence for talented students interested in mathematics or its theoretical applications to other fields. The sequence emphasizes the theoretical understanding of calculus in addition to teaching technical skills. Students completing the sequence will have acquired a deep understanding of the subject. The sequence satisfies all the basic mathematical prerequisites for majors and minors in mathematics, physics, and engineering. These include single variable calculus (MTH 161–162), multivariable calculus (MTH 164), differential equations, and linear algebra (MTH 165, 235). Each semester of the sequence is granted 5 credit hours rather than 4. Courses MTH 171–174 must be taken in sequence. MTH 171 is offered every fall. Students interested in taking MTH 171 should discuss their plans with a departmental representative from mathematics.

**MTH 190 Topics in Problem Solving.** This course is intended for students interested in developing problem-solving skills in mathematics. This course also prepares students for college-level mathematical competitions such as the Putnam.

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**MECHANICAL ENGINEERING**

*I believe, of course, in giving to all the people a good education. But the education must contain much besides book-learning in order to be really good*  
—Theodore Roosevelt (“Citizenship in a Republic,” April 23, 1910)

**Information about the Department**

The mechanical engineering curriculum provides a balance of courses in the humanities and social sciences, physics, applied mathematics, and engineering principles and design. Since modern engineering is increasingly reliant on computers for things such as computation, data storage and retrieval, visualization of complex engineering problems, laboratory instrumentation, and presentation of project results, we have included computer work throughout the curriculum. 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 is increasingly emphasized in the later years of the program. The capstone senior design sequence often features real design problems drawn from local industry. Design examples include wind turbines for third-world installation, automotive fuel valves, large optomechanical mirrors for solar power, automotive frames and suspensions, 3D printing of optics, heat transfer in organic farms, sustainable industrial refrigeration, and injection molding machines.

**Departmental Advice for Freshmen**

Mechanical engineering requires a solid foundation in mathematics, physics, and chemistry. This is built during the first two years of the program while students also take a first set of core mechanical engineering courses. In the second two years of the program, students take an increased number of mechanical engineering specialty courses, including many with an open-ended design component. To provide the breadth of knowledge required to address modern engineering questions, this science and engineering focus is also balanced in the curriculum by a selection of humanities and social science courses.

Many undergraduates in the department assist faculty members in research projects during the academic year and the summer. Recent projects involving undergraduates include experiments in
controlled nuclear fusion using high-power lasers, fuel cells, engineering coolants and lubricants, micro fluids, MicroElectro-Mechanical Systems (MEMS) and Micro–Optical Electro–Mechanical Systems (MOEMS), precision engineering and instrumentation, precision grinding tools, CNC machining, optical manufacturing, experimental observation of collective phenomena in fluids, edge strength testing of screens for smart devices, structural mechanics of historical structures, bubble dynamics, and the design of an automatic transmission for a bicycle.

Many of our students interact with local companies like ITT Exelis, Xerox, General Motors, Bausch and Lomb, OptiPro, and Gleason Works. This often occurs through company sponsorship of a project in one of the design or laboratory courses. Our “Industry Practicum” program provides part-time work during the academic year and full-time employment during the summer for selected students. Major University facilities such as the Laboratory for Laser Energetics and Strong Memorial Hospital are also sources for design and internship opportunities.

We encourage our students to study abroad, typically for one semester in the junior year. Study abroad credits transfer to the undergraduate major in mechanical engineering, and instruction can be in English. Examples of study abroad sites, among many others, are Australia, Spain, England, Botswana, New Zealand, and Israel.

**Typical Freshman Year Program**

**Fall Semester**

- MTH 141 or MTH 161
- CHM 137
- Technical elective
- (EAS 10X recommended)
- WRT 105 or elective

**Spring Semester**

- MTH 142 or MTH 162
- PHY 121
- ME 160
- ME 110
- WRT 105 or elective

**Clusters**

The Department of Mechanical Engineering offers the following four clusters: Biomechanics, Design with Materials, Engineering Design, and Force and Motion.

**Courses**

(Mechanical engineering courses available to freshmen)

**EAS 104/ME 104 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 in 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. (Fall)

**ME 107 Mechanics and Optics in Antiquity.** The application of engineering principles and technology to the design and performance of engineering structures from antiquity to the preindustrial world. The course combines literary, archaeological, and engineering evidence. We apply basic engineering principles (transfer of forces, momentum, and energy), study primary texts in translation, and examine existing structures and designs. Topics include evolution of engineering and engineered materials (metals, wood, stone, marble, glass, concrete, composites) and their limitations; Bronze Age fortifications; structural design of ancient temples; Roman aqueducts, siphons, and vaulted structures; engineering structural materials, stresses, and failure; lifting devices; construction engineering; columns, beams, vaults, trusses, frames; instruments of warfare, ballistics, and sea transport. (Spring)

**ME 106 Engineering in Antiquity.** The basic principles of mechanics and optics as they have developed in ancient Greece, Rome, China, Islam, and Western Europe, from 300 BC to 1700 AD. Examples: the law of the lever (Aristotle and Archimedes); center of gravity (Archimedes); gears, materials, and the Antikythera mechanism; statics and dynamics from the Middle Ages to Leonardo da Vinci and Galileo; the optics of Al-hacen, the development of eyeglasses, of the telescope (Galileo, Kepler, Newton), and of lens grinding and polishing; dynamics and strength of materials (Galileo), and the emergence of classical mechanics (Newton) and optics (Kepler). We study the basic mechanics and optics as we currently understand these topics, the original texts (in English translation), and some archaeological and historical discoveries. Our goal is to use current mechanics and optics to understand their millennia-long emergence. (Fall)

**ME 110 Introduction to Computer Aided Design and Drawing.** The course is designed to give freshmen interested in technology an introduction to reading and creating engineering drawings on a state-of-the-art computer-aided design system. The students also get exposure to manufacturing techniques, including a tour of a manufacturing facility. The course may be used for clusters in Design with Materials and Engineering Design. (Fall and Spring)

**ME 120 Engineering Mechanics I Statics.** This course covers the concepts of force and moment and their transmission in engineering structures such as trusses, frames, machines, and beams. Examples and applications range from machines to biomechanical structures. The course may be used for clusters in Biomedical Engineering, Engineering Design, Force and Motion, General Science, Mechanics, and Modern Technology. (Fall and Spring)

**ME 160 Introduction to Numerical Methods for Mechanical Engineers.** Programming basics, including functions, logic, looping, file manipulation, and basic data structures. Applied topics include number representation and error, root finding, interpolation, curve fitting, systems of linear equations, and data reduction and plotting (2D). Examples are drawn from typical problems in the mechanical engineering curriculum. (Spring) (2 credits)

**ME 108 Programming for Engineers.** Programming basics, including functions, logic, looping, file manipulation, and basic data structures. Applied topics include number representation and error, root finding, interpolation, curve fitting, systems of linear equations, and data reduction and plotting (2D). Examples are drawn from typical problems in the mechanical engineering curriculum. (Spring) (2 credits)

For More Information

Please visit the mechanical engineering program website at www.me.rochester.edu/.
Information about the Program

The minor in medieval and early modern studies enables students to pursue a program in the historical and cultural production of Europe and the Mediterranean from the fall of the Roman Empire and the rise of Islam to the mid-17th century. This period comprises distinct thematic continuities understood to be post-classical and pre-Enlightenment and it is intended to be multidisciplinary.

The minor requires six courses, one of which must be Classical and Scriptural Backgrounds. The divisional identity of the minor in medieval and early modern studies can be used to satisfy either a humanities or a social sciences area requirement, depending on course content and number of courses taken in either division.

Courses

AH 101 Introduction to Art and Visual Culture. This course is designed to introduce the student to aspects of the history of Western painting, sculpture, and architecture from the Renaissance through the present. We examine the various schools and 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, and the rise of the artist. The course, therefore, attempts two goals: one, to familiarize students with the principal monuments of the Western tradition from about 1400 onward, that is, the paintings, sculptures, buildings, and artifacts that form the substance of this narrative; two, to develop visual literacy, that is, the ability not only to identify but also to discuss artworks in a way that develops critical competence and an understanding of how the Western tradition of art has come about. (Fall)

ENG 112 Classical and Scriptural Backgrounds. Homer, Virgil, and Ovid. Greek tragedy and comedy: Aeschylus, Sophocles, Euripides, and Aristophanes. The Hebrew Bible—Abraham and Isaac, Moses and Pharaoh, Esther and Judah—and Christianity’s New Testament. The two great traditions studied in this introductory course—classical and Biblical—have been pondered by generations of writers and artists for thousands of years. A great deal of literary history is the story of intricately rewriting and adapting the core texts of these traditions; it has been said that the European philosophical tradition is a series of footnotes to Plato. Freshmen welcome! (Fall)

ENG 113 British Literature I. This course offers students a sampling of some of the most prominent and controversial literary texts in English literature from the 11th-century Beowulf and its monsters (which speaks indirectly of the insidious cycle of vengeance) to Wollstonecraft’s 18th-century Vindication of the Rights of Woman (which speaks clearly and passionately of reform). Spanning Anglo-Saxon and later medieval, Renaissance, Restoration, and Enlightenment eras, it aims to help students take away not only a sense of the material, philosophical, and cultural changes that Britain underwent in all its variety and conflict but also a wide choice for later, more concentrated study, if they wish, of specific English periods and writers. (Fall)

HIS 102 The West and the World to 1500. While exploring the history of Europe and its neighbors from the ancient to the medieval period, this course focuses on how people borrowed from, adapted, and reconciled various ideas to suit their own needs to form, over time, a coherent set of cultural values. To this end, we consider several themes throughout the semester, including changing models of political organization, ideas of individual rights and responsibilities, attitudes towards women and “outsiders,” and understandings of nature and of divine power. (Fall)

IT 195 Divine Comedy I. The course aims at familiarizing students with one of the most significant texts in Western culture. Through Dante’s text, 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. The course also provides students with an avenue of investigation on the problems of knowledge and guides them in developing critical tools and research skills. The first part of the semester is devoted to the creation of a historical and intellectual frame of reference in which to locate The Divine Comedy. The second part focuses on Inferno and a few cantos of Purgatorio. Lectures and class discussion are complemented by a weekly recitation session. (Fall)

REL 101 Introduction to the Old Testament. Examination of the texts of the Hebrew Bible (Old Testament for Christians) in their religious, historical, and literary contexts. In this course, students learn the history of the ancient Israelite people from their origins down through the post-Exilic period. Study of the texts of the Hebrew Bible (Old Testament) enable us to explore what we can know about ancient Israelite society and culture, the rise and fall of Israel as a nation-state, religious and theological debates about the role of God in shaping history, and the problem of suffering, as well as the writing of the biblical texts and the development of the canon. (Fall)
**MODERN LANGUAGES AND CULTURES**

"What sets worlds in motion is the interplay of differences, their attractions and repulsions. Every view of the world that becomes extinct, every culture that disappears, diminishes a possibility of life."

—Octavio Paz

"He who does not know foreign languages does not know anything about his own."

—Johann Wolfgang von Goethe

"A different language is a different vision of life."

—Federico Fellini

**Information about the Department**

International and multicultural by definition, the Department of Modern Languages and Cultures offers courses in many of the world’s major languages, literatures, and cultures and in comparative literature and theory. In MLC—as the department is commonly known around campus—students can major in French, German, Japanese, Russian, Spanish, or comparative literature. Students interested in Chinese or Italian may create an interdepartmental concentration through the Multidisciplinary Studies Center. Additionally, MLC is in the process of introducing new programs of language study. For 2016–17, MLC will offer elementary and intermediate levels of Korean and Portuguese.

All MLC majors and minors (except Japanese) begin counting courses toward the major with 151, the third semester of study, following 101–102. A major in a modern language field entails the study of a national culture, literary traditions and innovations, and, of course, language. Students with an interest in a modern culture or language can also choose to minor in any of the above fields, including Italian and Chinese. There are also several possibilities for interdisciplinary work in other languages and cultures: Russian studies (a major and a minor), Latin American studies (a minor), and certificates in Asian studies, literary translation studies (LTS), and Polish and Central European studies.

Students with an interest in national literatures and cultures will find courses taught in English under the comparative literature (CLT) rubric (for example, RUS 231/CLT 255A Great Russian Writers). Courses in comparative literature and cultural theory examine the politics, philosophy, history, and general cultural context of works of art, cinema, theater, popular culture, and literature. CLT courses encourage interdisciplinary work, especially with African and African-American studies, art history, film and media studies, gender and women’s studies, history, Jewish studies, and religion and classics. The major and minor in comparative literature offer an opportunity to compare and contrast theories of literature and culture in a global context. MLC welcomes students with primary interests in fields other than literature, whose diverse backgrounds and viewpoints enrich our exploration of interdisciplinary and cross-cultural studies.

**Departmental Advice for Freshmen**

The study of languages and cultures opens minds and attitudes and enables people to break down boundaries in daily life, business, science, and the arts. In MLC, you can begin study of a modern language, continue work in a language you have studied elsewhere, or pursue advanced studies in the literatures and cultures of the world. The department also encourages you to make use of the diversity of its offerings to enhance your studies in other fields. Language advisors can help you design a program of study in language, literature, and culture that fits your particular interests. If you major in biology, English, political science, or any of the College’s diverse programs, MLC has courses that add to your program of study.

The fall semester is the best time to begin or to continue with the study of a language and culture, as all the national programs in the department offer elementary and intermediate courses at the start of the year. Students with no previous experience in a particular language may enter any 101 course; placement is necessary for all other language courses and levels. The 101 and 102 undergraduate programs courses comprise the first year of language study. Courses numbered 151–153 are at the intermediate or second-year level. Courses at the 200 level require placement as well.

**For Students with Previous Language Training**

The College Board Subject Test Advanced Placement scores or International Baccalaureate rankings assist departmental advisors in finding the right course level for you. Information on how you learned the language or languages you know will also help us advise you on the most appropriate courses for you in the Department of Modern Languages and Cultures. The first step is to take the online placement exam for Chinese, French, German, Italian, Russian, or Spanish. (For Japanese, Korean and Portuguese, contact the particular program’s undergraduate advisor.) For the online placement exams in Chinese, French, German, Russian, or Spanish, you will receive a score that will be used along with the survey information you provide and with
any AP or IB scores you have submitted that will help determine your placement in a specific language course. Please note that any semester placement you may receive with your online numerical test scores are not University of Rochester placement rubrics. For Italian, you should discuss your score with the undergraduate advisor in the program.

Advanced Placement (AP)

AP 4: Students will be placed by the department into 152 or 200. Credit is granted for 151 upon completion of 152 with a grade of B or better. Credit is granted for 151 and 152 upon completion of 200 with a grade of B or better.

AP 5: Placement into 200. Credit for 151 and 152 is granted upon successful completion of 200 with a grade of B or better.

French—AP score of 5: Students will be placed by the department into FR 200 Advanced French. Four credit hours will be granted upon completion of FR 200 with a grade of B+ or better.

Spanish—AP score of 4: Students will be placed by the department into SP 152. Credit is granted for SP 151 upon completion of SP 152 with a grade of B+ or better.

Spanish—AP score of 5: Placement into SP 200. Credit for SP 151 and SP 152 is granted upon successful completion of SP 200 with a grade of B+ or better.

International Baccalaureate (IB)

Foreign Language

IB higher-level 5: Students are placed into 152 and are awarded credit for 151 after completion of 152 with a grade of B or better.∗

IB higher-level 6: Students are placed into 200 and are awarded credit for 151 and 152 upon completion of 200 with a grade of B or better.∗

IB higher-level 7: Students are placed into 200 and awarded credit for 151 and 152 upon completion.∗

MLC Clusters

Completion of a cluster of three courses in MLC fulfills the humanities requirement for graduation. In addition, Russian studies offers several humanities and one social sciences cluster. Each language program in the department offers clusters at the beginning, intermediate, and advanced levels, as well as others based on specific topics or themes, so any course you choose in MLC will fit into one or more clusters. Comparative literature and the national language programs offer clusters focusing on literary studies, cultural theory, and interdisciplinary topics. A few examples are Modern French Thought, Italian Culture and Civilization, Germany before Nazism, Japanese Popular Culture, Russian Literature and Culture, and Literature and Identity in Hispanic Societies. Some of these are interdepartmental and include MLC courses plus offerings in history, art and art history, music, anthropology, film and media studies, and gender and women’s studies. A couple examples are Introduction to European Studies and Continental Philosophy.

Special Opportunities: Study Abroad

MLC strongly encourages students to take advantage of the many opportunities for study abroad in a variety of places around the world. There are opportunities to take classes abroad or to do internships related to one’s interests. Returning study abroad students consider the time spent in another country as one of the most exciting and challenging experiences of their undergraduate education. The College sponsors several University of Rochester programs and is affiliated with others, such as the Paris Film Program; the IES programs in Salamanca, Granada, Barcelona, and Madrid; in Paris and Nantes; the St. Petersburg CIEE program; and the IES programs at several universities in China and Japan. MLC also offers a one-semester, interdisciplinary program in Italian studies in Arezzo, Italy. This program is directed by College faculty and administered through the Center for Education Abroad.

MLC-sponsored summer programs take students to France, Germany, Italy, Russia, and (in even-numbered years) a Spanish-speaking country. You do not have to major in a modern language in order to participate in these programs, but it is important to plan in advance with an MLC advisor in your field of interest. Advisors in each of the language programs help students pick the study abroad offerings best suited to their interests and language abilities. MLC also sponsors a yearlong exchange program with the University of Cologne and the University of Rennes. University of Rochester financial aid is transferable for many study abroad and internship opportunities. Through MLC, students taking courses in the department may also apply for a Mildred R. Burton Undergraduate Travel/Research Fellowship. Each year, many students are awarded fellowships to use toward our study abroad programs.

Courses

The Department of Modern Languages and Cultures currently offers introductory through advanced courses in Chinese, French, German, Italian, Japanese, Russian, and Spanish, as well as introductory and intermediate courses in Korean and Portuguese. This enables students to begin a new language or continue in a familiar one beginning with their first semester. Other courses, such as those listed here, provide more advanced studies of other literatures and cultures.

Spring courses have yet to be determined. The following courses are taught in English and have no prerequisites:

CHI 221 / CLT 269 Laborers, Sojourners, Immigrants: Chinese Journeys to the Americas (19th–20th Centuries). This course focuses on the wide variety of trajectories and circumstances that brought Chinese to the Americas in the 19th and 20th centuries and the vastly different realities that awaited them in different locations and in different eras. Students learn about several significant modes of translocation, including the “coolie trade” to Cuba, Peru, and the British Caribbean in the mid-19th century; “credit-ticket” movement that brought Chinese to the United States and other parts of the Americas in the same time period; as well as more recent waves of migration in the 20th century. Together, we look at the historic socioeconomic factors that spurred these voyages, the experiences of those who underwent them, and the lasting impacts Chinese communities have had on the locations in which they ar-

*For Spanish, a grade of B+ or better is required.
rived. Readings are drawn from a variety of fictional and nonfiction sources. Offered in English. (Fall)

**CHI 230/AH 270 Contemporary Chinese Art.** Course explores the emergence of experimental and documentary art in China since the end of the Cultural Revolution in 1976. We consider how questions of the remainders of past and new urban spaces, the shifting relations of writing and images, the politics of the body, and the changing location of China in a global cultural economy have driven wide-ranging experiments with new materials, mediums, and exhibition spaces. (Fall)

**FR 235/CLT 235 Texts Beyond Borders.** This course examines recent French literary production from the turn of the century to present day through the prisms of language and translation, intertextuality, identity and migration, notions that cross the borders of national literature. We analyze the theoretical conditions that address questions of postcolonial and postmodern literature, world literature, and cosmopolitan identity in literature and translation. Knowledge of French is strongly recommended but not absolutely necessary. Literary texts are available in both French and English. The course is conducted in English. (Fall)

**FR 255/CLT 283/PHL 291 Sartre and Heidegger.** This course studies two of the most influential works of 20th-century philosophy: Martin Heidegger’s *Being and Time* (1927) and Jean-Paul Sartre’s *Being and Nothingness* (1943). Together these two treatises defined existential phenomenology and changed the course of philosophy, exerting a profound influence over later writers and thinkers. Since both philosophers sought to fundamentally redefine human reality, we examine concepts such as freedom, bad faith, temporality, history, subjectivity, death, emotion, and the relation between self and other. We also compare Sartre’s insights with those of Heidegger, particularly in regard to the concept of authenticity. Conducted in English. (Fall)

**GER 205/CLT 282B/JST 205 Nietzsche and the Nietzscheans: Nietzsche and the Jewish Question.** Friedrich Nietzsche continues to be one of the most influential modern philosophers, yet controversy surrounds almost every aspect of his life and work, specifically his relationship to both the Jewish people and Judaism. In this course we read the most relevant texts on Nietzsche’s view of the “Judeo-Christian” tradition as well as his remarks on the Jewish nation. From there, we read a number of Jewish writers who both avow and disavow Nietzsche’s influence on their work. Authors include Franz Kafka, Sigmund Freud, Sara Kaufman, Jacob Taubes, Jacques Derrida. (Fall)

**GER 230/CLT 242A/ENG 232 Poe and Hoffmann: Uncanny Stories.** 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. (Fall)

**GER 247/CLT 202B/FMS 209/JST 219 The Holocaust in Film and Literature.** How does one represent the unrepresentable? This is the key question we explore as we look at films and literature about the Holocaust. As we look at fictional films, novels, documentaries and memoirs, we 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. (Fall)

**GER 272/CLT 222B/WST 272 Gender and Sexuality in the 20th Century.** This course examines literary, artistic, and theoretical representations of gender and sexuality as they have changed in the course of the 20th century. The focus is on texts from Western Europe and the United States, but we 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 explore the contested and politically charged debates around gender and sexuality that have shaped our views of identity over the last century. (Fall)

**IT 195/IT 220/CLT 253/ENG 206/HIS 156/REL 197/REL 285 Dante’s Divine Comedy: Part I, Inferno and Purgatorio.** The course aims at familiarizing students with one of the most significant texts in Western culture. Through Dante’s text, 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. The course also provides students with an avenue of investigation on the problems of knowledge and guides them in developing critical tools and research skills. The first part of the semester is devoted to the creation of a historical and intellectual frame of reference in which to locate *The Divine Comedy*. The second part focuses on *Inferno* and a few cantos of *Purgatorio*. Lectures and class discussion are complemented by a weekly recitation session. Students enrolled for the upper-level cross listings are assigned a separate complementary reading list with additional primary and secondary sources. (Fall)

**IT 248/CLT 213B/FMS 285/HIS 286 Modern Italy through Film.** Taking the inspiration from Martin Scorsese’s anthological film *My Voyage to Italy*, the course focuses on a few momentous episodes and phenomena of Italian political, social, and cultural history as portrayed and interpreted in film. We discuss aspects of Risorgimento, Fascism, the World Wars and their aftermath, the culture of individual cities, the contrast between North and South, the condition of women, emigration and immigration, power and repression, spirituality, and secularism. Among the major film directors, we include Rossellini, Visconti, Fellini, Olmi, and Bertolucci. The analysis of the movies is integrated with readings from the fields of history, literature, criticism, and theater. A glance at Verdi’s operas of the 19th century and at the tradition of social song as it develops in the postwar period complements the course. This course is complementary to HIS 228 offered in Arezzo. (Fall)

**JPN 210/JPN 210W/AH 222/CLT 220A/HIS 146 Topics in “Traditional” Japanese Culture.** This discussion-based course interrogates the construction and evolution of Japan’s cultural traditions and idioms from ancient times to the eve of modernity. Drawing from oral records and mythology, literary and historical texts, and performing and visual arts, among other mediums, this course asks students to understand and appreciate the dynamic contexts of Japanese “tradition.” At the same time, contemporary evocations of the past, as represented through manga and film, help us understand the processes through which traditions are (re)invented and (re)made. This course is therefore invested in both the historical legacy of tradi-
perspectives on race, gender, landscape, identity, and Japan’s historical work (e.g., iconography, visual landscape, character design, narrative specifics of animated cinematic construction that distinguish his defining influences, and routes of cultural exchange. We then focus where anime comes from: historical precedence, significant sources, sensibilities of his creation, Studio Ghibli. We begin by investigating 1) a comprehensive “grass roots” study of anime as film form and completions weekly assignments. (Fall)

JPN 214/JPN 214W/CLT 214M/CLT 214W/ENG 259/FMS 299 Atomic Creatures: Godzilla. A focused study of Godzilla on film, beginning with the 1954 film that inspired and helped define the Japanese kaiju eiga genre. The larger context of the course is a critical investigation of genre film, specifically the science-fiction/horror/ creature-feature film, and a careful consideration of the “culture of war” (World War II through 21st century). We begin with a sampling of seminal non-Japanese titles that provided the foundation for the Godzilla film paradigm and then focus on a close textual study of select “Godzilla films” that help us understand the historical and social contexts for Godzilla’s erratic trajectory since 1954. Recent DVD releases with both dubbed and original Japanese language versions enable us to dissect the culturally generated permutations of kaiju eiga. (Fall)

JPN 231/CHI 231 Asian Calligraphy: History and Practice I. An introduction to the Chinese and Japanese writing systems, including their historical development, artistic practices, and practical applications. This entails the study of kaisho (print script) and kanji (Chinese characters) as well as the meanings of the kanji. One class meeting per week is devoted to the study of calligraphy. Ideal for those studying Chinese or Japanese, but also issues of gender, race, psychology, sexuality, morality, and history as they relate to the Japanese literary corpus. A selection of shorter fiction and a few novels are available in English translation, and students need not be familiar with Japanese. (Fall)

JPN 294/JPN 294W/CLT 210/CLT 210W/ENG 258/FMS 207 Hayao Miyazaki and Planet Ghibli. This course offers 1) a comprehensive “grass roots” study of anime as film form and cultural phenomenon; and 2) a more specific and guided investigation of the work of Hayao Miyazaki and the worldview and visual sensibilities of his creation, Studio Ghibli. We begin by investigating where anime comes from: historical precedence, significant sources, defining influences, and routes of cultural exchange. We then focus on Miyazaki’s work and the Ghibli corpus in order to examine the specifics of animated cinematic construction that distinguish his work (e.g., iconography, visual landscape, character design, narrative tropes, music); methods of adaptation, influence, and genre variation; reception and fan culture; and anime’s potential for providing unique perspectives on race, gender, landscape, identity, and Japan’s historical and mythological past. (Fall)

RST 126/RUS 126/HIS 134 Russia Now. Students 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 follows a particular area of interest (e.g., national identity, the market economy, politics, health issues, crime, culture, foreign policy) throughout the term, does background work on this topic, and writes it up towards the end of the term. Students who read Russian are 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, and 2) acquaint students with a variety of resources from the United States, Russia, and a number of other countries and the different perspectives these sources may give on one and the same issue. Students write two short essays and one longer research paper. (Fall and Spring) (4 credits)

RST/RUS 127 Russia Now. In this 2-credit version of the “Russia Now” course, students follow current events in Russia through the Internet, newspapers, magazines, and other sources. Along with a general attention to current events, each student follows a particular area of interest (e.g., national identity, the market economy, politics, health issues, crime, culture, foreign policy) throughout the term, does background work on this topic, and writes it up towards the end of the term. Students who read Russian are 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, and 2) acquaint students with a variety of resources from the United States, Russia, and a number of other countries and the different perspectives these sources may give on one and the same issue. May be taken twice for credit. (Fall and Spring) (2 credits)

RST/CLT/FR/GER/IT 160 The New Europe. One class each week looks at the postwar rise of the European Union and the extent to which it has successfully united a majority of European countries and created a new, postnational European identity. The other weekly class follows current events in a Europe that stretches from the Atlantic coast eastward to the Ural Mountains of Russia and comprises more than forty nations, each of which has its own “brand” based on a complex mix of historical, geographical, economic, and cultural factors. In English. (Fall)

RUS 231/CLT 255A/RST 231 Great Russian Writers. This is a chronological survey of the most important Russian writers of the 19th century, from the end of romanticism through the rise of realism to the advent of modernism. We read Alexander Pushkin’s novel in verse Eugene Onegin, Mikhail Lermontov’s psychological study Hero of Our Time, Nikolai Gogol’s comic masterpiece Dead Souls, Ivan Goncharov’s novel about a man who cannot get out of bed, Oblomov, Ivan Turgenev’s novel about generational differences Fathers and Sons, Dostoevsky’s suspense novel The Gambler, and two plays by the forerunner of modern theater, Anton Chekhov: Uncle Vanya and Three Sisters. Our goal is twofold: to understand the shape and development of Russian prose in the 19th century and to heighten our own appreciation of fine literature. Four five-page essays. In English. (Fall)
RUS 289/RUS 289W/RST 289/RST 289W/HIS 206/HIS 206W Dangerous Texts: Literature and Politics in Russia. 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 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 also see the ways in which writers did indeed perceive themselves as a second government and how this changed the way they wrote. The goal of this course is to arrive at an understanding of the unique role played by literature in Russian history. In English. (Fall)

SP 215/CLT 256B/ENG 243/LTS 465 Don Quixote: The Book, the Myth, the Image. 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 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 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 do the bulk of the work in Spanish. (Fall)

SP 287/CLT 205/FMS 276 Latin-American Film. This course explores the repackaging of Hollywood genres and conventions by the directors of Latin American cinema. The genres we study include melodrama, thriller, film noir, comedy, and literary adaptations, with films from Chile, Cuba, Colombia, Mexico, Brazil, and Argentina. Although we screen a few classics of the golden age (1950s) for comparison, emphasis is on films of the last 20 years. Course taught in English, but written work may be done in Spanish for Spanish credit. (Fall)

Intermediate and Advanced Language and Conversation Courses

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For More Information
Please visit the modern languages and cultures program website at www.sas.rochester.edu/mlc/.
Information about the Department

Students from all disciplines may participate in the pleasures of musical study and performance to acquire a deeper understanding of the many ways music reflects values of various cultures, influences lives, and enriches human existence. The Department of Music in the College offers courses of study leading to the BA degree with a major, a minor, and six clusters in music. Numerous varied courses address non-majors who wish to study music on an introductory, interdisciplinary, or aesthetic basis. Degree programs, course offerings, and performance opportunities in music are diverse and invite choice and flexibility. Courses offered at the Eastman School of Music, normally open to any student presenting the proper prerequisites, augment the range and depth of musical experiences and courses available to students in the College.

Full-time, matriculated undergraduate students who pass an entrance audition may take applied music lessons at Eastman. See Departmental Advice for Freshmen, below, about applying and auditioning for lessons; interested students should visit www.esm.rochester.edu/lessons and sign up for an audition, preferably before August 15. Students with questions about the audition process for lessons should contact Jimmy Warlick, the performance program manager in the music department. Beginning music lessons are available without credit and for a fee through Eastman’s Community Music School. Call (585) 274-1400 or visit ECMS online at www.esm.rochester.edu/community for more information.

More than 400 students play or sing in more than a dozen offered credited ensembles. Auditions for all of these ensembles take place during the first week of school. For audition information, contact the performance program manager in the music department.

The formal study of music at the collegiate level interrogates the dynamic relationship among composer, performer, and listener in various cultural contexts and historical frames. For creators and audience members alike, music can be both a cultural practice/artifact and an aesthetic experience. To that end, the College music department offers a balanced curriculum that addresses performance (through private studio instruction and ensemble participation), theoretical and historical investigation, and experiential learning about the musical process.

The study of the musical experience, often broadly called “musicology,” encompasses many diverse fields of inquiry, including theory and analysis of musical languages, styles, and works; historical and critical discourse about repertories, genres, and periods; composition and improvisation; musical perception; music education; performance practices; cultural contexts and reception.

Department Contacts

Freshman advisor: Professor Matthew BaileyShea, matt.baileyshea@rochester.edu or Professor Corbett Bazler, cbazler@ur.rochester.edu

Administrative questions: Elaine Stroh, estroh@ur.rochester.edu

Ensemble and studio lessons: Jimmy Warlick, jwarlick@ur.rochester.edu

Departmental Advice for Freshmen

Every student at the University of Rochester should take at least one music course during his or her four years here. Music department courses accommodate a wide range of interests for students with no background in music to those interested in making music their livelihood. We strongly encourage students considering a major in music to take music theory during their freshman year. See “Courses” for a list of classes open to freshmen.

Students interested in registering for a music theory course should take the theory placement exam administered (one time only) during Orientation. Although no RSVP is required, more information about the placement exam can be obtained by contacting Jimmy Warlick in the music department or checking the music department website. This brief exam is held in Strong Auditorium during freshman orientation week.

Students who read music and perform at an intermediate level can audition for applied music lessons by visiting www.esm.rochester.edu/lessons and signing up for an audition prior to the first week of classes. Note to brass musicians—unlike other instrumental areas, the brass auditions include musical excerpts to be prepared in advance. Please contact the performance program manager in the music department to obtain PDF files of the required excerpts.

The BA with a Major in Music

The College’s Bachelor of Arts degree in music addresses students who can meet both the intellectual and musical challenges of a rigorous program that emphasizes the broad experience of a liberally educated person. The concentration comprises a balanced program of academic courses, private instruction, and ensemble experience that fosters understanding of musical languages, historical developments, and compositional styles while encouraging excellence in performance.

Students may choose from among eight individual “tracks” of study with the core curriculum in music theory and history, included in all tracks, providing the common foundation for advanced study of specialized subfields in music (musicology, theory, conducting, management, performance, composition, music education,
etc.) both as emphases in the final years of undergraduate education and at the graduate or professional level. Majors wishing to pursue something other than the basic track can choose an alternative track in composition, conducting music history/theory, music in world cultures, musical theater, performance, and popular music/jazz. Any student interested in a 3-2 program in ethnomusicology or a cultures, musical theater, performance, and popular music/jazz. BA/MA combined program with certi, Any student interested in a 3-2 program in ethnomusicology or a cultures, musical theater, performance, and popular music/jazz. Any student interested in a 3-2 program in ethnomusicology or a cultures, musical theater, performance, and popular music/jazz. Although the major in music is a demanding one, students often also explore, beyond the introductory level, one or more non-music disciplines. Some students pursue a double major. Such flexibility allows students to combine pre-law or pre-medicine preparation with a major or minor in music.

Freshmen who plan to major in music should take the theory placement examination to determine appropriate placement in the theory curriculum. Prospective majors should also audition for applied music lessons and an ensemble.

**Advanced Placement (AP)**

Students who have taken the Advanced Placement examination in Music Theory and earned a score of 4 or 5 can receive advanced placement credit for the course MUR 110.

**Music Clusters**

Students whose major is in the social sciences or natural sciences and engineering divisions are invited to pursue one of the six music clusters:

**Music Theory (H1MUR001)**

Grammar and syntax of Western music, including notation, harmony, counterpoint, and some composition.

**Introduction to Classical Music (H1MUR013)**

Explores Western art music from a variety of perspectives, including music theory, history, and performance.

**Popular Music (H1MUR014)**

Explores various styles and forms of popular music in Western culture.

**World Music (H1MUR017)**

An introduction to non-Western music.

**Musical Styles and Ideas (H1MUR016)**

A diverse array of repertoires and approaches to the musical experience.

**The Performing Musician (H1MUR011)**

A hands-on approach to the experience of music.

**Courses Open to Freshmen**

**MUR 100 Experiencing Music.** A new approach to “music appreciation” that could be offered only at the University of Rochester, with its extraordinary musical resources, including nearly 800 concerts and recitals per year, a professional-quality recording studio, and the largest academic music library in the New World. This enjoyable course celebrates the “ears-on” experience of various aspects of musical performance and assumes no previous technical training in music. Participants develop listening skills through the enjoyment of live musical presentations, in-class performances, discussions with the performers and living composers, and guided listening sessions. Students attend some rehearsals and concerts, including at least one Rochester Philharmonic concert in Kodak Hall at the Eastman Theatre. Websites and other technological media also are used in lieu of text. (Spring, alternate years)

**MUR 101 Elements of Music.** A course for the student with no previous musical experience. Topics 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. For the student with no previous musical experience. (Fall and Spring)

**MUR 103 Musical Adventures (Too Hip a Trip to Miss).** Bach to Coolio—and lots of stops in between—this course explores the wonderful world of music. We’ll fill our backpack with a few essentials for our journey: some musical vocabulary and grammar. We’ll explore such questions as, “What is music?” and “Why do humans make it?” We’ll find out what one another of us think is musically “mint” and musically “gross” and why. We’ll explore the interesting world of musical sounds and styles of New Orleans, Chicago, and Harlem. From concert halls to church halls; from beer halls to dance halls, we’ll go in search of music. We’ll meet Dukes and Counts and Princes and Queens, royal and otherwise. And, because everyone has some spirit of invention, we may even try our hand at a little musical creation. Prerequisites: none. (Spring)

**MUR 104 Carillon.** Private carillon instruction, weekly 30-minute lessons or the equivalent. By audition only. Permission of instructor required. (2 credits)

**MUR 106 A Brief History of Western Music.** This course is meant to be both a traditional class in music appreciation and a broad survey of Western notated music from its earliest manifestations up to the present day. Early lectures and assignments help students develop more sophisticated listening skills and a conceptual vocabulary with which to talk about music. We then focus on representative pieces from each major art-historical period (medieval, renaissance, baroque, classical, romantic, modern, postmodern) as well as explore how that music functioned and held meaning for the people that composed and listened to it. Exams test knowledge of repertory and musical style, and short writing assignments venture into more detailed analyses and interpretations of musical works.

**MUR 109 Musicianship I: Literacy Skills.** Extensive work with clefs, notation, intervals, and scales. Aural work through sight singing and dictation emphasizing melody and rhythm. Music-reading work emphasizes speed and fluency in recognizing structures in
musical score. Prerequisite: some prior experience in reading music notation in treble and bass clefs. (Fall and Spring) (1 credit)

MUR 110 Introduction to Music Theory. Basic concepts of music theory addressing students with some musical experience in an instrument or voice but little or no music theory. Scales, keys, intervals, chords, basic part-writing, and other fundamental aspects of musical structure. Some ear training and aural skills. Prerequisite: ability to read music, preferably in both treble and bass clefs. (Students who have completed MUR 101 should not register for MUR 110.) (Fall)

MUR 111 Theory I. 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. Prerequisite: MUR 101 or 110; or permission of instructor (placement test). (Fall only)

MUR 113 Musicianship II. 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. (Fall and Spring)

MUR 118 Beginning Piano for Non-Music Majors I. Elective course for non-music majors from River Campus with no previous keyboard instruction and cannot read music. The course includes technique, fundamental skills, and repertoire. Note: Seating is limited due to keyboard availability; no additional students will be accepted once the sessions are full. Classes are held at the Eastman School of Music Campus. See the school's website for information on start date, cancellations, etc. www.esm.rochester.edu/classpiano/. (Fall only) (2 credits)

MUR 119 Beginning Piano for Non-Music Majors II. Continuation of MUR 118. See note at MUR 118 above. (Spring) (2 credits)

MUR 122A History of Jazz. This study of jazz as an American musical art form is 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 is 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. Prerequisites: none. (Fall only)

MUR 122B History of Jazz II. This course focuses on jazz music and musicians in the latter half of the 20th century (ca. 1955–2000). We investigate the relationship of jazz to the following topics: new musical styles; other art forms; changes in American society; technological developments; and the evolution of recording, broadcast, and news media. In doing so, we consider not only musicians who first emerged as leaders during this period (Ornette Coleman, John Coltrane, Bill Evans, Herbie Hancock, Keith Jarrett, Chick Corea, Wynton Marsalis, John Scofield) but also those whose careers began earlier (Louis Armstrong, Dizzy Gillespie, Miles Davis, Gil Evans) and continued into the 1950s and beyond. We also examine how repertoire from previous historical periods came to be viewed by subsequent generations of musicians and listeners. The instructional format includes lectures and discussion along with in-class viewings/listenings of recorded performances. This course is designed for students with little or no musical training. The coursework consists of assigned readings, listenings, brief written assignments, and two exams. Prerequisites: none.

MUR 123 Music of Black Americans. The course studies 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 is given to significant literary and aesthetic developments, especially during the Harlem Renaissance and the poetry of several writers of that era are surveyed. The course treats blues, its origins, and its 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. (Spring only)

MUR 124 Signed, Sealed, and Delivered: Deals and Innovations that Changed the Music Industry Forever. A look at the historical deals and innovations that have impacted the music business between 1877 and the present. From groundbreaking inventions to brilliant marketing initiatives to hushed back-room deals, this course exposes the key moments where the record industry changed forever, both for good and for bad. (2 credits)

MUR 125 History of Rock Music. This course explores the history of rock music, emphasizing the period between 1955 and 1990. The periods preceding (1900–55) and following (1990–present) are considered to a limited extent. Discussion and reading focus mostly on the music, identifying a wide variety of rock music styles within the historical context of the development, transformation, and interaction of pop styles of these decades in general. Issues of technological development, social, political, and cultural context, race and gender, and music business practices are considered also. Prerequisites: none. Knowledge of technical musical terms and an ability to read music are not required for this course. (Spring)

MUR 126 Opera. A small number of representative operas are 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 are examined as components of production. Divas welcome. Prerequisite: ability to read music.

MUR 127 The Blues. See online course description for REL 151.

MUR 128 Women and Music. This course focuses primarily on women composers but also includes material on women as performers, patrons, and consumers, as well as consideration of the role that gender plays in the experience of music. Prerequisites: none.
MUR 129 The Rolling Stones and British Blues-Rock. The music of the Rolling Stones is examined, starting with the earliest music from 1962 and extending to the early 1970s. Emphasis is on the band's stylistic development, as well as on the British blues movement of the early to mid-1960s. The music of other blues-based British groups, including Blues Incorporated, the Yardbirds, the Animals, the Bluesbreakers, Cream, and Led Zeppelin, also are considered. No previous training or ability to read music is required. (Fall)

MUR 130 The Beatles, the British Invasion, and Psychodelia. 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 in the 1950s, 60s, and 70s. No background in music theory or ability to play a musical instrument is required. (Fall)

MUR 131 Rock Music of the 1970s. This course surveys rock music in the 1970s, paying special attention to ways in which '70s styles developed out of '60s' styles. Artists considered 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. No previous musical training is required. (Fall)

MUR 132 Star Makers. Includes a historical overview of music stars and the publicity campaigns used to promote their careers. From Frank Sinatra through the 1940s; through Elvis Presley and the 1950s; through the Beatles and the Rolling Stones in the 1960s; through the self-indulgent '70s with acts like Elton John, Kiss, and Prince; up to today's high-profile campaigns for Justin Bieber, Rhianna, and Lady Gaga. Students will be versed in the art of writing an artist bio, press releases, and in the various types of PR events staged to gain publicity. Starmakers also looks at the various types of publicity, such as career launching, crisis management (scandals, sudden death of celebrity), and tour press. We also look at how social media has become a game changer for music publicity. (Fall)

MUR 135A American Musical Theater. A historical and critical survey of the Broadway musical with a focus on its so-called Golden Age (from Oklahoma! to Cabaret). Weekly listening, reading, and video assignments with analysis of dramaturgy, lyric and musical forms, process of adaptation and production, modes of performance. Prerequisite: ability to read music or strong background/interest in musical theater. (Spring, alternate years)

MUR 135B Sondheim and the Modern Musical Theater. A historical and critical survey of the American musical theater from roughly 1960 to the present as reflected principally in the works of composer/lyricist Stephen Sondheim and/or producer/director Harold Prince. Analysis of lyrics, musical forms and idioms, process of adaptation and production, modes of performance. Although prior completion of MUR 135A is recommended, students with a strong background in musical theater will be admitted as well. (Fall, alternate years)

MUR 136 Shakespeare and Music. 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. Prerequisites: none.

MUR 137 Thinking about Music. Everyone knows that music can elicit a wide variety of emotions. But whether classical or jazz, punk, rock, or gospel, music also communicates countless other meanings, denoting aspects of race, religion, gender, culture, and politics. This course explores various ways of thinking about musical meaning. After first building a musical vocabulary, we discuss many kinds of music in different contexts, including classical and popular music, Broadway and opera, film scores, music videos, advertisements, and religious and nonwestern traditions. (Fall)

MUR 138 Television and Radio. This course surveys the history of the radio and television industries, their origins, and their impact on various aspects of American culture. Weekly lectures, listening assignments, and viewing assignments are required. (Spring)

MUR 139 Early Radio. This course surveys the history and development of the radio industry from its beginnings to the mid-1940s. Weekly lectures, listening assignments, and viewing assignments are required. (Spring)

MUR 140 Religion and Hip Hop Culture. Religion is an often overlooked element in the study of hip hop culture. This course offers students the opportunity to examine the variety of ways religion finds expression in the dynamic cultural medium of hip hop. (Alternate years)

MUR 141 Introduction to Audio and Music Engineering. The science and technology of the electric guitar and related accessories such as amplifiers and effects processors opens a window onto the fields of audio, music, and electrical engineering. The course begins with students building and experimenting with electric guitars to learn about the vibration of strings, musical tuning systems, overtones and timbre, modes of oscillation, Fourier analysis, transducers and passive electrical components, and circuits. In a second project, a headphone amplifier, students are introduced to the fundamental concepts of electronics, including voltage, current, resistance and impedance, basic circuit analysis, ac circuits, impedance matching, and analog signals. The course then moves on to introduce basic digital signal processing concepts through a guitar effects processor (stomp box) project; this includes conversion of sound to digital format, frequency analysis, digital filtering and signal processing, and musical sound synthesis. (Fall)

MUR 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. In this course, students study both the musical structure and the fascinating social/cultural history of hard rock and metal through reading, listening, discussion, and analysis. More than 40 years of hard rock and metal trends are discussed—Sabbath to Stryper to Slipknot—and several guest musicians and lecturers complement the course materials with performances and anecdotes. Students demonstrate their knowledge through listening quizzes, three full-length exams, writing assignments, and a comprehensive final project. Prerequisites: none. (Fall)

MUR 161 Broadcasting in the Digital Age. A descriptive and critical analysis of the nature of electronic mass media, broadcast practices, and impact. Historical development of mass media institutions and role of media in society, including evaluation of news, government regulation, economics, emerging technologies, and audience dynamics, as well as decision-making and organizational aspects of the broadcast industry. 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. (Spring only)
MUR 201 Basic Jazz Theory and Improv 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, vocalization, transcription from records of jazz solos. Prerequisite: MUR 111 or permission of instructor. (Fall only) (2 credits)

MUR 202 Basic Jazz Theory and Improv II. Continuation of MUR 201. Prerequisite: MUR 201 or permission of instructor. (Spring only) (2 credits)

MUR 203 Susan B. Anthony and Her World. See online course description for WST 201.

MUR 210 Ngoma: Drumming, Dance, and Ritual in Southern Africa. Throughout much of southern Africa, the word *ngoma* means drum. It also refers to specific musical styles that combine drumming, dance, and song. Finally, there is often a ritual dimension to *ngoma*, which is used in ceremonies focused around individual and social healing. In this class, students bring *ngoma* alive by learning to perform various Zimbabwean *ngoma* genres with the option of specializing in either drumming or dance. Through video clips, audio recordings, photos, and articles, we also learn to understand *ngoma* within a larger cultural framework.

Eastman Courses

In addition to those listed above, qualified students may take courses at Eastman. In general, introductory theory courses (MUR 111 and 112) are prerequisites for taking most Eastman music courses, and the instructor’s permission is necessary to register.

Ensembles

Auditions for performing ensembles occur during the first week of the academic year. During orientation, audition sign-up sheets are posted on the large bulletin board in the second-floor stairwell of Todd Union. Contact Josef Hanson (josef.hanson@rochester.edu) for details. Students accepted into the groups may receive credit by registering for ensembles during the Drop/Add period. Those who complete the semester satisfactorily receive one credit and a grade.

The following performing ensembles are available for credit:

**Instrumental Ensembles**

MUR 153 Symphony Orchestra
MUR 154 Chamber Orchestra
MUR 155 Chamber Ensembles
MUR 156 Wind Symphony
MUR 157 Jazz Ensemble
MUR 159 Gamelan Ensemble
MUR 165 Mbira Ensemble
MUR 168 West African Drumming
MUR 170 Brass Choir
MUR 175 Percussion Ensemble
MUR 180 Rock Repertory Choir

**Vocal Ensembles**

MUR 150 Women’s Chorus
MUR 151 Men’s Chorus
MUR 152 Chamber Singers
MUR 158 Gospel Ensemble

**For More Information**

Please visit the music program website at www.rochester.edu/college/MUR/.

**MUSIC AND SOUND**

“Music is a science, certainly, in which exists sure and infallible knowledge, for whether we speak of it in terms of problems or effects, it would never demonstrate any change or alteration. And indeed, we might also with reason call it an art, for it is both a composite of perceptions...and is not useless to life.

—Aristides Quintilianus

*On Music* (late third century A.D.)

**Information about the Program**

The Music and Sound Initiative is an exciting collaboration between faculty in the University’s Arts, Sciences, and Engineering disciplines and the Eastman School of Music. Music, science, and engineering play pivotal roles in the University of Rochester and in the broader Rochester community. The Music and Sound Initiative serves as a focal point for enhancing and expanding research programs that span these disciplines. We encourage students who wish to engage in interdisciplinary study in these or related disciplines to visit our website (https://www.rochester.edu/college/mas/) and to contact us.

The Music and Sound Program at the undergraduate level includes two minors and five clusters that explore and unite the topics of music theory and music processing; language structure and processing; the auditory system that processes both music and language; and cognition, the larger set of abilities of perception, memory, and learning that permit humans to appreciate and learn music and language. The core undergraduate course in music and
Courses

The following courses are part of the music and sound clusters. Freshmen who complete BCS 110 or 111 during the fall semester may be eligible to take certain upper-level brain and cognitive sciences electives in the spring. Similarly, students who complete LIN 110 during the fall may be eligible to take 200-level linguistics courses in the spring.

**BCS 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. Prerequisites: none. Part of clusters N1MAS001, N1MAS002, N1MAS003, and music cognition minor. (Fall and Spring)

**BCS 111 Foundations of Cognitive Science.** Introduces the organization of mental processes underlying cognition and behavior. Topics include perception, language processing, learning, and memory. Integrates knowledge of cognition generated from the fields of cognitive psychology, artificial intelligence, neuroscience, linguistics, and philosophy. Prerequisites: none. Part of clusters N1MAS001, N1MAS002, N1MAS003, and music cognition minor. (Fall and Spring)

**BCS 260 Music and the Mind.** Introduction to the discipline of music cognition. Topics include empirical methods; psycho-spatial 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. Prerequisite: one semester of music theory or permission of instructor. Part of clusters N1MAS001, N1MAS002, N1MAS003, S1MAS001, H1MAS001, music and linguistics minor, and music cognition minor. (Fall)

**MUR 110 Introduction to Music Theory.** Basic concepts of music theory addressing students with some musical experience in an instrument or voice but little or no music theory. Scales, keys, intervals, chords, basic part-writing, and other fundamental aspects of musical structure. Some ear training and aural skills. Prerequisite: ability to read music, preferably in both treble and bass clefs. Part of clusters N1MAS002 and H1MAS001. (Fall)

**MUR 111 Theory I.** 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. Prerequisite: MUR 101 or 110; or permission of instructor (placement test). Part of clusters N1MAS002, H1MAS001, music cognition minor, and music and linguistics minor. (Fall)

**LIN 110 Introduction to Linguistic Analysis.** Investigation of the structure of human language, covering the basic techniques and concepts in the subfields of contemporary linguistic analysis. The course emphasizes work in primary material and data analysis and focuses on developing skills in data collection and defining relevant questions to seek evidence to address theoretical and empirical questions in the analysis of language. Prerequisites: none. Part of clusters S1MAS001, N1MAS003, and music and linguistics minor. (Fall and Spring)

*For More Information*

please visit the music and sound program website at www.rochester.edu/college/mas. Students are welcome to attend our Music Cognition Symposia (twice per semester, non-credit) to experience a sampling of research in the discipline. Details are posted on the website, and questions can be answered by Melinda Adelman, the BCS undergraduate coordinator.
NAVAL SCIENCE

“If you are going to achieve excellence in big things, you develop the habit in little matters. Excellence is not an exception, it is a prevailing attitude.”

—Colin Powell

Information about the Department

Naval Reserve Officer Training Corps Rochester leads 70 men and women, Midshipmen, to earn a college degree and a commission in the Navy or Marine Corps. We develop academic, moral, and physical excellence. Staff mentorship and fellow Midshipman camaraderie ease the transition to college and set a framework for future success.

Midshipmen normally take one naval science course per semester, starting with the two listed below. Additionally, a weekly lab period covers topics of interest to the military service: leadership seminars, speakers on cultural studies, and visits from officers serving in the fleet. Outside the classroom, activities include intramural sports and community service. In regional military drill and athletic competitions, we consistently place among the top three. An integral part of the University and community, Midshipmen participate in the full range of Rochester activities.

Departmental Advice for Freshmen

Our classes are available to any student interested in learning about military service, regardless of the intent to join. Some courses meet cluster requirements for graduation; check with your academic advisor for details. Freshmen and sophomores interested in becoming officers in the Navy or Marine Corps are encouraged to explore the opportunities our program offers. Most scholarships are awarded in high school; however, students may affiliate on a nonscholarship basis through the college program for additional opportunities to earn a commission and/or a scholarship.

Courses

Freshman Year Classes

NAV 093 Introduction to Naval Science. This course introduces students to life in the United States Navy and Marine Corps. Taught by a naval officer, course content covers military customs, courtesies, and traditions; rank structures; officer and enlisted relation-

ships; and potential career paths. Individual research projects allow students to explore areas of interest. Active-duty guest speakers share their service experience. (Fall)

NAV 250 Sea Power and Maritime Affairs. This course focuses on the development of the US Navy and Marine Corps. As the country and the world have grown and changed, so too has our service. It examines how the history of the Navy fits in with, and has been shaped and influenced by, the history of the country and the world. The class also explores how changes in technology, strategy, politics, and personalities, along with the battles and wars fought, have made the Navy and Marine Corps what they are today. (Spring)

For More Information

Please visit the naval science program website at www.nav.rochester.edu.

THE INSTITUTE OF OPTICS

Information about the Department

Optics and optical engineering deal with the generation, propagation, detection, manipulation, and application of light. The University of Rochester’s optics department, called the Institute of Optics, is one of the world’s leading centers for teaching and research in this dynamic field and has been for quite some time—it awarded the nation’s first BS degree in optics in 1932. Although few people realize that “optics” and “optical engineering” are things they could major in, the world’s need for optics experts is always growing. The birth of the laser in the early 1960s is only the most famous of the many advances in optics that continue to change our world, 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.

A degree from the Institute of Optics is a symbol of quality and distinction recognized throughout the world. The institute’s 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 required coursework includes classes in geometrical optics, interference and diffraction, advanced mathematical methods, electromagnetic theory, aberrations and testing, optical sources and detectors, and quantum theory, as well as many laboratory classes. Majors supplement their required coursework with a number of electives to tailor their programs to their specific interests. Senior year includes a yearlong capstone experience, which usually consists of either mentored research as a member of a professor’s group, or a team-based design project including a customer and a faculty advisor. The 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, polishing, and testing of optical elements, giving our students unusually direct access to cutting-edge technology and industry-standard software. Many students also get involved as underclassmen in the world-class faculty research programs that are a distinctive part of the institute’s culture. In addition, research opportunities are available for optics undergraduates at the Laboratory for Laser Energetics (LLE). The LLE features some of the most advanced lasers in the world, such as the Omega EP, which is capable of picosecond operations (www.lle.rochester.edu/).

Departmental Advice for Freshmen
A student entering optical science and engineering as a freshman typically takes a basic science course, mathematics, a writing or cluster course, and Introduction to Optics or another introductory engineering course. The second semester continues with mathematics, physics, a cluster or writing course, and an introduction to scientific computing. The sophomore year contains more courses in math and physics, a cluster course each semester, and the first two core courses in optics, Geometrical Optics (OPT 241) and Interference and Diffraction (OPT 261)—each course has an accompanying 2-credit lab. The junior year program builds on this foundation and contains courses in electromagnetic theory, lens aberrations and testing, light sources and detectors, and the quantum theory of light. The senior year, drawing on previously completed academic study, features the student’s senior research or design project. Several technical electives are also typically taken the senior year. In addition, select seniors may take graduate-level courses and apply earned credit toward a master’s degree from the Institute of Optics. Consult with the undergraduate program manager (room 106 Wilmot Building) for more details.

Please note: Any freshman with a strong academic background in math and physics (i.e., AP credit) may, with instructor and advisor permission, directly enter OPT 241, Geometrical Optics.

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 regional and international optics industry; to work in engineering sales; and to enter business programs to pursue an MBA. Medicine and law also offer significant opportunities for someone with a background in optics. Optical instrumentation and techniques are increasingly important in medical research and medical practice, so a medical doctor (or an MD/PhD) with a BS in optics can establish a very active practice.

Typical Freshman Year Program

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td>MTH 161</td>
<td>MTH 162</td>
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<tr>
<td>CHM 137</td>
<td>PHY 121</td>
</tr>
<tr>
<td>WRT 105 or cluster course</td>
<td>WRT 105 or cluster course</td>
</tr>
<tr>
<td>OPT 101 Introduction to Optics</td>
<td>Scientific computing course</td>
</tr>
</tbody>
</table>

Courses

**OPT 101 Introduction to Optics.** This course provides an introduction to the field of optics—from ancient history to the future. Fundamental concepts such as refraction, diffraction, interference, and imaging are explored in a nonmathematical interdisciplinary approach. Each class includes vivid demonstrations that students can try out in the laboratory afterward. The importance of optics in other fields such as electrical, mechanical, biomedical, and chemical engineering, as well as physics and biology are explored and highlighted. Team projects and presentations give students in-depth appreciation of modern technologies ranging from DVD data storage to quantum encryption. We also discuss career paths and jobs in optics.

**Study Abroad Opportunities**
We encourage our students to study abroad, typically during a semester of junior year. Many study abroad credits transfer to the optics curriculum, and instruction can be either in English or the language of the host country. Examples of study abroad program sites for optics include Australia, Spain, and New Zealand.

**For More Information**
Please visit the Institute of Optics website at www.optics.rochester.edu or visit the undergraduate program manager located in Wilmot Building, Room 106.
"Philosophy is to be studied, not for the sake of any definite answers to its questions . . . but rather for the sake of the questions themselves; because these questions enlarge our conception of what is possible, enrich our intellectual imagination, and diminish the dogmatic assurance which closes the mind against speculation."

—Bertrand Russell

Information about the Department/Advice for Freshmen

The Department of Philosophy offers a variety of courses concerning traditional and contemporary philosophical issues. Many philosophical problems arise from a reflective examination of our ordinary beliefs. An excellent example is the problem of freedom and determinism. Most people believe that they have free will but also believe that people are biological organisms whose behavior is determined by internal and environmental factors. These beliefs raise philosophical questions: Can people be both free and determined? If so, how can that be? If not, which are we? Some other philosophical problems concern the nature and methods of scientific inquiry, morality, the legitimacy of governmental coercion, and knowledge and skepticism. The department offers courses on these topics and others, as well as courses on reasoning and logic.

The philosophy major requires 10 courses, including Philosophy 101, two required courses in the history of philosophy, one course in logic, and an undergraduate seminar. Concentrators wishing to emphasize a particular sub-field of interest may make use of optional guidelines for ways of satisfying the major that emphasize either Law and Ethics, History of Philosophy, or Logic and the Philosophy of Science. Many philosophy majors are double majors, and majors who qualify may participate in a philosophy honors program. (For more information about our requirements and guidelines, see www.rochester.edu/college/phl.)

The Department of Philosophy also offers a minor, which consists of five courses (at least two of which are upper-level, i.e., with numbers above 202) chosen in consultation with the undergraduate advisor.

In addition to the major and minor, the department offers six clusters: Ethics and Values; History of Philosophy; Logic; Knowledge, Mind, and Nature; Philosophy and Law; and Philosophy and Teaching Internship. All except the logic cluster are in the humanities. There is considerable flexibility within each cluster. Many introductory courses may be used as the first course in a cluster.

The department sponsors a variety of internships, including some in law and a teaching internship in which students work with elementary school children on reading, writing, and critical thinking skills. Many philosophy majors go on to law school, where they find the analytic and critical skills emphasized in philosophy most useful. Others go on to medical school or business school. Some go on to do graduate work in philosophy.

All students who wish to take a philosophy course, including those students who plan to major or minor in philosophy, should begin with any of the introductory courses listed below.

International Baccalaureate (IB)

Philosophy—Students who receive a higher-level exam score of 5 or better are awarded credit for PHL 101. No credit is granted for subsidiary-level exams.

Courses

PHL 101 Introduction to Philosophy. A study of fundamental philosophical problems and approaches to their solutions. (Fall and Spring)

PHL 102 Ethics. A critical examination of leading theories of right and wrong, and good and evil. (Fall and Spring)

PHL 103 Moral Problems. The application of ethical theory to moral problems, such as punishment, abortion, and racism. (Fall and Spring)

PHL 105 Reason and Argument. This course is a study of reason and argument on both scientific and non-scientific topics. We discuss how to evaluate reasoning as it is found in editorials, speeches, and essays and how to understand and evaluate the reasoning found in reports on scientific research. (Fall)

PHL 110 Introductory Logic. Precise methods for formalizing arguments, demonstrating their validity, and proving theorems in first-order symbolic logic are discussed. (Fall and Spring)

PHL 111 Philosophy of Religion. Same as REL 161. (Fall)

PHL 118 Business Ethics. A study of the applications of general moral theory to some of the important moral problems arising in the areas of business and management. (Fall)

PHL 135 Environmental Ethics. An examination of central concepts and issues in environmental ethics, including the nature of and responsibility for current environmental crises; the varying responsibilities of individuals, institutions, and nations; the importance of sustainability; and the ultimate principles and values at stake. (Spring)
PHL 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? (Fall)

PHL 171 Philosophical Foundations of Feminism. The investigation of some of the philosophical issues raised by contemporary feminism, such as questions about justice, human nature, and human freedom. Same as WST 205. (Spring)

For More Information
Please visit the philosophy program website at www.rochester.edu/college/phl/.

PHYSICS AND ASTRONOMY

"The eternal mystery of the world is its comprehensibility." —Albert Einstein

Information about the Department
The Department of Physics and Astronomy is dedicated to providing an environment that gives flexibility and customized study plans in which all undergraduate students have the resources they need to succeed. The research interests of the department are very broad, covering condensed-matter physics, nuclear and particle physics, biological physics, plasma physics, mathematical physics, quantum optics, atomic and molecular physics, astrophysics, and infrared astronomy. Research colloquia and seminars are offered every week during the academic year and are open to undergraduates.

We offer special programs for undergraduate students, such as the Research Experience for Undergraduates (REU), the Rochester Symposium for Undergraduate Physics Students (RSPS), and the Teaching Internship Program. In addition, the department supports a students’ section of the American Institute of Physics, serving the interests of undergraduate and graduate students. Undergraduate students are encouraged to engage in research activities at research laboratories on and off campus. There are opportunities for learning data analysis using the excellent computer facilities of the department. More information is available in the Physics and Astronomy Undergraduate Handbook available from our undergraduate office (Room 211 Bausch & Lomb Hall) and on our website at www.pas.rochester.edu.

General Advice
The Department of Physics and Astronomy offers programs leading to the BA or BS in physics; the BA or BS in physics and astronomy; minors in either physics or astronomy; and certificates in biological physics, medical physics, or biological and medical physics.

The BA program in physics is designed for those students interested in physics in conjunction with another area of human endeavor (law, environmental sciences, energy policy, medicine, business, engineering, education, etc.). It lends itself to a double major with other departments.

The BS program in physics provides a thorough preparation for graduate work in physics or astrophysics and is appropriate for students with career interests in teaching and research. The curriculum stresses the fundamentals: classical mechanics, electromagnetism, thermal and statistical physics, quantum mechanics, modern laboratory practices, and introductions to nuclear and particle physics, solid state physics, biological physics, astrophysics, and astronomical techniques. Students are encouraged to present a senior thesis and to participate in research opportunities provided by the department’s research groups. Typically, about 30 undergraduates per year participate in summer and academic-year research. The department is the site of an NSF-funded Research Experience for Undergraduates (REU) program.

The BA and BS programs in physics and astronomy require, in addition to many of the same courses required for the degree programs in physics, up to two introductory and up to three upper-level courses in astronomy. The BA program is designed for those students not expecting to pursue careers in astrophysics. The BS program is designed primarily for students interested in entering graduate programs in physics or astrophysics.

Departmental Advice for Freshmen
Students with interests in science, mathematics, or engineering who have taken physics in high school are encouraged to begin their introductory study with PHY 141 (honors) in the fall semester. They will continue with PHY 143 (honors) in the spring semester and PHY 142 (honors) in the fall semester of their sophomore year. Students without previous experience in calculus and/or physics are advised to delay their first physics course until the spring semester, when PHY 121 is offered. Students who do well in PHY 121 and wish to pursue introductory physics in greater depth can then switch to PHY 142 (honors) in the fall semester of their sophomore year. The regular continuation of PHY 121, PHY 122–123, is also suitable for physics and engineering students. PHY 113–114 is a calculus-based two-semester course sequence appropriate for majors in the biological and life sciences. For other majors requiring a less intense introduction to physics or astronomy, PHY 100, 102, 103 and AST 102, 104, 105, 106 are courses for nonscientists and are often used for the physics or the physics and astronomy cluster programs.

Students enrolled in PHY 121 or PHY 141 should register concurrently for MTH 161 (Calculus I). Students with AP credit for MTH 161 may want to brush up on mathematical skills using books
such as Preparing for General Physics, Math Skill Drills by Arnold D. Pickar (Addison Wesley).

All physics and astronomy majors should start with the same recommended physics sequences as physics majors (see above). In addition, freshmen are encouraged to take AST 111 in the fall semester.

**Advanced Placement (AP)**

<table>
<thead>
<tr>
<th>Student's AP grade</th>
<th>Placement/credit available</th>
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<tbody>
<tr>
<td>5 on test C-I (mech)</td>
<td>Credit for PHY 113 or 121, placement into PHY 114, 122, or 142*</td>
</tr>
<tr>
<td>5 on test C-II (E&amp;M)</td>
<td>Credit for PHY 114, conditional† credit for PHY 122 or 142*, placement into PHY 123 or 143*</td>
</tr>
<tr>
<td>5 on test B (general)</td>
<td>Conditional credit† for PHY 113 or 121, placement into PHY 114 or 122</td>
</tr>
<tr>
<td>4 on test C-I (mech)</td>
<td>Conditional credit† for PHY 113 or 121, placement into PHY 114, 122, or 142*</td>
</tr>
<tr>
<td>4 on test C-II (E&amp;M)</td>
<td>Conditional credit† for PHY 122, placement into PHY 123 or 143*</td>
</tr>
</tbody>
</table>

**International Baccalaureate (IB)**

Physics—Students who receive a higher-level exam score of 7 are placed into PHY 114 or PHY 122. Additionally, they are awarded credit for PHY 113 or PHY 121 after completion of PHY 114 or PHY 122 with a grade of B– or better.

**Clusters**

Courses from the Department of Physics and Astronomy appear in 19 approved clusters. The clusters involve three-course sequences and include Science: Discovery, History, and Methodology; An Introduction to the Physical World; Quantitative Physics; Honors Physics; The Nature of the Universe; Origins; The Scientific Method; Introduction to Physical Science; The Science of Light and Sound; Musical Sound: Science and Synthesis; Mechanics; Energy and Power; Science and Technology by Inquiry; Chemistry and the Physical World; General Science; Physics in Seafaring.

**Physics Courses**

**PHY 100 The Nature of the Physical World.** This introductory course is 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. No background knowledge is required, and the material is presented with very little mathematics. Substantial use is made of demonstrations. Prerequisites: none. (Fall or Spring)

**PHY 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 multiverse reality are examined, including the many-worlds view of quantum mechanics as well as fractal and cyclical cosmologies. There are no prerequisites, no background knowledge is required, and the material is presented with very little mathematics. Substantial use is made of demonstrations. This course is intended to be equivalent to our Physics 100 course in terms of satisfying cluster requirements. Prerequisites: none. (Spring)

**PHY 103 Physics of Music.** 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. Two lectures 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. Prerequisites: none. (Fall)

**PHY 109 Quantum Reality.** This is an introductory course for non-physics majors who want to learn some basic principles of quantum mechanics. We plan to approach these concepts by relating them to human experience in everyday life. The course is designed with a lot of demonstrations, in many of which the students play a role of either quantum objects or the observers. The course is conceptual, and the use of mathematics is limited to bare minimum. We plan to cover properties of waves, double-slit diffraction experiment, particle in a box and quantization of states, Heisenberg’s uncertainty principle, the Pauli principle and how to build an atom, the birth of new particles and the birth of the universe. Prerequisites: none. (Fall)

**PHY 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 their 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. Laboratory and workshop registration is done at the same time as course registration. Prerequisite: MTH 141 or 161 (may be taken concurrently). (Fall and Summer I)

**PHY 114 General Physics II.** Second course of a two-semester sequence suitable for students in the life sciences. Electricity and magnetism, 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 and workshop registration is done at the time of course registration. This course is offered both in Spring Semester...
and in Summer Session II (B-6). Prerequisites: PHY 113; MTH 142–143 or 162 (may be taken concurrently). (Spring and Summer II)

PHY 121 Mechanics. Course makes extensive use of geometry and algebra, as well as trigonometry and simple integration and differentiation. Prior knowledge of introductory calculus (simple integration and differentiation) is required. Passing of the math placement test (PHY 099) for PHY 121 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 each week and one three-hour laboratory every other week are required. Laboratory and workshop registration is done at the same time as the course registration. This course is offered in Spring Semester and in Summer Session (A-6). Prerequisites: PHY 099 (formerly PHY 101) and MTH 162 (may be taken concurrently). EAS 101, 102, 103, 104, or 105 can be accepted in place of PHY 099. (Spring and Summer I)

PHY 121P Mechanics (Mastery/Self-paced). Covers the same material as PHY 121 and runs in parallel with that course but operates as a self-paced, mastery-learning course, unlike the traditional, lecture/recitation-based PHY 121. The Mechanics course material is divided into 17 units. A student progresses through these units one at a time or his or her own pace, demonstrating mastery of each unit—by getting a near-perfect score on a quiz based on the unit's material—before moving to the next unit. Instructor-facilitated, peer-led, and individual learning in a workshop staffed 40 hours per week by faculty and teaching assistants replaces the lectures and recitations; video lessons, study guides, and practice problems supplement the textbook and workshop. Mastery learning has been shown, in hundreds of controlled experiments, to be substantially better than traditional methods in promoting proficiency and retention. (See C. C. Kulik, et al. 1990, "Effectiveness of mastery learning programs: a meta-analysis," Rev. Educ. Res., v.60, p. 265, for a review of such studies.) The laboratory requirements are the same as in PHY 121. Prerequisites: PHY 099 (formerly PHY 101) and MTH 162 (may be taken concurrently). EAS 101, 102, 103, 104, or 105 can be accepted in place of PHY 099. (Spring)

PHY 122 Electricity and Magnetism. Second semester of a three-course sequence for students planning to major in physics, other physical sciences, or 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 each week and one three-hour laboratory every other week are required. Laboratory and workshop registration is done at the same time as course registration. Prerequisites: PHY 099 (formerly PHY 101), PHY 121, MTH 162, or PHY 112 and MTH 143 (or its equivalent). EAS 101, 102, 103, 104, or 105 can be accepted in place of PHY 099. (Fall and Summer II)

PHY 122P Electricity and Magnetism (Mastery/Self-paced). Covers the same material as PHY 122 and runs in parallel with that course but operates as a self-paced, mastery-learning course, unlike the traditional, lecture/recitation-based PHY 122. See the PHY 122P catalog entry for a brief description of the self-paced, mastery-learning format used in PHY 122P. The laboratory requirements are the same as in PHY 122. Prerequisites: PHY 099 (formerly PHY 101), PHY 121, MTH 162, or PHY 113 and MTH 143 (or its equivalent). EAS 101, 102, 103, 104, or 105 can be accepted in place of PHY 099.

PHY 123 Waves and Modern Physics. Third semester of a three-course sequence for students planning to major in physics, other physical sciences, or 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 and workshop registration is done at the same time as course registration. Prerequisites: PHY 121, PHY 122; MTH 163 or MTH 165 (may be taken concurrently). (Spring)

PHY 141 Mechanics (Honors). First semester of a three-course honors sequence, recommended for prospective departmental majors and other science or engineering students with an interest in physics and mathematics who have taken physics in high school. Topics 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. Laboratory and workshop registration is done at the same time as course registration. Prerequisite: MTH 161 (may be taken concurrently). (Fall)

PHY 142 Electricity and Magnetism (Honors). Third semester of a three-course honors sequence 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 122 but are covered 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; 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. Laboratory and workshop registration is done at the same time as course registration. Prerequisites: PHY 141 or performance at or above the B+ level in PHY 121, MTH 162, or MTH 172 (may be taken concurrently). (Fall)

PHY 143 Waves and Modern Physics (Honors). Second semester of a three-course honors sequence, recommended for prospective departmental concentrators and other science or engi-
neering students with a strong interest in physics or mathematics. Topics are the same as PHY 123 but are covered in greater depth. Introductory examinations of Bohr’s atomic model; Broglie waves; momentum and energy quantization; Heisenberg’s uncertainty relation; Schrödinger’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 each week and one three-hour laboratory every other week is required. The laboratory and workshop registration is at the same time as the course registration. Prerequisites: PHY 141 or permission of the instructor; MTH 162 (may be taken concurrently). (Spring)

Astronomy Courses

AST 102 Relativity, Black Holes, and the Big Bang. 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: 1) 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 2) to provide non-science majors with a glimpse of the processes by which scientific theories are conceived and advanced. Prerequisites: none. (Fall or Spring)

AST 104 The Solar System. To acquaint the non-physical-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. Prerequisites: High school math through intermediate algebra; no physics required. (Fall or Spring)

AST 105 Introduction to 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 descriptive astronomy and the physical principles describing the operation of various celestial objects, with a minimum of mathematical detail. Prerequisites: none. (Fall or Spring)

AST 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 is drawn very widely from astronomy, physics, geology, chemistry, and biology, presented with a minimum of mathematical complexity. Prerequisites: none. (Fall or Spring)

AST 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 nighttime observing project taking CCD images of planets and their satellites using the Mees Observatory 24-inch telescope. Prerequisite: MTH 161 or 171 (may be taken concurrently) (Fall)

AST 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 nighttime observing project based upon student use of professional-style telescopes and CCD cameras. Registration for recitation is required at the time of course registration. Prerequisites: PHY 141–143 or PHY 121–123 (or concurrent enrollment); MTH 161–165 or MTH 171–174 (or concurrent enrollment), or permission of instructor; AST 111 recommended but not required. (Spring)

For More Information

Please visit the physics and astronomy program website at www.pas.rochester.edu or consult the undergraduate program coordinator (211 Bausch & Lomb or UGCoordinator@pas.rochester.edu).
**Information about the Department**

Political science is the attempt to discover, describe, and explain how politics manifests itself in the world. Our subject matter emerges from numerous contexts, including U.S. local, state, and national politics; the politics of other nations; and international relations. It also arises from more abstract, philosophical concerns. We attempt to create knowledge by the development and use of rigorous theory and the drive to generalize and by rigorous empirical testing through sophisticated, theory-relevant statistical and qualitative methods.

In Rochester’s Department of Political Science, we teach students how to understand real-world politics and give them the tools to think, question, and act. Our graduates pursue an array of careers, including teaching, medicine, and research, but most graduates find that political science gives them a background that is especially useful for careers in law, government, policy analysis, business, or journalism.

The department offers both a traditional major in political science and a major in international relations. While drawing on some of the same courses, the majors are distinct, each with its own requirements. The department website contains full information about both majors.

The department regularly updates its website with information for students who wish to major, minor, or take a cluster in political science or international relations. The website contains detailed information on undergraduate advising, course offerings, distribution requirements, upper-level writing requirements, internships, and departmental honors. We also have faculty advisors available to answer questions nearly every weekday morning and afternoon during the academic year. Names and office hours of advisors are on the department website. Students may find our website at www.rochester.edu/college/psc.

**Courses**

**PSC 101 Introduction to Comparative Politics.** Why do democracies emerge, and what explains their vibrancy (or lack thereof)? What causes ethnic conflict? Why do revolutions occur? Why does it matter what rules democracies use for elections? This course introduces students to comparative politics and the study of these important domestic political institutions, processes, and outcomes across and within countries. Cases are drawn from different countries and historical periods to give students a grounding in the method of comparative analysis. This course is recommended for those thinking about a major, minor, or cluster in international relations or political science and others who are simply interested in learning more about the politics of developed and developing countries. (Fall and Spring)

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"What is government itself but the greatest of all reflections on human nature? If men were angels, no government would be necessary."

—James Madison

"The Federalist" No. 51

**Departmental Advice for Freshmen**

The department offers a number of introductory courses at the 100 level that are especially suited for freshmen. These courses are described briefly below. We strongly recommend that students interested in a major or minor in political science take at least one of these courses in their first year. Some 200-level courses are open to freshmen and may be suitable for students who have performed very well on an AP exam in American politics or comparative government, or who have an excellent background in high school courses in history and government and a strong interest in political science or international relations. Although it does not count for the major, freshmen might also choose a version of WRT 105 that emphasizes politics, government, or international issues. Freshmen who have questions about any particular course should speak either to a departmental advisor or directly to the course instructor at the beginning of the semester.

We strongly recommend that students interested in international relations take two courses in the field in the first year: PSC 101 (Introduction to Comparative Politics) and PSC 106 (Introduction to International Relations). These two courses fulfill part of the core requirements for the major in international relations. Students might also look for other courses, including 100-level courses that count toward one of the specialized tracks and 200-level courses open to freshmen. Students are also advised to begin or continue courses in a foreign language. Not only does this help meet the requirements, but it also allows the student to consider opportunities for study abroad that require proficiency in a language other than English.

**Advanced Placement (AP) Political Science**

Students who receive a score of 4 or 5 on the AP exam in either American or Comparative Government will be granted 4 credits in political science. Students who receive a 4 or 5 on both AP exams are not eligible for additional credit.

**Advanced Placement (AP) International Relations**

Students who receive a 4 or 5 on the AP exam in American or Comparative Government or in U.S., European, or World History will be granted credit for one course toward the International Relations major. Students who received a 4 or 5 on multiple AP exams are not eligible for additional credit. This course will be classified as one of the three elective courses and will be considered a transfer course.
PSC 105 Introduction to American Politics. How has presidential behavior changed over time? What strategic decisions do members of Congress make to achieve their goals? Why has the American electorate become so polarized? This course introduces students to the foundations of American government. Key concepts at the heart of American politics are introduced, their evolution over time presented, and their place in contemporary politics discussed. The course is appropriate for majors and non-majors with an interest in understanding how the American political system works. (Spring)

PSC 106/IR 106 Introduction to International Relations. This course provides students with the background and conceptual tools they need to understand contemporary international relations. The course 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. Students are introduced to the literature in a broad way to make them familiar with the main theoretical traditions in the field. Students are asked, as much as possible, to read original texts rather than a textbook. Time permitting, we also examine topics of particular current interest, such as the evolving nature of power in the post–Cold War environment as well as special global challenges like nation building and the proliferation of weapons of mass destruction. (Fall)

PSC 107 Introduction to Positive Political Theory. Positive political theory is a line of thought that starts with the premise that politics amounts to nothing more or less than a process through which we choose between the competing values, wants, or interests of different persons. It asks whether widely held aspirations regarding how such conflicts are resolved are actually possible to realize and, if so, how. In this class you learn and practice the basic techniques that positive political theorists use to explore this simple but powerful view of politics. (Spring)

For More Information
Please visit the political science program website at www.rochester.edu/college/psc.

PSYCHOLOGY

“...the mind which the psychologist studies is the mind of distinct individuals inhabiting definite portions of real space and of a real time.”
—William James

Information about the Program/Advice for Freshmen

Psychology, as a science of behavior and mental life, uses the methods of science to seek answers, develop theories, and explore applications across a broad range of areas, including social factors; learning and memory; motivation; biological factors; development; cognition and language; sensation and perception; movement and action; organizations; and psychopathology. Instruction is offered throughout this broad spectrum of behavior and mental life issues, treating both the natural science and social science aspects of psychology. Coursework includes theoretical and empirical emphases, as well as the application of psychology to the “helping professions.” Student experiences may range from lecture courses, many with small recitations, to individual laboratory, practicum, and internship situations. Individual programs, including a major, minors, an honors program, and several clusters, may be tailored to provide excellent background for postgraduate work in psychology, medicine, education, business, social work, counseling, and other related social and natural sciences, as well as entry into various occupations, particularly those involving delivery of human services.

Students planning to pursue graduate studies in psychology are advised to seek general breadth and focused depth in their knowledge of psychology as well as a working familiarity with research skills.

Advanced Placement (AP) and International Baccalaureate (IB) PSY 101, Introduction to Psychology, is waived as a prerequisite for the major and the minors in psychology for students who receive a score of 4 or higher on the AP Psychology examination or a 5 or higher on the higher-level IB examination. A score of 4 or 5 on the AP examination or of 6 or higher on the higher-level IB examination will earn college credit for PSY 101. There is also a placement examination offered during Orientation and at other times by the College Center for Academic Support. Any PSY 101 prerequisites are waived upon passage of this exam.
Clusters
Clusters are offered separately by the two departments that offer courses in psychology. The Department of Brain and Cognitive Sciences offers natural science clusters. The Department of Clinical and Social Sciences in Psychology offers social science clusters and administers the program in psychology. The social science clusters in psychology cover the range of areas in clinical and social sciences in psychology, namely, psychology as a social science, psychopathology, motivation, social psychology, organizational psychology, personality, developmental disabilities, and emotional development.

Courses
The Department of Clinical and Social Sciences in Psychology and the Department of Brain and Cognitive Sciences offer courses in psychology. The latter department also offers its own programs that are described elsewhere in this handbook.

All of the following courses are included in various clusters in Clinical and Social Sciences in Psychology (social sciences) or Brain and Cognitive Sciences (natural sciences).

**PSY 101 Introduction to Psychology.** One fall section is exclusively for freshmen and has special features that enhance the first semester here. (A mixed class section of PSY 101 is offered in the spring term.) PSY 101 is an excellent entry point for all future directions in psychology. It is a prerequisite to the major and minors, an entry point for the cluster Psychology as a Social Science and provides a broad background upon which to base a choice of more specialized clusters.

The following are courses in psychology programs that are available with advice to first-year students. Although PSY 101 is not a formal prerequisite for the higher-numbered courses listed below, it is strongly recommended as both substantial and contextual background.

**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. (Fall)

**PSY 111 Foundations of Cognitive Science.** This course provides an introduction to basic concepts in modern cognitive science, adopting the perspective of modern cognitive psychology. The course is divided into three sections. The first section introduces central cognitive processes, such as pattern recognition, attention and memory, and concepts and categories. The second section focuses on natural language, using language comprehension and language production as a domain for introducing more detailed models of cognitive processes. The third section examines higher-level thinking, focusing on reasoning and decision making. Prerequisites: none. (Fall and Spring)

**PSY 161 Social Psychology and Individual Differences.** 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 complete several individual difference measures and receive feedback at the end of the course. Format is lectures augmented with discussions and demonstrations. (Spring)

**PSY 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. (Fall)

**PSY 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 patterns. Includes the nature and mechanisms of development in humans and an overview of what is known about brain and behavior development in other species. (Spring)

**PSY 181 Theories of Personality and Psychotherapy.** A survey of psychodynamic, existential, and empirical approaches to personality and psychotherapy. Important: the content of this course can inspire personal growth and self-understanding to the extent that students actively wrestle with and apply the material to their own experience; as a result, this course is designed as a “hybrid” course that combines online learning with traditional face-to-face learning in the form of small-group discussions. (Fall)

**PSY 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 numbers, time, and causality in animals ranging from ants to apes. (Fall)

**PSY 210 Social Cognition.** Social cognition combines classic social psychology with methods and theories from cognitive psychology and neuroscience to study how people make sense of each other and the social world. We examine how the social environment influences cognitive processes such as attention, heuristics, and appraisals and how these processes in turn affect decisions, behaviors, and health. We critically evaluate research on a variety of topics, such as emotion regulation, stereotyping and prejudice, and stress and decision making. (Fall)

**PSY 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. Please note that, because of the significant overlap between them, students may earn degree credit for only one of these courses: CSP/PSY 211, STT 211, and STT 212. (Fall and Spring)

**PSY 232 Psychology of Consumerism.** Examines the psychology behind product placement, marketing of products, brand identity, and advertising to consumers. (Spring)

**PSY 262 An Approach to Human Motivation.** This course provides a review of the theoretical and empirical development of a contemporary approach to human motivation, namely, Self-Determination Theory, which originated at the University of Rochester and is currently researched by scholars around the world. Topics also include applica-
Applications of Self-Determination Theory to such domains as psychopathology and psychological health, work, education, sport, and culture. (Spring)

**PSY 263 Relationship Process and Emotions.** Relationships are among the most important endeavors of human activity. In the past two decades, extensive theory and research has been devoted to understanding the processes of regulating people’s thoughts, feelings, and behavior in meaningful relationships with friends, family, and romantic partners. The purpose of this seminar is to explore this literature. We examine psychological research on such important topics as attachment, emotion, intimacy, conflict resolution, relationship differences and similarities, and the impact of relationships on physical health and emotional well being (as well as other topics that may arise). (Fall)

**PSY 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. (Fall)

**PSY 267 Psychology of Gender.** Exploration of the ways males and females differ in interaction, theories of development of sex differences, and consequences for social change. (Fall)

**PSY 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. (Spring)

**PSY 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; issues pertaining to biological, social, and cognitive development are discussed. (Spring)

**PSY 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, diagnosis, and treatment modalities. (Spring)

**PSY 282 Abnormal Psychology.** This course provides a conceptual overview to the field of psychopathology. We discuss assessment and diagnosis, etiology, developmental course, treatment, and prognosis of the major psychological disorders. Current theory and research are emphasized. (Spring)

**PSY 283 Behavioral Medicine.** An overview of the application of behavior/lifestyle change approaches to the treatment of medical disorders and the examination of interfaces between behavior and physiology. Topics include diabetes, cardiovascular risk factors, chronic pain, and cancer. (Spring)

**PSY 289 Developmental Child Psychopathology.** 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. (Fall)

**CSP 301W Teaching Psychology.** In-depth consideration of topics in psychology and their communication. PSY 101 is a lab for this course. (Fall)

**CSP 351/CSP 352 Research in Development Neuropsychology.** This course provides guided, direct research experiences in developmental neuropsychology, with a particular focus on autism and other developmental disabilities. (Fall and Spring)

**CSP 377/CSP 378 Exploring Research in Family Psychology.** 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. (Fall and Spring)

**CSP 385 Psychology of 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. (Spring)

**PSY 391 Independent Studies in Psychology.** Supervised research on topics in psychology. May be repeated. An Independent Studies Fair is held at the beginning of each semester to facilitate linkages between students and researchers. (Fall and Spring)

For More Information
Please visit the psychology program website at www.psych.rochester.edu/undergrad.
PUBLIC HEALTH–RELATED PROGRAMS  
(MULTIDISCIPLINARY STUDIES CENTER)

Health care is vital to all of us some of the time, but public health is vital to all of us all of the time.  
—C. Everett Koop

Information about the Program

The study of public health provides a rich intellectual framework for the multidisciplinary study of society’s most challenging problems. The program is designed to help students develop the many different skills that are needed to understand and respond to health challenges that arise in local, regional, and global populations.

The program offers both BA and BS degrees. The program offers BA degrees in bioethics; in epidemiology; in health policy; and in health, behavior, and society. The BS is intended for students who want to specialize in environmental health. The program also offers four minors and six clusters. (Students may choose to major, minor, or complete a cluster within the program, but they may not do more than one).

Program Advice for Freshmen

The study of public health integrates a wide range of disciplines: it requires, for example, the ability to use and understand statistics, to understand how human and environmental factors contribute to human exposure to environmental toxins and pathogens, to empathize with people from different backgrounds and cultures, to understand social institutions that structure health care, and to analyze complex ethical situations. For that reason, all of the public health programs require a set of core competencies in a variety of disciplines, and each of the majors incorporates courses from many different departments to support its intellectual goals. Indeed, the majors fall into different divisions of the College: epidemiology; health policy; and health, behavior, and society (and their associated minors) are in the social sciences division; bioethics (and its minor) is in the humanities; and environmental health is in the natural sciences. We also offer clusters in natural sciences (Epidemiology and Statistics), social sciences (Introduction to Public Health; Health, Environment, and Sustainability; Health Policy; Medicine in Context), and humanities (Bioethics).

A public health–related major or minor is an ideal way to explore an interest in the health professions of medicine, dentistry, and nursing. To integrate fully an interest in public health with admissions requirements for professional schools, students are strongly encouraged to meet with a health professions advisor in the College Center for Advising Services.

All the public health majors require the same core of five courses, so those courses are an excellent place to explore the majors: PH 101, PH 102, PH 103, STT 211 or 212, and PHL 225 or 228. Many of these courses are also required to complete a minor or cluster. But students can also learn about the basic themes of the majors in the other courses listed below.

Courses

**PH 101 Introduction to Public Health I.** This is a broad survey course designed to introduce beginning students to public health history, concepts, and contemporary issues locally, nationally, and globally. The course is divided into four sections: What is Public Health (history and definitions); Public Health Disparities (health and wealth; social justice; who gets sick/who stays healthy); Issues in Public Health (lead poisoning; tobacco; obesity; emergency; clean water/air; injury; health systems/reform); and Global Health Issues (globalization and development; maternal and child health). (Fall and Spring)

**PH 102 Introduction to Public Health II.** This is a broad survey course designed to introduce beginning students to four core areas in public health: biostatistics, health policy and management, environmental health science, and social and behavioral sciences. Each of these areas is addressed by experts in the field. Prerequisite: PH 101. (Spring)

**PH 103 Concepts of Epidemiology.** This course provides beginning students with the fundamental concepts needed to understand health-related information and health policy. The course introduces students to the history of epidemiology and the basic methodological principles used to describe disease occurrence in populations and identify causes of disease. These concepts are subsequently discussed in the context of health policy, outbreak investigations, and epidemiological specialties. (Fall)

**PH 116 Introduction to the U.S. Health System.** This course examines the organization, financing, and functioning of the United States health care system. It also explores historical perspectives and the insights of international comparisons. Topics include the economics of the U.S. health system, access to care, health policy and politics, and disability and disability politics. (Fall)

**PH 201 Environmental Health.** This course covers the basic principles used to evaluate the potential human health risk of exposure to environmental contaminants in air, water, and food. Prerequisites: PH 103, BIO 110/112, CHM 131, or permission of instructor. (Spring)

**PHL 225 Ethical Decisions in Medicine.** Medicine produces some of the most troubling ethical questions that our society faces. We are now confronted with extremely premature infants, elderly people incapacitated by Alzheimer’s disease, and others who have
sunk into permanent vegetative states. We can diagnose horrible diseases with genetic testing, we have myriad options of reproduction if the old-fashioned way is not possible, and we have the option to replace the failing organs and even to enhance our mental and physical abilities. Behind all these issues are deep questions about social justice in the allocation of resources of health care. In this class, we examine some of these ethical controversies both in lectures and in small groups, in which students have more opportunity to present their own views and explore those of others. Students enroll in one of three discussion sections as well as the lecture. Prerequisite: one previous course in philosophy or permission of instructor. (Spring)

PHL 228 Public Health Ethics. Most health care ethics focus on the individual decisions about health care, but many ethical questions have implications for society at large. The demands that individual health decisions make on the system may create collective problems, and conversely, the needs of society may limit the freedoms that individuals think they should have. Public health ethics, then, lie at the intersection of medicine, political philosophy, and public policy. This course examines the values of health, social needs, and freedom through a systematic examination of situations in which these conflicts arise. Three papers, weekly responses, class participation. Prerequisite: one previous course in philosophy or permission of the instructor. (Fall)

STT 211 Applied Statistics for the Social Sciences I. Descriptive statistics, statistical analysis, and statistical inference as used in the social sciences, including elements of correlation, regression, and analysis of variance. (Public health students may take either STT 211 or STT 212; degree credit is awarded for only one.) (Fall and Spring)

STT 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. (Public health students may take either STT 211 or STT 212; degree credit is awarded for only one.) (Fall and Spring)

Students interested in the bioethics program may also wish to consider the following course:

PHL 103 Contemporary Moral Problems. An introduction to moral philosophy as applied to current topics. Some questions to be explored: Is torture morally permissible in the fight against terrorism? Is it okay to destroy embryos for stem cell research? Is abortion sometimes justified? How? Is active euthanasia ever permissible? Is capital punishment justifiable in principle? In practice? How far does our moral duty to aid distant strangers extend? What sorts of political and socioeconomic principles are morally justifiable? Do animals have moral rights? How should we understand the meaning and value of life and death? We also explore related general questions: Is it always possible for a good enough end to justify bad means? What is the relation, if any, between morality and religion? Are there objective facts about right or wrong, or is morality ultimately subjective or relative to cultures or times? Are there situations in which every available action is wrong? (Fall and Spring)

For More Information
Specific information on public health–related majors, minors, and clusters may be obtained by visiting our website, www.rochester.edu/college/ph/index.html, or by scheduling an appointment with our academic counselor in the Multidisciplinary Studies Center, Dewey 4-209-B.

REGENCY

“Not by one road is it possible to arrive at so great a mystery.”
—Symmachus

“If I went back to college today, I think I would probably major in comparative religion, because that’s how integrated it is in everything that we are working on and deciding and thinking about in life today.”
—John Kerry, U.S. Secretary of State

Information about the Department
Religion is a major force in the world, both in the past and in the present. It often plays a key role in shaping the lives of individuals as well as societies and cultures at large. It has been and can be a source of peace and compassion or an impetus for division and war. Students of religion learn to employ a variety of theoretical and interpretive approaches in the endeavor to understand religion in the diverse forms it has taken in different cultures and historical periods. The concentration in religion focuses on the study of the world’s major religions through analyses of their histories, texts, rituals, institutions, and practices that are embedded in complex cultures, societies, and political systems. Students can also take courses in which some aspect of religion, such as ritual, pilgrimage, mysticism, or myth, is studied thematically and comparatively.

Additionally, the department offers a wide range of courses that explore the many ways in which religious ideas and practices intersect with other aspects of human culture and society. For example, the department offers courses that examine the intersection of religion and different genres of music such as hip-hop or blues. Other courses examine the ways in which religion has influenced the law and shaped societal understandings of guilt and punishment. Still others examine the ways in which different religious traditions have shaped human understandings of the nature of the body and the self and have informed everyday bodily practices related to eating, dress-
ing, and sexuality. Finally, in other courses, students grapple with the ways in which religions have provided the framework for understanding fundamental and perennial questions about the meaning of life, how to understand evil and suffering in the world, and what do we mean by “the good.”

The concentration in religion is structured so that students have considerable independence in shaping and structuring their major so that they can focus on those areas of the study of religion that are of greatest interest to them while also developing a strong foundation in the study of religion generally and a mastery of the methods and theories used by scholars to understand religion in all its fascinating complexity.

Students in the Department of Religion and Classics are encouraged to do independent research, both in their classes and during the summer. Over the past 10 years, many students in the department have presented their research at the University of Rochester Research Exposition as well as at national conferences and have been awarded significant prizes in recognition of their work. Recent graduates of the program in religion have an excellent record of admission to top-tier graduate schools as well as to medical schools and law schools.

The program in religion is housed in the Department of Religion and Classics, which also offers a major in Classics as well as minors in Arabic, Hebrew, Turkish, Classics, Latin, and Greek.

Departmental Advice for Freshmen

We want students to take courses that interest them, and, thus, there are no prerequisite courses that freshmen need to take in the religion concentration before moving on to a course that fits their interests. Freshmen, however, are encouraged to begin with a 100-level course. Many students initially take a course in religion in order to fulfill their cluster requirement in the humanities and then go on to declare a minor or major in religion or in classics. Freshmen are encouraged to contact the director of undergraduate studies with any questions.

Courses

All the courses listed below may be used as part of a major, minor, or cluster in the humanities. The Department of Religion and Classics offers many popular clusters, such as East Meets West, Religion and Society, Religion in America, Christianity, Buddhism, Judaism, Hinduism, Islam, Classical Civilization, Latin, Greek, Hebrew, and Arabic.

Fall Semester

REL 100 Introduction to the Study of Religion. In this course, students explore and are introduced to a) the complex interconnections between religion and national identity, politics, gender, and sexuality as well as everyday practices related to eating, dress/adornment, family life, etc., b) the ways in which religion has variously been defined with respect to the sacred, belief, ritual, practice, and experience, and c) the major approaches to the study of religion and central debates within the field of the study of religion.

REL 101 Introduction to the Old Testament. Examination of the texts of the Hebrew Bible (Old Testament for Christians) in their religious, historical, and literary contexts. Students learn the history of the ancient Israelite people from their origins down through the post-Exilic period. Study of the texts of the Hebrew Bible (Old Testament) enable us to explore what we can know about ancient Israelite society and culture, the rise and fall of Israel as a nation-state, religious and theological debates about the role of God in shaping history and the problem of suffering, as well as the writing of the biblical texts.

REL 104 History of Christianity. The development of Christianity from its origins in the first century to the medieval period to the Reformation up to the 21st century.

REL 105 Asian Search for Self. An introduction to the intellectual and religious history of India. We investigate ways in which early Vedism, classical Hinduism, Buddhism, and Jainism conceive of the cosmos, meaningful human existence, and life’s ultimate goals.

REL 111 Philosophy of Religion. Topics include the existence of God, the nature of God, and the relation of God to the world. We examine traditional arguments for and against God’s existence, we consider divine attributes such as omnipotence and omniscience, and we discuss such topics as miracles and the relation of faith and reason.

REL 115 Sex and Power. Introduction to the interdisciplinary scholarship of gender, sexuality, and women's studies. As a survey course, this class is designed to give students from diverse backgrounds and disciplines a basic understanding of debates and perspectives discussed in the field. We use gender as a critical lens to examine some of the social, cultural, economic, scientific, and political practices that organize our lives. We explore a multitude of feminist perspectives on the intersections of sex, gender, sexuality, race, ethnicity, class, religion, and other categories of identity. In this course, we interrogate these categories as socially constructed while acknowledging that these constructions have real effects in subordinating groups, marking bodies, and creating structural, intersectional inequalities.

REL 149 The Arab Revolutions: Fiction and Current Events in the Arab World. This course combines contemporary Arabic fictions in translation with discussion of the recent history and current events of the Arab world to help us understand what is happening there now.

REL 154 Religion and the Race for the White House. This course addresses the diversity and depth of religious practice in the United States and its role in presidential politics. Taught thematically so that we may examine specific religious movements and questions in depth, attention is paid to those religions generally conceived to be “traditional” in the United States as well as those widely perceived as “nontraditional.” Themes considered include civil religion, millennialism, race and gender, and the dynamics of liberalism and conservatism.

REL 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.
REL 170 Religion and Hip Hop Culture. This course considers an often-overlooked element in the study of hip hop culture: religion. Specifically, the course offers students the opportunity to examine the variety of ways that religion finds expression in the dynamic cultural medium of hip hop. Class format includes lectures, discussions, films, and video/music presentations.

REL 175 Religion and Chinese Society. This course examines the complicated relationship between religion and society in China. It takes a sociological approach, emphasizing that religion should be studied as a social phenomena that closely interacts with the development of society at large. The focus is on contemporary times from the end of the 19th century through present. During this period, China experienced tremendous change. This course introduces how such change impacted and was expressed through religion, religiosity, and religious politics.

REL 189 Sexuality in World Religions. Study of issues surrounding human sexuality as it has been treated in world religions. Issues such as homosexuality, transgender/transsexual, marriage, family, sexual ethics, and gender in world religions are covered.

Arabic
ARA 101 Elementary Arabic I. An introduction to modern standard Arabic, including the alphabet, pronunciation, vocabulary, grammar, elementary conversation, and reading.

ARA 103 Intermediate Arabic I. Readings, drills, and continued study of grammar.

Hebrew

HEB 103 Intermediate Hebrew. Continuation of HEB 102 with emphasis on enhancing reading comprehension, writing, and speaking skills. Students are expected to have a good understanding of the structure of Hebrew, including familiarity with verb forms. Cross-listed with JST 104.

HEB 204 Hebrew through Media and Literature. Designed to develop advanced reading and conversational skills using various materials, including Israeli newspapers, Hebrew movies and songs, and texts from modern Hebrew literature (fiction and poetry). Writing skills are enhanced through a series of related home assignments. Review of Hebrew verbal system and syntactical structures and enrichment of vocabulary are also among the objectives of this course.

Turkish
TUR 101 Elementary Modern Turkish I. This is the first half of the elementary level of Turkish. In the course, students gain a closer familiarity with Turkish culture through the intensive learning of Turkish language. Turkish is the primary language of instruction. Note: The terms "lecture" and "recitation" conventionally used to identify the blocks have a purely bureaucratic significance and do not reflect in any way the pedagogical approach of the course.

TUR 103 Intermediate Turkish. This the first half of the intermediate level of Turkish. Students improve their Turkish language skills by practicing conversation, engaging with authentic materials for reading and listening, writing short texts, and studying vocabulary and grammar. Prerequisite: TUR 102 or permission of instructor.

Spring Semester

REL 103 History of Judaism. This course provides an overview of Jewish history, texts, traditions, practices, and beliefs and emphasizes Judaism as a living tradition, one that is subject to both continuity and change among its practitioners.

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

ARA 102 Elementary Arabic II. Continuation of ARA 101.

HEB 102 Elementary Hebrew II. Direct continuation of Elementary Hebrew 101 with emphasis on enhancing reading, writing, and speaking skills. Cross-listed with JST 103.

HEB 104 Intermediate Modern Hebrew II. Continuation of HEB 103.

HEB 204 Hebrew through Conversation. A conversational course designed to offer the opportunity to converse and discuss anything in Hebrew, from poetry to politics, depending on the interest of the class. Cross-listed with JST 204.

TUR 102 Elementary Turkish II. The second half of Elementary Turkish.

TUR 204 Intermediate Turkish. The second half of Intermediate Turkish.

For More Information
Please visit the religion program website at www.rochester.edu/college/rel/ or email the director of undergraduate studies with any questions.
“Every Russian . . . lives in multiple worlds: in a past that still shapes his thinking and language and habits; in the sometimes unbearable present, with its economic and psychological shocks; and in the future, which is even more unknowable, more unpredictable, than it is elsewhere . . . every Russian is, in some way, engaged in building a new reality, a new state, a new identity, a place in the greater world.”
—David Remnick

“Recent media accounts have argued that the U.S. government suffers from an absence of high-quality expertise on Russia . . . Moreover, the shortage of informed expertise transcends our borders. The House of Lords’ scathing 2014 report attacked the UK’s demolition of its Russian expertise and that Britain has sleepwalked through the crisis leading to the invasion of Ukraine. French analysts tell a similar story in France.”
—“Countering Putin begins with knowing what his regime is saying” article in The Hill (American political newspaper published in Washington, D.C.)

Information about the Program
Russian studies is an interdepartmental program in the College that incorporates the perspectives 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 providing the core faculty for this program are modern languages and cultures, history, and political science, but a concentration may include courses in, or cross-listed with, international relations, religion and classics, Judaic studies, Polish and Central European studies, film 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.

A Russian studies major or minor can be designated as belonging either to the humanities or social sciences, depending on the student’s course choices. Students with a strong interest in Russian studies have done second majors in history, political science, international relations, and other fields. Russia has a history and culture that go back more than a millennium, while its democracy and market economy are relatively new. The Russian Studies Program prepares students not only to know about this area but also to work in Russia or to prepare for future graduate study and careers in the field.

Program Advice for Freshmen
Almost any course in our curriculum that interests you is a good place to get started, whether it is language, literature, current events, history, art history, or an introductory course in international politics. All Russian studies courses are open to first-semester freshmen.

Clusters
The program offers two humanities clusters: 1) Introduction to Russian Culture and Civilization, and 2) Russian Studies. There is also a Russian Studies Cluster in the Social Sciences—Great Experiments: Identities and Cultures in Transition. Additional Russian clusters are offered through the Department of Modern Languages and Cultures and the Department of History. All Russian-related courses fit one or more clusters.

Study Abroad
Students who major or minor in Russian studies are strongly encouraged to take part in the Summer Program at St. Petersburg University run by the Department of Modern Languages and Cultures or the semester-long CIEE program sponsored by the College. Scholarships are available through the Mildred R. Burton Undergraduate Travel/Research Fund.

Courses
Russian Language
Incoming students with a background in Russian should consult the Russian section in the Department of Modern Languages and Cultures for placement. There are courses at the beginning, intermediate, and advanced levels, and fall of the freshman year is an ideal time to begin with 101 or to continue the study of Russian.

Russian Studies
The following courses given in English may be of particular interest to freshmen:

Fall Semester

RST 126 Russia Now. Students learn how to analyze ongoing political, economic, and social changes in the world’s largest country through the use of print and electronic sources along with background reading on Russia since the end of Communism. In English.

RST 160 The New Europe. Students follow events in Europe (from Spain to Russia) using print and electronic sources. Weekly discussions, analysis, three written briefings on developments. In English.

RST 231 Great Russian Writers. This is a chronological survey of the most important Russian writers of the 19th century, from the end of romanticism through the rise of realism to the advent of modernism. We read novels by Pushkin, Lermontov, Gogol, Dosto-
evsky, and Turgenev and plays by Chekhov. Our goal is twofold: to understand the shape and development of Russian prose in the 19th century and to heighten our own appreciation of fine literature. In English.

RST 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 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 also see the ways in which writers did indeed perceive themselves as a second government and how this changed the way they wrote. The goal of this course is to arrive at an understanding of the unique role played by literature in Russian history. In English.

PSC 106 Introduction to International Relations. This course provides students with the background and conceptual tools they need to understand contemporary international relations. The course 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.

Spring Semester
RST 126 Russia Now. Tracking political, economic, and social events in contemporary Russia, discussing them in class and writing briefing papers. In English.

RST 128 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. Readings 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 (Demons) and a wide range of materials from the 20th century. In English.

RST 222 Russian Drama. An introduction to the Russian theater in its cultural and political context, with close readings of plays from the late 18th century to the late 20th century. The early comic masterpieces of Griboedov and Gogol held up a mirror to social problems and gave birth to plays on social themes by Ostrovsky and Tolstoy in the late 19th century. The plays of Anton Chekhov at the turn of the century both anticipated and highly influenced the developments of modern theater in the decades to follow, both in Russia and abroad. We conclude by examining theater in the Soviet period in plays by Kharms, Bulgakov, and others. In English.

HIS 132 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. Topics include Peter’s westernization of Russian elites and the costs thereof, the Pugachev rebellion of 1773–75, 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.

For More Information
Please visit the modern languages and cultures’ program website at www.rochester.edu/college/mlc/ to learn more about the Russian studies program.

STATISTICS

“Figures don’t lie; liars figure.”

Information about the Program
Statistical designs of experiments and their analysis are indispensable, for instance, in producing effective medical compounds and treatments, for improving the quantity and quality of food production, and for maintaining the quality of manufactured goods. Statistical techniques are also widely used in biological, educational, genetic, psychological, and other sciences. Refined statistical procedures are extensively employed in economics for studying education needs, predicting economic growth, forecasting industrial production and employment rates, studying stock market fluctuations, and assessing the environment, health care, and social welfare. A number of political and social studies routinely employ a variety of statistical procedures.

The program in statistics offers a wide variety of courses for a major or minor in statistics, a joint major in mathematics/statistics, and the prerequisites for majors in other departments. Some of these courses are also required for the certificates in actuarial and management studies and for three clusters within statistics. Double majors with statistics and other areas such as economic and mathematics are also possible.

Departmental Advice for Freshmen
STT 211, 212 and 213 are noncalculus courses, and only one of them is required for several majors and minors. These three courses and the intermediate level STT 216 introduce statistical analysis, methods, and procedures for a number of applications. Computer packages are used for statistical analysis in all these courses. A wide range of additional courses in statistical theory and applications is available.
Courses

**STT 211 Applied Statistics for the Social Sciences I.**
Contains statistical analysis, methods, and procedures for applications in social sciences.

**STT 212 Applied Statistics for the Biological and Physical Sciences I.** Contains statistical analysis, methods, and procedures for applications in physical sciences.

**STT 213 Elements of Probability and Mathematical Statistics.** With a brief introduction to the elements of probability, the basic statistical analysis, principles, and procedures are introduced and illustrated through applications.

**STT 216 Applied Statistics II.** Prerequisite: can be taken after one of STT 211, 212, or 213. A quick review of the basic topics is followed by tests of hypotheses, sample size determination, paired comparisons, analysis of variance, regression and correlation, Chi-square tests for goodness of fit and for association and contingency.

For More Information
Please visit the statistics program website at www.rochester.edu/college/STT/.

SUSTAINABILITY
(MULTIDISCIPLINARY STUDIES CENTER)

"The great challenge of the twenty-first century is to raise people everywhere to a decent standard of living while preserving as much of the rest of life as possible."

—Edward O. Wilson

Information about the Program

The minor in sustainability is an interdisciplinary program of study incorporating courses from the natural and social sciences and humanities. The goal of the minor is to provide a curriculum that encourages students to learn to communicate and to solve problems of societal relevance that straddle disciplinary boundaries in sustainability and global change. The required core includes one natural science course and a selection of two courses from the social sciences and humanities.

Students wishing to satisfy the natural science or social science distribution requirement must take four of the six classes from that division.

Program Advice for Freshmen

Courses appropriate for freshmen are listed below. Several other courses in the minor are upper-level courses and may have required prerequisites. Students interested in these courses are encouraged to take appropriate introductory courses in the departments of interest.

Advanced Placement

Students who have scored a 4 or 5 on the AP Environmental Science exam may use that credit for EES 103 Introduction to Environmental Science.

Clusters

There are four clusters in sustainability: one in humanities, one in natural sciences, and two in social sciences. The clusters are Sustainability and the Humanities; Health, Environment, and Sustainability; Society and Sustainability; and Energy and Sustainability.

Courses

**BIO 104 Ecosystem Conservation and Human Society.** As the natural resources on which human society depends are depleted, the need for sound conservation policies increases. The course examines a new approach in conservation biology that identifies and places economic value on the services that natural ecosystems provide. Such services are basic to sustainable societies and include clean water and air, waste decomposition, pollination, and farmland productivity. Major themes the course covers include an overview of other approaches in conservation biology, a review of the services that ecosystems provide, ways the value of these services are determined, and how this novel approach is influencing economic and political policy at local, national, and international levels. (Fall)

**CAS 245/ENG 245 Literature and the Modern Environmental Imagination.** We live the entirety of our lives on the earth, whether we dwell in urban, suburban, natural, or virtual spaces, and we usually do this without considering the full impact of our surroundings. In this course, we study environmental writing in an attempt to "remember" how relationships to place, space, nature, and environment have changed in the 19th and 20th centuries. Our investigation focuses on how modern life and processes of modernization—including urbanization, media, mobility, industrialization, technology, consumerism, colonialism—have revolutionized humanity’s relationships to land, space, place, time, and even our own bodies. We develop critical awareness of how the environment profoundly shapes our identities even while it is rendered invisible by the accelerating social, economic, and technological upheavals of modern times. (Fall)

**CHE 150 Green Energy.** An introductory engineering course about energy production, conversion, and utilization. The first half of the course covers energy and power metrics, material and energy balances, and the fundamental laws of thermodynamics. The
remainder of the course 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. (Fall)

ECO 108 Principles of Economics. The fundamentals of microeconomic and macroeconomic theory, with applications; preparation for subsequent economics courses. This course is a prerequisite for ECO 238 Environmental Economics. (Fall and Spring)

PHL 103 Contemporary Moral Problems. An introduction to moral philosophy as applied to current topics. Some questions to be explored: Is torture morally permissible in the fight against terrorism? Is it okay to destroy embryos for stem cell research? Can abortion sometimes be justified? How? Is active euthanasia ever permissible? Is capital punishment justifiable in principle? In practice? How far does our moral duty to aid distant strangers extend? What sorts of political and socioeconomic principles are morally justifiable? Do animals have moral rights? How should we understand the meaning and value of life and death? We also explore related general questions: Is it always possible for a good enough end to justify bad means? What is the relation, if any, between morality and religion? Are there objective facts about right or wrong, or is morality ultimately subjective or relative to cultures or times? Are there situations in which every available action is wrong? (Fall, Spring) This course is part of the Energy and Sustainability, Society and Sustainability, and Sustainability and the Humanities clusters and an option for a 100-level prerequisite for PHL 230 Environmental Justice.

PSC 246 Environmental Law and Policy. An examination of federal environmental law and policy from a practical and historical perspective. This course provides a basic foundational understanding of U.S. environmental law and helps students develop the tools necessary to critique and improve environmental policy making. Topics include an overview of key federal environmental laws; some of their major loopholes; and how environmental laws are shaped through agency regulation, judicial interpretation, political pressure, and their efficacy at safeguarding the environment and the public. The course is taught through a combination of lectures, a group project focused on a specific case study, and student-led discussions about key aspects of environmental laws. Students finish by considering emerging environmental issues and ways to address them. (Fall)

For More Information
Consult the sustainability program website at www.rochester.edu/college/mac/sustainability.html

THEATER COURSES
See English for program details.

WOMEN’S STUDIES

Susan B. Anthony Institute for Gender and Women’s Studies

Women’s studies focuses on the experiences of diverse groups of women and changing cultural gender issues as well as economic, political, and psychological relations between women and men. Because gender and women’s studies asks questions about women, sexuality, and gender that no single academic department is able to answer, the program encourages an interdisciplinary approach. The program also offers an exciting range of internships in the community through which students may earn course credits.

The program offers an undergraduate major and minor, an honors program, and clusters in the humanities and social sciences. Students have the opportunity to work with faculty from the humanities, sciences, and social sciences who are appointed in the College, the Eastman School of Music, the Margaret Wärner Graduate School of Education and Human Development, the School of Nursing, and the School of Medicine and Dentistry.

The College opened the program in women’s studies in 1982 to addres curricular and scholarly issues important for understanding the role of women in contemporary society. The Susan B. Anthony Institute for Gender and Women’s Studies is named to honor Susan B. Anthony, the 19th-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 connections with the city of Rochester.

In addition to the undergraduate curricular program, the institute also sponsors graduate certificates, graduate fellowships, regular faculty research seminars, public lecture series, conferences, and opportunities for students to meet with visiting scholars.

“...it is the duty of all our schools, colleges, and universities to open their doors to woman and give her equal and identical education advantages side by side with her brother man.”

—Susan B. Anthony

Motions for coeducation presented to state teachers’ convention (1857)
Departmental Advice for Freshmen
Students interested in a major, double major, or a minor in women's studies are encouraged to take WST 100 (2 credits) and foundation courses (samples listed below) during their freshman and sophomore years. Courses open to freshmen vary from year to year. Our introduction and foundation courses generally lead into clusters. Numerous elective courses cross-listed with women's studies are offered each year. Certain courses not already cross-listed with women's studies can be taken through other departments and applied towards WST credit. Students are advised to check with the institute office.

Clusters

**Humanities**
- Race and Gender (H1WST001)
- Gender, Culture, and Representation (H1WST002)
- Gender and Literature (H1WST003)
- Gender and Sexuality (H1WST004)
- LGBTQ Studies in the Humanities (H1WST005)
- Theory and Philosophy of Feminism (H1WST006)

**Social Sciences**
- Gender and Social Issues (S1WST001)
- History and Theory of Feminism (S1WST002)
- Gender, Science, and Health (S1WST003)
- Gender and Public Policy (S1WST004)

Courses

**WST 100 Writing Women's Lives.** (Fall 2015 topic) WST 100 topics change each semester. Women's Personal Cinema approaches women's studies through the heterogeneous genre of personal cinema, understood as autobiographical documentary, autoethnography, diary, and first-person cinema. Often utilizing amateur equipment (16mm/8mm film, consumer video cameras) and found footage, these sophisticated works interpenetrate private and public spheres and subvert dominant practices to produce new meaning. Examining film, video, and photo projects by women in different cultural contexts we ask: How does the production and consumption of media contribute to the formation of modern social subjects? How can memory, identity, gender, and sexuality be interrogated through cinematic forms? Can personal cinema produce spaces of aesthetic possibility, expression, and political resistance? We consider these questions through forms transgressing categories of narrative, documentary, and avant-garde in addition to texts in cinema studies, feminist theory, and art history. (2 credits)

**WST 200 Colloquium in Women's Studies.** The diversity of feminist thought and practice in its importance in forming women's studies, in its impact on other disciplines, and in its articulation with lives and social practices.

Sample Foundation Courses
Foundation courses are offered under many general topics, including women and gender in history, society, politics, literature, art, philosophy, health, science, as well as issues in lesbian and gay studies. Foundation course offerings vary from year to year and are offered in both fall and spring semesters. Some of our foundation courses are:

**WST 103 Language and Sexuality.** This course investigates 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. Part of Cluster H1WST004. (Fall)

**WST 205 Philosophical Foundations of Feminism.** This course analyzes the conceptual foundations of beliefs of the nature and behavior of women, examines different types of feminist theory, and considers the political and ethical consequences of feminism. Topics include woman as Other; sex roles and self-determination; liberal, Marxist, and radical feminist theories; equal rights; and abortion. Clusters: History and Theory of Feminism S1WST002, Gender and Public Policy S1WST004, Theory and Philosophy of Feminism H1WST006. (Spring)

**WST 206 Feminism, Gender, and Health.** This course considers how theories of gender, social organization, and biological sex shape the questions asked and explanations and interventions offered in the areas of health, disease, and well being. We examine the effects of gender, social class, and race in mediating health effects, with particular emphasis on women's health. Some issues examined include life cycle and transitions, collective and individual trauma, access to health services, HIV/AIDS, reproductive health, and longevity. Clusters: Gender and Public Policy S1WST004, Gender and Social Issues S1WST001, History and Theory of Feminism S1WST002, Gender, Science and Health S1WST003. (Fall)

**WST 210 LGBTQI Experiences in U.S. History.** This course looks at the history of sexuality in the United States through the vantage point of queer communities. The term “queer” encompasses lesbian, gay, bisexual, transgender, and intersex (LGBTQI) identities. Special attention is paid to issues of class, gender, race, ethnicity, repression, and resistance. While the primary focus of this course is 20th-century U.S. queer history, we also discuss LGBTQI identities and analyze the ideas of queer and safe spaces. The final part of the course examines contemporary issues facing queer communities such as legal rights, educational policy, and media representation. Cluster: LGBTQ Studies in the Humanities H1WST005. (Fall)

**WST 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 investigates the way in which visual images of women participate with other cultural and social factors in the construction of the idea of woman. It looks 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 introduce a variety of approaches. Cluster: Gender, Culture, and Representation H1WST002. (Fall)
WST 249 Women, Activism, and Social Change Perspectives. This course examines how women’s involvement in a variety of late 19th- and 20th-century social movements placed social activism at the center of women’s political life and challenged existing notions of citizenship in the United States. During the semester, we examine women as activists from a variety of movements, including those mobilizing on issues relating to political equality, economic justice, race and racism, sexual identity, peace, gender equality and identity, public health, the family, and social welfare. (Spring)

For More Information
Please visit the gender and women’s studies program website at www.rochester.edu/college/wst/.

THE WRITING, SPEAKING, AND ARGUMENT PROGRAM

"I find great challenge in presenting an argument and reward in selling an idea. To me, writing is more gratifying than balancing a chemical equation, more expressive than musical composition, and more difficult than calculus."

— Ian Stanley
Psychology Major, Class of 2012

Information about the Program
The Writing, Speaking, and Argument Program (WSAP), in concert with faculty across the College, builds a strong community of undergraduate and graduate writers, speakers, and researchers. Writing, speaking, and argument enable us to discover, develop, test, and communicate our ideas. Effective communication—including critical thinking, problem solving, organization of ideas, and clarity and power of expression—is of enormous importance in both academic and professional settings. Through communication, we see the truth, utility, or beauty of what we know and make our knowledge have an impact on the world at large. WSAP leads the effort to familiarize students with key principles and strategies for becoming successful communicators across different modes and contexts. For both undergraduates and graduates, the program fosters a culture of open, honest, and critical communication.

WSAP is home to the Primary Writing Requirement (PWR); the undergraduate English for Academic Purposes Program (EAPP); a range of undergraduate writing courses related to writing, speaking, and tutoring; and the Writing and Speaking Center, where students can find tutoring services.

Primary Writing Requirement and Placement Information
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 or WRT 105A and B, versions 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. The substitute course may not also be used to fulfill the Upper-Level Writing Requirement. Transfer students who have completed a WRT 105 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 writing.rochester.edu.

Students admitted to the College through the English for Academic Purposes Program fulfill the requirement by earning a grade of “C” or higher in WRT 103, EAPP Critical Reading, Reasoning, and Writing, and WRT 104, EAPP Research, Reading, and Writing. For more information on EAPP placement and courses, please refer to writing.rochester.edu/EAPP.

Courses
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 focus 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 and editing workshops. Each section has unique content. For an updated list of course descriptions, please refer to http://writing.rochester.edu. (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, are taught in computer labs, and are limited to 10 students. WRT 105E students who have worked diligently but have not attained a B- or better may take an incomplete and sign up for the Extension, a weekly workshop and tutorial that allows...
students to raise their final grades and satisfy the Primary Writing Requirement. Each section has unique content. For an updated list of course descriptions, please refer to http://writing.rochester.edu. (Fall and Spring)

**WRT 105A Reasoning and Writing in the College: First Course in WRT 105A-WRT 105B Sequence.** WRT 105A (Fall) and WRT 105B (Spring) distribute the work of WRT 105E across two semesters, with WRT 105A covering the first half of WRT 105E. WRT 105A immerses students in the experience of academic writing, with a particular emphasis on analyzing, using, and documenting scholarly and no-scholarly texts. It provides instruction and practice in constructing cogent and compelling arguments as students draft and revise two short argumentative essays. Students develop and test their ideas through discussion, informal writing, peer critiques, and self-assessments. All sections of WRT 105A and B revolve around a theme and include a weekly writing group in which students do the work of writing with immediate support from the course instructor. To proceed from WRT 105A to WRT 105B, students must earn a grade of “C” or higher. (Fall)

**WRT 105B Reasoning and Writing in the College: Second Part of WRT 105A-WRT 105B Sequence.** The second half of the WRT 105A-WRT 105B sequence, WRT 105B immerses students in the experience of academic writing, with a particular emphasis on analyzing, using, and documenting scholarly and nonscholarly texts. It provides instruction and practice in constructing cogent and compelling arguments as students draft and revise a proposal and an 8- to 10-page argumentative research paper. Students develop and test their ideas through discussion, informal writing, peer critiques, and self-assessments. All sections of WRT 105A and B revolve around a theme and include a weekly writing group in which students do the work of writing with immediate support from the course instructor. WRT 105B students who have worked diligently but have not attained a grade of “B−” or higher may take an incomplete and sign up for the Extension, a weekly workshop and tutorial program that allows students to continue working on their writing, raise their final grades, and satisfy the Primary Writing Requirement. (Spring)

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

**LIN 161/WRT 250 Modern English Grammar.** This course is a comprehensive review of the grammar of modern standard English. The course is of interest to those who wish to sharpen their language skills or to know more about the workings of the English language whether for practical, cognitive, or creative ends. Drawing on work in mostly pretheoretical, descriptive linguistics, this course reveals the mechanics of standard English structure with occasional detours into the finesse of usage across registers (dialect to slang). Students learn to develop the ability to see patterns in grammar as well as its structural possibilities and limits. Assignments regularly involve reflection on form, usage, and speaker judgments. Through a final project, students investigate some aspect of an English variety available to them. Throughout, students work with their data samples of English to explore how speaker choices lead to particular grammatical structures or yield ungrammaticality. Background in linguistics or grammar not needed. Prerequisite: PWR satisfied. (Fall)

**WRT 261 Writing in a Digital World.** (Cross-listings: ENG 288, DMS 250) The purpose of writing in a digital world is to engage with a broader community around a topic of interest and contribute to public knowledge. In this course, students are invited to dig deeply into a question of interest, write for a public audience, and use the Internet as an archive of information waiting to be discovered, analyzed, and written about. Students can draw on pre-existing research interests from their majors or develop a line of inquiry stemming from class discussions, writing, and research. In order to gain experience writing to a range of readers, students engage in a writing process informed by peer review, self-assessment, and revision. Shorter writing assignments help students develop and refine ideas as they transform texts for different audiences. The final research project is multimodal, published for a public audience, and should demonstrate your ability to think critically about a topic and effectively communicate that knowledge to a range of readers. Prerequisite: PWR satisfied. (Fall)

**WRT 245 Advanced Writing and Peer Tutoring.** (Cross-listing: ENG 285) This course prepares sophomores and juniors as well as seniors enrolled in five-year programs for work as writing fellows. 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. Prerequisites: satisfaction of Primary Writing Requirement and a minimum GPA of 3.0; by application only. (Fall)

**WRT 247 Spoken Communication and Peer Tutoring.** This course prepares selected sophomores, juniors, and eligible freshmen for work as speaking fellows. Focuses not only on the skill of public speaking but also on peer tutoring and assisting students with their own forms of spoken communication. In this course, we examine various components of presentations, including effective use of visual aids and professional delivery styles. We also explore several types of spoken communication for different purposes and audiences, including argumentative and descriptive speeches, interviews, and group presentations. Through analyzing, studying the construction of, and creating and delivering their own presentations, students improve their own speaking styles and develop the skills necessary to aid their peers in constructing and revising presentations as well as in making the transition from page to performance. By the end of the semester, students should be ready to take on their own hours as peer tutors. (Spring)
Writing and Speaking Center Services

The Writing and Speaking Center offers a wide variety of writing and speaking support services for undergraduate students of all levels and in all disciplines. Our office is staffed by graduate-student Writing Consultants and undergraduate Writing and Speaking Fellows from the humanities, the social sciences, and the natural and applied sciences. Our tutors provide individualized feedback and assistance on all types of academic writing and speaking. We invite students to use our services during any stage of the writing process, from brainstorming ideas to polishing a final draft. Similarly, students can visit a Speaking Fellow at any point as they are developing or practicing a presentation. The Writing and Speaking 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 our website at http://writing.rochester.edu or call 273-3577.

For More Information
Please visit the writing, speaking, and argument program website at http://writing.rochester.edu/.
Advice for Freshmen

The College signed an admission partnership with the Simon Business School in October 2006. The Admission Partnership agreement offers students an opportunity to receive a $10,000 scholarship if they enroll in a full-time Simon MBA or MS program any time after graduation from the College. Additionally, the Simon School specifically targets students with less than three years of post-college work experience for admission into our MS programs. Candidates for the MBA program generally have several years of work experience prior to entry. Students from any academic major are eligible to apply; however, coursework in economics, accounting, calculus, and statistics is recommended, both in preparation for the MBA or MS curriculum and as an indicator of interest and aptitude for a business career. Graduate Management Admission Test (GMAT) or Graduate Record Exam (GRE) scores are considered.

The Simon MS program may be suitable for liberal arts graduates with focused career goals who desire a graduate business degree with only one additional year of study. Simon offers several MS degree options in areas such as finance, marketing, medical management, general management, and accountancy. While candidates are evaluated on a variety of criteria, Simon is particularly interested in identifying candidates who show promise of leadership in tomorrow’s business world by combining a positive, can-do attitude with interpersonal skills, intellectual talent, entrepreneurial orientation, and personal integrity.

The Simon School also teams up with the College in offering a 3-2 program through which a student can earn a bachelor’s degree in his or her undergraduate major and an MBA degree both in five years instead of the usual six years. The 3-2 program is highly selective, since a significant majority of MBA candidates have several years of full-time work experience prior to entry. Students in the 3-2 program complete major and cluster requirements during three years of study in the College. They earn a bachelor’s degree at the end of year four by meeting remaining elective bachelor’s degree requirements through satisfactory completion of first-year MBA coursework at Simon. The MBA degree is awarded at the end of year five. Summer internships and business-related work experience are expected of successful 3-2 applicants. The GMAT must be taken no later than January of the junior year.

For More Information

For more information on the school and its offerings, please contact the Simon School MBA and MS Admissions Office, 305 Schlegel Hall, (585) 275-3533 or email admissions@simon.rochester.edu.
Margaret Warner  
Graduate School of  
Education and Human  
Development

"Education is a social process. Education is growth. Education is not preparation for life; education is life itself."  
—John Dewey

Advice for Freshmen

The Warner School is a graduate school for students with passion, commitment, and drive who aspire to improve the human condition as leaders in education, broadly conceived as supporting learning and development in a variety of contexts and across the life course. Warner prepares teachers, counselors, K–12 and higher-education administrators, helping professionals, policy analysts, educational policymakers, scholars, researchers, and consultants to enter our nation’s most challenging arena and become a powerful force for positive change and social justice.

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 the school’s programs in their senior year. In addition to the core programs in teaching and curriculum, counseling, human development, higher education, school leadership, and educational policy, Warner has interdisciplinary programs in health professions education, Applied Behavior Analysis (ABA), online education, and program evaluation. There is also a new certificate program for undergraduates interested in teaching English abroad.

The programs tackle enduring challenges in education and human development with fresh, nontraditional approaches. Warner School students think deeply about the many ways that teaching, learning, and development shape lives and societies. By combining research and practice, we work to improve schools and institutions and to make communities more just.

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, leadership, and change—are encouraged to take courses at the Warner School. Issues such as the relations among race, gender, language, ethnicity, class, disability, sexuality, 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.

Undergraduates are encouraged to explore Warner School courses offered in teaching and curriculum, higher education, educational policy, counseling, human development, and health professions education. Such 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. 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 only one additional year of postgraduate study. Students are also encouraged to explore the new certificate program to teach English abroad.

The Warner School offers a number of scholarship opportunities for qualified University of Rochester undergraduates who are interested in pursuing graduate study at the Warner School. For a complete listing of scholarship opportunities, visit www.warner.rochester.edu/admissions/scholarships.

In 2015, the New York State Legislature approved a law that stipulates applicants to teacher education programs, including education leadership programs, must submit official scores of a graduate school entrance examination. To be in compliance with this new New York State regulation, the Warner School will require official results of the Graduate Record Examination (GRE) or all other approved tests.

Students who are interested in a career in education are encouraged to meet with a Warner School admissions counselor to learn more about 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 LeChase Hall on the historic Wilson Quadrangle between Todd Union and Wilson Commons on the River Campus.

For More Information

For more information on the school and its offerings, please contact the Warner School Office of Admissions, LeChase Hall, (585) 275-3950, e-mail admissions@warner.rochester.edu, or visit www.warner.rochester.edu.
HEALTH PROFESSIONS ADVISING AT THE UNIVERSITY OF ROCHESTER

Curriculum
All of the prerequisite courses necessary for admission to medical, dental, and veterinary school, as well as many other health professions programs are offered here. There is no “pre-medical,” “pre-dental” or even “pre-health” major, and it is not necessary to major in a science in order to improve one’s preparation or chances for acceptance. Medical school applications are very competitive, so choose your courses and major carefully, paying attention to your interests and strengths. Students tend to do best in courses that match their passions, and the wise student selects courses with career alternatives in mind. In addition, there is no rush to complete the prerequisite courses for medical school, and students tend to perform better in challenging courses when they spread them out over four years.

The undergraduate curriculum for a “pre-professional” student is similar to any other undergraduate in the college; there are academic prerequisites to complete before applying to graduate or professional school (noted on the following chart and the health professions website), and students must prepare for their future career through experiential learning. The successful applicant to graduate or professional school has both the academic background and the career experience gained through clinical and research experience to convince the admissions committee he or she has a realistic understanding of, and is a “good fit” for, the profession. There is no one-size-fits-all approach to admissions, and preparation for a career in the health professions is an individual process.

Advising
The advisors in the Office of Health Professions (HP) Advising provide students with the specialized academic and career information related to health professions schools. Health professions advising information can be found on the health professions website, www.rochester.edu/college/ccas/health/, and advisors respond to email at URhealthprofessions@UR.rochester.edu. Throughout the year, HP advising offers a range of specialized seminars, from gaining clinical and research experience to graduate/professional program application planning sessions. To join the HP Advising listserv, please send an email to urhealthprofessions@ur.rochester.edu with the subject “listserv.” By joining this group, you will receive weekly emails with announcements on health professions-related opportunities, including internships and research and graduate school information sessions as well as advising sessions and upcoming deadlines.

Activities
HP advising seminars and events include opportunities to interact with admissions directors from a variety of health professions programs as well as alumni/professionals working in various health care fields. In addition, the University of Rochester has many student organizations that offer students opportunities to explore health professions and community service in medical settings, as well as connect with other students with similar career interests. Membership in the Charles Drew Pre-Health Professions Society (C.Drew) is open to all students interested in the health professions. A large and active organization, C.Drew hosts events throughout the year.

Research
For students who are interested in research, both the River Campus and the Medical Center offer a wealth of opportunities, and many students have been able to engage in research for academic credit or as paid employees with assistance from the faculty, the Office of Undergraduate Research, and the Gwen M. Greene Career and Internship Center.

Clinical Opportunities
It is essential that students interested in the health professions acquire hands-on experience before making a firm commitment to the field. Our Strong Memorial Hospital and other area hospitals are always in need of volunteers, as are many local service organizations. The on-campus Medical Emergency Response Team (MERT) as well as the volunteer ambulance companies in the neighboring suburbs, for example, welcome volunteers and are excellent sources of experience. For students interested in mental health, the Compeer program pairs volunteers with troubled individuals who need companionship and emotional support. The nearby Al Sigl Center houses several organizations that serve the physically challenged. There are many, many ways in which students may explore health-related careers while helping others. More information on gaining experience is highlighted on the HP website, www.rochester.edu/college/ccas/health/experience/index.html.
A. Prerequisites: Schools of medicine, dentistry, osteopathy, optometry, podiatry, and veterinary medicine have similar foundational prerequisites for admission. Because individual programs vary, however, students should consult the web pages of the programs they wish to enter and talk with a health professions advisor. More information is also available on the health professions advising web page at www.rochester.edu/college/CCAS/health/.

Students can meet most pre-professional requirements by taking any one of the sequences shown for each subject area below. Nonetheless, students should consult a departmental advisor in order to choose the appropriate sequence for their ability and intended major.

Medical schools have recently adopted a new MCAT, which includes a broader section of content. At Rochester, students are required to take coursework in the natural sciences, humanities, and social sciences to meet graduation requirements. Students will be well prepared for this new MCAT exam if they take into account the expanded competencies for medical practice outlined in the MCAT 2015 as well as the medical school admissions requirements when selecting majors, minors, and clusters across all three divisions at the University. The expanded exam includes information in biochemistry, statistics, and social and emotional determinants of health (psychology, sociology, and public health).

B. General Program Planning Guidelines: It is important that students intending to apply to health professions schools make an early start on science courses. There is no “one size fits all” schedule (especially since so many entering freshmen have AP and/or transfer credit), but here are some key points to keep in mind:

1. The application process for medical, dental, and veterinary school is approximately 18 months long, meaning students will need to apply one full academic year before they intend to matriculate. Students should consider from the beginning that they may be better, more mature, more competitive applicants if they wait until their senior year or later to apply. There is no preferred timetable to prepare for medical, dental, or other health professional school, and spreading your prerequisite coursework over four years of study allows for greater flexibility in your course selection.

2. Any student considering a biology or biological sciences major should take biology in the freshman year. The biology department strongly recommends that a student enrolling in BIO 110 or BIO 112 also enroll in CHM 131. If there is concern about a student’s ability to handle more than two science/technical courses in a semester, consider one of these alternatives:
   - Take biology and chemistry in the freshman year and calculus in the summer or in the sophomore year.
   - Take calculus with chemistry in the freshman year and biology in the summer.

3. You need only two semesters of mathematics for most health professions schools. Some medical schools do not require math; however, they do require physics, which here at the University of Rochester has a requirement of one year of calculus. Students will also need to take one semester of statistics.

4. Many Rochester students who apply to health professions schools complete general chemistry in the freshman year, organic chemistry in the sophomore year, and physics in the junior year. This “timetable” may be altered to fit individual needs. What is most important to remember is that admission tests for health professions schools must be taken no later than a year before expected matriculation, and all required science courses must be completed prior to taking standardized tests.

5. REPEATS: Most health professions schools do not treat repeated courses as the College does. Both grades are included in the cumulative average, so even an “A” in a second attempt does not substantially raise the average.

6. Health professions schools are not troubled by a few grades of “W* in an otherwise strong record, and they will certainly “forgive” course withdrawals resulting from circumstances beyond a student’s control (e.g., illness, family emergency). Students should keep in mind that a grade of “W* indicates that an effort was made to complete a course. When a course is dropped (deleted) from a 16-credit program, the student appears to have carried an “underload” for the entire semester. This is usually more detrimental than a grade of “W.”

7. AP credit: Students should investigate how health professional schools treat AP credit, as most will expect additional coursework in a subject if a student uses AP credit to satisfy an introductory course requirement. Some schools will not accept AP credit at all.
C. PREREQUISITE OPTIONS FOR HEALTH PROFESSIONS GRADUATE PROGRAMS

Biology: One year of laboratory-based biology coursework (at Rochester, you will need to take three semesters of biology in order to fulfill the laboratory requirements)

Option 1: BIO 110 \(\rightarrow\) (BIO 111 OR 115)/BIO 117P \(\rightarrow\) (BIO 190 OR 198)/BIO 198P
Option 2: BIO 112 \(\rightarrow\) BIO 113/BIO 117P \(\rightarrow\) (BIO 190 OR 198)/BIO 198P (AP credit)

Chemistry: Competency in laboratory-based inorganic chemistry (often met by, but not limited to, introductory chemistry courses) and organic chemistry. Requirements vary from school to school.

Option 1: CHM 131/CHM 131 Lab \(\rightarrow\) CHM 132/CHM 132 Lab \(\rightarrow\) CHM 203/CHM 207 \(\rightarrow\) CHM 204/CHM 208
Option 2: CHM 132/CHM 132 Lab OR CHM 137/CHM 137 Lab \(\rightarrow\) CHM 203/CHM 207 \(\rightarrow\) CHM 204/(CHM 208 OR CHM 210) \(\rightarrow\) BIO 250/(BCH 208 recommended)
Option 3: CHM 171/CHM 173 \(\rightarrow\) CHM 172/CHM 210W \(\rightarrow\) CHM 211 \(\rightarrow\) BIO 250/(BCH 208 recommended) (with AP Chem credit and chemistry major)

Biochemistry: One semester

BIO 250 with or without BCH 208 depending on chemistry requirements as described above.

Physics: Two semesters with lab (level of coursework will depend on AP credits and placement)

Option 1: PHY 113/PHY 113 Lab \(\rightarrow\) PHY 114/PHY 114 Lab
Option 2: PHY 121/PHY 121 Lab \(\rightarrow\) PHY 122/PHY 122 Lab
Option 3: PHY 141/PHY 141 Lab \(\rightarrow\) PHY 143/PHY 143 Lab (plus PHY 142/PHY 142 Lab)-For Physics majors
Option 4: PHY 122/PHY 122 Lab \(\rightarrow\) PHY 123/PHY 123 Lab

Math: Generally, one semester of calculus and one semester of statistics. Level and specific number of calculus courses will depend on math placement and prerequisites needed for physics.

Option 1: MTH 141 \(\rightarrow\) MTH 142 \(\rightarrow\) MTH 143; STT 211 OR STT 212 OR STT 214
Option 2: MTH 161 \(\rightarrow\) MTH 162; STT 211 OR STT 212 OR STT 214
Option 3: MTH 162; STT 211 OR STT 212 OR STT 214
Option 4: MTH 164 OR MTH 171 \(\rightarrow\) STT 211 OR STT 212 OR STT 214

English: Completing the primary (WRT 105 OR WRT 105E OR (WRT 105A AND WRT 105B)) and the upper-level writing requirements of a major will satisfy most English requirements.

Psychology/Sociology: In 2015, the MCAT was revised and now includes a new section addressing the psychosocial contexts of health. For that reason, while this is not the only way to prepare for the MCAT, we strongly encourage students to consider a cluster from those given below. This is not an exhaustive list, and which cluster is most appropriate will vary among individual students.

S1PH001—Introduction to Public Health
S1PH002—Health Policy
S1PH003—Health, Environment and Sustainability
S1PH004—Medicine in Context
H1PH001—Bioethics
S1CSP009—Social/Emotional Development

S1PH001—Introduction to Public Health
S1PH002—Health Policy
S1PH003—Health, Environment and Sustainability
S1PH004—Medicine in Context
H1PH001—Bioethics
S1CSP009—Social/Emotional Development

S1CSP004—Social Psychology
S1CSP006—Psychology as a Social Science
S1CSP001—Psychopathology
S1CSP003—Psychology of Motivation
S1CSP008—Personality Psychology
S1CSP007—Psychology of Developmental Disabilities
EDUCATION ABROAD

Students majoring in all academic disciplines may study abroad. By the time of graduation, about a third of Rochester undergraduates have had an international educational experience. Most students study abroad in the junior year or in the first semester of their senior year, although a number of programs are open to sophomores. Summer study is also an option. The University of Rochester offers more than 75 programs in 40 countries in Africa, Asia, Australia and New Zealand, Europe, and Latin America. There’s something for everyone!

Rochester students interested in education abroad experiences have an expanded and improved selection of opportunities in exchange programs. Exchange programs offer students the option of directly enrolling for a semester’s or year’s study at select partner institutions. Direct enrollment provides undergrads the opportunity to explore and study overseas in a more independent, self-directed way by integrating fully into the campus community as a full-time student. Consult with an advisor in the Center for Education Abroad about exchange opportunities in Australia, China, Hong Kong, Japan, Macau, Peru, Poland, Singapore, South Korea, Sweden, and the United Kingdom. A study abroad grant is available for those who participate in a semester abroad through one of the University of Rochester’s exchange partners.

It is never too early to learn about your options. Students majoring in science and engineering are especially encouraged to begin exploring their options in the freshman year. The best way to find out more is to attend a study abroad general information meeting. Schedules are available at our website: www.rochester.edu/abroad.

The Center for Education Abroad is located in Dewey Hall 2-161. The phone number is (585) 275-7532, and the email address is abroad@admin.rochester.edu. Study abroad advisors are eager to meet with you to discuss study abroad as part of your undergraduate experience!

TAKE FIVE SCHOLARS PROGRAM

The Take Five Scholars Program, unique to the University of Rochester, provides free tuition for an additional year or semester of study designed to enrich a student’s curriculum. Admitted students are afforded the opportunity to indulge in the pleasure of studying a sustained and coherent interdisciplinary topic of intellectual interest—to learn for the sake of learning. Students may submit an application—once they’ve been admitted into a major—until the fall semester of their senior year. Some sample program titles include “Media and Its Effect on Gender Roles and Perceptions,” “Chinese Sign Language Comparison and Analysis,” and “The Intricate Puzzle of the Mind.” Since its inception in 1986, more than 1,100 undergraduate students from the River Campus and the Eastman School of Music have become Take Five Scholars. There is currently no limit to the number of students accepted into the program, and new students are admitted each semester.

KAUFFMAN ENTREPRENEURIAL YEAR (KEY) PROGRAM

The University of Rochester defines entrepreneurship as the “transformation of an idea into an enterprise that generates value”—intellectual, social, cultural, or economic. More than just a discrete set of business skills or practices, entrepreneurship is a way of thinking and approaching problems. The KEY Program provides selected students with the opportunity to devote one or two semesters, tuition-free, in their fifth year to the study and practice of entrepreneurship. Students may propose to participate in internships, special projects, business plan development, research into various facets of entrepreneurship, or analysis of how culture and public policy influence entrepreneurial activity. Applications may be submitted once students have been accepted into a major, and up to the fall semester of the senior year.

CERTIFICATE AND CITATION PROGRAMS

Certificate programs are taken in conjunction with, not in place of, majors. They are meant to supplement a student’s chosen area of study and to formalize into a coherent whole, courses taken outside the area of the major. Specific requirements for each program are listed in the Undergraduate Bulletin.

Certificate programs approved by the College and administered through the Multidisciplinary Studies Center include:

- **Actuarial Studies**: 7 courses and 2.5 GPA required. Must also demonstrate computer proficiency. Students are encouraged to contact the Society of Actuaries for information about exams and professional certification.

- **Literary Translation Studies**: 7 courses in six core component areas. Minimum 2.0 in program coursework. There are also four requirements for admission to the program, including prior foreign language training.

- **Mathematical Modeling in Political Science and Economics**: 9–10 courses and 2.0 GPA required.

- **Polish and Central European Studies**: 10 courses and 2.0 GPA required.

Note that courses used toward these certificates may not be taken on the S/F option except for the Polish and Central European Studies Certificate, in which one secondary course may be taken S/F. Completion of one of these certificates appears as a notation on the transcript. Handouts concerning these certificates are available at the Multidisciplinary Studies Center in 4209B Dewey, and details are on its website at www.rochester.edu/college/msc/.

Other certificate programs available to students include:

- **Biophysics** (administered through a Bio/Medphysics Committee in the Department of Physics and Astronomy)

- **Biotechnology** (administered through the Program in Biology and Medicine in Room 402 Hutchison Hall)

- **Medphysics** (administered through a Bio/Medphysics Committee in the Department of Physics and Astronomy)
• Stage Management (administered by the Department of English)

Certain certificate programs are authorized clusters. See the Cluster Search Engine for details: www.rochester.edu/college/ccas/clusters/.

Note also the following:

Citation for Achievement in College Leadership
This program recognizes those students who have developed leadership skills through specific academic study coupled with specific practical application. Students need to complete at least three different leadership experiences. Each leadership experience has two components:

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

Completion of the citation will appear as a notation on the transcript.

A handout that includes all academic and practical components that have been authorized for use toward this citation is available at the Academic Services Counter in 312 Lattimore.

Prestigious Fellowships and Scholarships
The Fellowships Office, located in 4-209B Dewey Hall, coordinates our advising program for prestigious national and international academic competitions such as the Beinecke, Carnegie Junior, Churchill, Critical Language, Davis Projects for Peace, Fulbright, Gates Cambridge, Goldwater, Marshall, NSF, Rhodes, RISE, Schwarzman, Soros, Truman, and Udall. Funding for these highly selective programs comes from various public and private sources outside of the University, including international sponsors. The award programs provide fellowships and scholarships based on academic merit in addition to other criteria, including distinctive achievements in research, campus involvement, leadership, community service, civic engagement. A few programs also consider financial need status. Some fellowships can only be used in the United States, but there are also programs for international experiences. Some of these programs provide funds to support undergraduate-level study and research, while others support advanced study and career development opportunities after the completion of a bachelor’s degree. The Fellowships Office maintains information on and assists students applying for a wide range of high-profile awards. Becoming aware of these opportunities early in one’s undergraduate career is key to presenting a competitive application. Rochester students have been successful in many of these competitions, and you can join the list of winners.

The director of fellowships invites students with outstanding academic and extracurricular records to apply for appropriate fellowships and scholarships and mentors them throughout the application process. Students interested in learning more about these awards and the application process may attend an information session, visit the fellowships website at www.rochester.edu/college/studentfellowships, or stop by the Fellowships Office in 4-209B Dewey Hall. Follow us also on Facebook and Twitter at /URFellowships. After reviewing published informational materials, students are encouraged to take the next step of visiting the office to discuss specific awards in light of their individual academic interests and aspirations.

Maybe there’s a Critical Language Scholarship, Goldwater, Fulbright, or Rhodes in your future. Freshman year is the perfect time to begin preparing for these potentially life-changing opportunities.
MAJORS AND MINORS

MAJORS

Natural Sciences and Engineering
- Applied Mathematics
- Audio and Music Engineering
- Biological Sciences
  - Biochemistry
  - Cell and Developmental Biology
  - Computational Biology
  - Ecology and Evolutionary Biology
  - Microbiology
  - Molecular Genetics
  - Neuroscience
- Biology
- Biomedical Engineering*
- Brain and Cognitive Sciences
- Chemical Engineering*
- Chemistry
- Computer Science
- Data Science
- Earth and Environmental Sciences
  - Environmental Science
  - Environmental Studies
  - Geological Sciences
- Electrical and Computer Engineering*
- Engineering and Applied Sciences
- Engineering Science
- Environmental Health
- Geomechanics
- Mathematics
- Mathematics-Statistics
- Mechanical Engineering*
- Optical Engineering*
- Optics*
- Physics
- Physics and Astronomy
- Statistics

Social Sciences
- Anthropology
- Business
- Economics
- Epidemiology
- Financial Economics
- Health, Behavior, and Society
- Health Policy
- History
- International Relations
- Linguistics
- Political Science
- Psychology

Humanities
- American Sign Language
- Art and Art History
  - Art History
  - Studio Arts
- Bioethics
- English
- Film and Media Studies
- Modern Languages and Cultures
  - Comparative Literature
  - French
  - German
  - Japanese
  - Russian
  - Spanish
- Music
- Philosophy
- Religion and Classics
  - Classics
  - Religion

INTERDISCIPLINARY MAJORS
- African and African-American Studies
- American Studies
- Archeology, Technology and Historical Structures
- East Asian Studies
- Digital Media Studies
- Interdepartmental Studies
- Russian Studies
- Women’s Studies

MINORS

- African and African-American Studies
- American Sign Language
- Anthropology
- Arabic
- Archaeology, Technology, and Historical Structures
- Art History
- Astronomy
- Audio Music Engineering
- Bioethics
- Biology
- Biomedical Engineering
- Brain and Cognitive Sciences
- Business
- Chemical Engineering
- Chemistry
- Chinese
- Classics
- Clinical Psychology
- Comparative Literature
- Computational Biology
- Computer Science
- Creative Writing
- Dance
- Economics
- Electrical and Computer Engineering
- English Literature
- Environmental Engineering
- Environmental Geology
- Epidemiology
- Ethics
- Film and Media Studies
- French
- Geological Sciences
- German
- Greek
- Health, Behavior, and Society
- Health Policy
- Health Psychology
- Hebrew
- History
- History of Philosophy
- Interdepartmental Studies
- International Relations
- Italian
- Japanese
- Jewish Studies
- Journalism
- Latin
- Latin-American Studies
- Legal Studies
- Linguistics
- Materials Science
- Mathematics
- Mechanical Engineering
- Medical Anthropology
- Medieval and Early Modern Studies
- Movement Studies
- Music
- Music Cognition
- Music and Linguistics
- Optics
- Organizational Psychology
- Paleontology and Evolution
- Philosophy
- Philosophy of Science
- Physics
- Political Science
- Psychology
- Psychology as a Natural Science
- Psychology as a Social Science
- Religion
- Research in Visual Science
- Russian
- Russian Studies
- Social and Emotional Development
- Spanish
- Statistics
- Studio Arts
- Sustainability
- Theater
- Visual Science
- Women’s Studies

* Students in these programs may complete somewhat modified clusters.