

2014

## URI Undergraduate and Graduate Course Catalog 2014-2015

University of Rhode Island

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# THE UNIVERSITY OF RHODE ISLAND

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2014–2015 CATALOG [uri.edu/catalog](http://uri.edu/catalog)



# THE UNIVERSITY OF RHODE ISLAND

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**2014–2015 CATALOG**



Undergraduate Admission  
401.874.7100

Graduate Admission  
401.874.2872

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*The University of Rhode Island is committed to the principles of affirmative action and the attainment of equal employment and equal educational opportunities for all qualified individuals. For further information, please contact the Affirmative Action Office at 401.874.2442.*

## Academic Calendars

### ADMISSION / READMISSION DEADLINES

Information for undergraduate, graduate, and non-matriculating students, as well as readmission:  
<http://www.uri.edu/es/acadinfo/acadyear/admission.html>

### BILLING DATES AND DEADLINES

<http://www.uri.edu/es/students/bill/billcalendar.html>

### DETAILED ACADEMIC CALENDAR

Current academic calendar in PDF format:  
<http://www.uri.edu/es/calexams/detailedcalendar.pdf>

### GRADUATE STUDENT DEADLINES

List of important graduate school deadlines:  
[http://www.uri.edu/gsadmis/documents/deadline\\_calendar\\_2014-2015.pdf](http://www.uri.edu/gsadmis/documents/deadline_calendar_2014-2015.pdf)

### SUMMER CALENDAR

Dates and deadlines for summer sessions:  
<http://web.uri.edu/summer/?item=10>

### EXAM SCHEDULE KINGSTON

<http://www.uri.edu/es/calexams/FinalExamSchedule.html>

### EXAM SCHEDULE PROVIDENCE

<http://www.uri.edu/es/calexams/FCCEFinalExamSchedule.html>

## Take Our Word for It

Please refer to the current online University of Rhode Island Catalog at [uri.edu/catalog](http://uri.edu/catalog) for definitive curricular and course information. In case of discrepancies between this PDF version of the current catalog or departmental materials, the live version of the catalog found at [uri.edu/catalog](http://uri.edu/catalog) is considered the authoritative source. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

## Offer Your Feedback

If you notice any factual errors ...

- in a description of an undergraduate or graduate program of study, as it existed on July 1, 2014, contact the Dean's Office for that program (College or Graduate School).
- in a course description, as it existed on July 1, 2014, email the discrepancy along with a copy of or a link to the approved legislation proving the error to [urifacsen@gmail.com](mailto:urifacsen@gmail.com). Approved bills can be found on the Faculty Senate site.
- in any other part of the catalog, email [catalogeditor@uri.edu](mailto:catalogeditor@uri.edu).

## Notice of Change

Rules, regulations, dates, tuition, fees, personnel including faculty, the availability and titles of academic programs and areas of specialization, their administrative location, and courses set forth in this catalog are subject to change without notice. Where a change in program requirements is made while a student is enrolled, the student may elect to complete the program under the requirements in effect at the time of matriculation or to shift entirely to the new requirements, but may not choose parts of each set. As a result of the ongoing reviews of all programs, certain offerings and specializations may be deleted or restructured between editions of this catalog.

## About URI

### Introduction

The University of Rhode Island has the intimate feel of a smaller university, but our thinking—and our research, innovations, and cross-discipline collaboration—is very big. At URI you'll find some of today's leading innovators, discoverers, and creative problem solvers offering a constant flow of big ideas to address global issues.

Besides the traditional majors you'd expect at a state flagship university, here, unique interdisciplinary programs that blend such disciplines as languages with textiles, engineering with business, pharmaceuticals with engineering, and archaeology with marine sciences engage URI's 13,000 undergraduates and 3,000 graduate students in real-life, problem-solving initiatives. From new technologies for identifying and treating killer diseases, to the latest solutions for environmental challenges, to forensic sciences that protect against global and cyber terrorism, and more, the University of Rhode Island is prepared to help.

Our 13,000 undergraduates and 3,000 graduate students work side by side with approximately 600 full-time, tenure-track teaching faculty, as well as with dedicated lecturers, researchers, and adjunct faculty. We're proud to be an increasingly international community, with students representing most states and dozens of countries and alumni living in more than 80 countries around the globe.

### Mission

The University of Rhode Island is the State's public learner-centered research university. We are a community joined in a common quest for knowledge. The University is committed to enriching the lives of its students through its land, sea, and urban grant traditions. URI is the only public institution in Rhode Island offering undergraduate, graduate, and professional students the distinctive educational opportunities of a major research university. Our undergraduate, graduate, and professional education, research, and outreach serve Rhode Island and beyond. Students, faculty, and alumni are united in one common purpose: to learn and lead together. Embracing Rhode Island's heritage of independent thought, we value:

- Creativity and Scholarship
- Diversity, Fairness, and Respect
- Engaged Learning and Civic Involvement
- Intellectual and Ethical Leadership

### Campus Facilities

From the rolling farmlands and surrounding forests to the ocean and coastal watershed, we enjoy natural resources that inspire our students and faculty to do their very best work.

Our main campus is located in the beautiful, historic, rural town of Kingston, just 30 miles south of Providence and close enough to New York and Boston for easy collaboration with fellow experts in any discipline. At the center of campus lies students' favorite place to hang out, study, and enjoy New England's foliage and scenery—a grassy quadrangle sur-

rounded by handsome, old granite buildings that are home to classrooms, auditoriums, computer labs, and more.

Between there and the athletics complex – with its gymnasiums, athletic fields, tennis courts, and aquatic center – our students learn and live in state-of-the-art, environmentally award-winning academic buildings, a wide range of student residence halls, and fraternity and sorority houses.

Our urban **Feinstein Providence Campus** is home to the Alan Shawn Feinstein College of Continuing Education, the University's biotechnology manufacturing program, the URI Providence Biotechnology Center, our Bachelor of Interdisciplinary Studies, and our Center for Urban Studies and Research.

Our coastal Narragansett Bay Campus, six miles east of Kingston, overlooks the West Passage of Rhode Island's prized bay and is the site of URI's internationally renowned **Graduate School of Oceanography**, as well as ocean engineering labs and marine sciences research.

And 20 miles to the west lies our **W. Alton Jones Campus**—2,300 acres of pristine woods, fields, streams, and ponds that form the backdrop for environmental education, research, and conference and wedding facilities.

URI is a fully networked university, with classroom media support services, telephone services, multi-media development services, and instructional support for faculty provided by URI's office of Information Technology Services (ITS). In our residence halls, students have access to both hardwired network outlets and wireless internet service, and all general-purpose classrooms are equipped with multi-media equipment and wireless network access. For more technology details, visit [uri.edu/its](http://uri.edu/its).

University Libraries provides access to millions of print and electronic resources at the Robert L. Carothers Library and Learning Commons on URI's Kingston campus, the Pell Marine Science Library at the Narragansett Bay campus, and the College of Continuing Education Library at the Providence campus. We're a member of the Higher Education Library Information Network (HELIN), giving 24/7 borrowing privileges to faculty, staff, and students at 10 regional institutions of higher learning and several Rhode Island health sciences libraries via an online public access catalog. For more library details, visit [uri.edu/library](http://uri.edu/library).

### History

Our history of big thinking began in 1888, when a handful of South Kingstown residents, the South Kingstown Town Council, and the State of Rhode Island made a collective donation of \$5,000 to purchase the 140-acre Oliver Watson Farm and establish a state agricultural school and experiment station. We were the Rhode Island College of Agriculture and Mechanic Arts then. As Rhode Island's land-grant institution, charged by the Morrill Act of 1862 with agricultural, mechanic arts, and industrial education, we graduated our first 17 students in 1894.

By 1909, we'd established the Ocean State's first marine laboratory, created an outreach department, offered our first master's degree, begun our Greek system, and become Rhode Island State College. We became the state's flagship university with a name change to the University of Rhode Island in 1951, and were named the state's only sea grant and urban grant university in 1966 and 1995, respectively.

We've long since outgrown our original charge to teach agri-

culture, military tactics, mechanical arts, and classical studies, and are now gaining national and international recognition as a preeminent research University tackling global issues.

**21st Century Learning Environment** Although we've invested nearly \$1 billion over the last 20 years into building, rebuilding, and renovating more than 50 campus buildings designed to increase cutting-edge resources for students and faculty, we are not bound by bricks and mortar. We're also taking steps toward a 24/7 learning environment, creating online programs, increasing online courses, and doubling our hybrid courses.

And, we know that learning outside the classroom is as important as learning inside the classroom, so we're increasing and improving meaningful opportunities for experiential learning through research, creative work, and scholarship. Thousands of students take part each year in practical internships and study abroad opportunities with partners in Rhode Island and around the globe through our **Center for Career and Experiential Education**, our **Office of International Education**, and our **Business Engagement Center**.

## Research and Economic Development

As the principal public research institution in the state of Rhode Island, URI houses innovative research facilities as varied as our programs of study. For details, visit the website of the college or department in which you are interested.

The strength and expertise of our researchers and programs of scientific inquiry attract more than \$100 million per year in research funding from federal and state agencies, foundations, and commercial firms. The richness of our research funding allows the students and faculty of our research enterprises to do work with potential to improve the lives, health, and economies of people in Rhode Island, the nation, and the world, while generating hundreds of millions of dollars for our state and local economies, creating additional high-paying jobs, and increasing state and local tax revenues.

Our **Division of Research and Economic Development** and **URI Research Foundation** are strengthening liaisons among the University, its researchers, and corporations around the globe; leveraging investment capital to market inventions, expand resources, and support additional research. For details, including copies of current and past annual reports, visit [uri.edu/research/tro/reports2](http://uri.edu/research/tro/reports2).

## Community, Equity, and Diversity

Our campus communities are made up of students, faculty, staff, and alumni representing a rich diversity of cultures, lifestyles, beliefs, religions, political affiliations, and philosophies. As such, our commitment is to be a welcoming community for all and to help all members of our community develop the ability to communicate, understand, and engage productively with people different than themselves. For more information about how we're doing that, visit the **URI Office of Community, Equity, and Diversity**.

The culture of URI is defined in the "Cornerstones" below, developed by the Quality of Student Life Committee and endorsed by the URI Student Senate:

The University of Rhode Island is a principled community

guided by values. As members of this community, we subscribe to the following principles, which form the foundation of our endeavors.

- We pursue knowledge with honesty, integrity, and courage.
- We promote independent choice, intellectual curiosity, open-mindedness, and free expression.
- We respect the rights and dignity of each individual and group.
- We reject prejudice and intolerance, and we work to understand differences.
- We accept personal responsibility for our actions and their consequences.
- We actively cooperate to improve the University, the state of Rhode Island, and the global community beyond our borders.
- We strive to be a community where the environment and property are treated respectfully.
- We seek to create and maintain an environment conducive to personal health and wellness.
- We work to develop skills that promote lifelong learning, leadership, and service.

Additionally, various organizations, such as the Alumni Association, work to encourage the continued support and engagement of current and future alumni as committed partners of the University, its mission, and its traditions. Recognizing more than 100,000 alumni throughout the world, the URI Alumni Association is an interdependent organization offering programs and services for alumni and raising funds to support scholarships and programs. For details, visit [alumni.uri.edu](http://alumni.uri.edu). The University of Rhode Island Foundation, an independent 501©(3), is charged with conducting all charitable fundraising efforts on behalf of the University and administering the investment of the University's endowment portfolio. For details, including copies of current and past annual reports, visit [urifoundation.org](http://urifoundation.org).

## Globalization of Opportunities and Experiences

As technology breaks down borders and time zones, we are taking steps to ensure that our students are prepared to live and work in an increasingly globalized economy. We're developing relationships with businesses, institutions of higher education, and communities on the other side of the globe for meaningful study abroad and internship opportunities for more students. We're developing new and blended academic programs that will increase the number of graduates fluent in languages other than English. And we are taking steps to triple our population of international students who can bring diverse world cultures to our community of students and staff right here in Rhode Island. Find out more about our **Global Opportunities**.

## Affirmative Action and Nondiscrimination

The University of Rhode Island prohibits discrimination, including harassment and retaliation, on the basis of race, color, creed, national or ethnic origin, gender, gender identification or expression, religion, disability, age, sexual orientation, genetic information, marital status, citizenship status, or status as a special disabled veteran, recently separated veteran, Vietnam era veteran, or any other veteran who served on active duty during a war or in a campaign or expedition for which

a campaign badge has been authorized; in the recruitment, admission, or treatment of students, the recruitment, hiring, or treatment of faculty and staff, and in the operation of its activities and programs, except in those special circumstances permitted or mandated by law and cases that may arise under applicable federal and state law and regulations, including but not limited to Titles VI and VII of the Civil Rights Act of 1964, as amended; Title IX of the 1972 Educational Amendments to the Higher Education Act; the Age Discrimination in Employment Act of 1967; Sections 503 and 504 of the Rehabilitation Act of 1973, as amended; the Equal Pay Act of 1963; the Americans with Disabilities Act of 1990; ADA Amendment Act of 2008; the Genetic Information Nondiscrimination Act, Executive Order 11246, as amended; Executive Order 91-39; Executive Order 92-2; and Rhode Island General Law 28-5.1, as amended; and all other laws which pertain to access and equity.

Inquiries concerning compliance with antidiscrimination laws should be addressed to Roxanne Gomes, Title IX Coordinator and Director of Affirmative Action, Equal Opportunity, and Diversity, Suite 201, Carlotti Administration Building, 401.874.2442. Questions regarding provisions for students with disabilities should be directed to the director of Disability Services for Students in the Office of Student Life, 330 Memorial Union, 401.874.2098 (TTY via R.I. Relay, 711); **[uri.edu/disability/dss](http://uri.edu/disability/dss)**.



## Student Life and Services

An enriching college life includes a well-balanced mix of academic and extracurricular activities. The University offers a unique blend of student organizations and activities.

### Student Government

**Undergraduate.** The Student Senate is a legislative body that represents the undergraduate students to the administration and faculty. It oversees student organizations and provides funding for them by distributing a portion of the Student Activities fee. The Senate Office is located in the Memorial Union, phone: 401.874.2261. URI's Interfraternity Council supervises fraternity affairs, and the Panhellenic Association governs sorority life.

**Graduate.** The Graduate Student Association (GSA) is a government body maintained by and for the graduate students of the University with the purpose of enhancing the academic, intellectual, and social opportunities of its members. Officers and members of the GSA Senate, who are elected annually from the entire graduate student body, distribute GSA funds to graduate students for conference attendance and thesis binding, organize social events, and serve as graduate student representatives on University-wide committees. GSA offices are located in Room 317 of the Memorial Union, phone: 401.874.2339, e-mail: gsa@etal.uri.edu, website uri.edu/gsa.

### Housing and Dining

**Undergraduate Housing.** Residence halls and boarding facilities are available to URI students during the regular academic year and during summer sessions. Some students prefer the option of living in a fraternity or sorority or off campus. On-campus housing for incoming transfer students is limited.

**On-Campus Residence Halls and Dining Centers.** There are 23 residence halls, an undergraduate apartment complex, and multiple theme houses on campus offering a variety of living accommodations. Notices are forwarded to all residence hall students during the spring semester to inform them of the housing application procedure for the following year. After returning students have been assigned, first-year students who have paid their housing deposit by May 1 will be assigned to the designated first-year housing spaces. All other students will be assigned on a space-available basis. Assignments of incoming students are generally made in the order in which their housing deposits are received. Every effort is made to honor roommate requests.

For rates and contracts, applications for residence hall living, and more information about housing options, go to **housing.uri.edu**.

URI offers a variety of menus, including popular brands, at two large dining centers, a food court, two cafés, a late-night restaurant and lounge, concession stands, and a convenience store. The University requires that all students living in non-apartment style residence halls choose from a selection of available resident meal plans. Detailed descriptions of meal plans, facilities, menus, and hours of operation are available at **uri.edu/dining**. Each URI student also has the opportunity to obtain a Ram account, which is an optional debit card account

accessed through the student's ID card. Students who participate in the program have the ability to purchase food and supplies from various on- and off-campus merchants. Unused dollars in the Ram Account transfer from semester to semester until graduation.

**Fraternities and Sororities.** The Greek community at the University of Rhode Island is comprised of 30 organizations, three undergraduate governing boards, and two alumni governing boards, which represent 17 men's groups (fraternities) and 13 women's groups (fraternities/sororities). The Coordinator of Greek Affairs in the Office of Student Life advises these groups. The more than 1,700 active members of fraternities and sororities account for approximately 14% of the total University undergraduate full-time day population.

The URI fraternity and sorority community utilizes its founding values in combating the national health crisis of alcohol abuse on college campuses. Fellowship, scholarship, leadership, community involvement and service have become the focal points for URI's Greek community. URI is a Northeast Greek Leadership Association award-winning campus, exemplifying what's best about Greek Life.

For more information about Greek Affairs, phone 401.874.2883 or visit **uri.edu/greek**.

**Graduate Housing.** Interested students should contact URI's Department of Housing and Residential Life for information, at 401.874.5390.

**Off-Campus Housing.** The Off-Campus/Commuter Housing Office is located in Room 316 of the Memorial Union and maintains an online database of rental property and roommate listings available to URI students, faculty, and staff. The Office is an on-campus resource for landlord and tenant questions and also provides information on resources available to off-campus students.

There are approximately 6,000 undergraduate and graduate students who commute from the surrounding neighborhoods daily to URI to attend classes, study in the library, and stay involved on campus. The most popular rental communities are in Narragansett, South Kingstown, and Kingston. A majority of the off-campus properties that students rent are beachfront properties that are available during the academic year, September through May. Students generally pay rents between \$400-600 per person per month to live in a furnished house. Supermarkets, laundromats, restaurants, shopping centers, and recreational facilities are nearby.

Commuter students receive RIPTA bus discounts and commuter meal plans. RIPTA bus discounts are available through the Memorial Union Information desk located on the 2nd floor. Commuter meal plan information is available by contacting the Campus Access Office in Memorial Union Room 216 or by visiting the Dining Services website at **uri.edu/dining**.

For more information about Off-Campus Housing, phone 401.874.2828 or visit **uri.edu/commuter\_housing**.

### Student Services

**Center for Career and Experiential Education.**

**Visit** [uri.edu/career](http://uri.edu/career) The Center for Career and Experiential Education (CCEE) engages students and alumni in a high quality personal and professional educational experience,

from admission through employment. Career and internship advisors provide self assessments, searching and networking strategies, resume development and internship information sessions. The center offers RhodyNet, an online database of job and internship opportunities and events for our students and alumni.

We also offer classes for career development (ITR 300) that engage students in self-reflection and work place skill development. This course helps students to increase awareness of the professional decision-making process, explore career choices, and expand understanding the relationship between education and the world of work. Students study key career development theories and learn how to integrate self-knowledge into occupational and life decisions, set goals, and devise strategies to attain these goals.

The academic internship program (ITR 301-304) provides students with full-time or part-time experiential learning opportunities (fall, spring, and summer). The program is designed for motivated students who wish to apply classroom learning to field experiences in career related settings. Student interns are supervised by a qualified professional at their placement site and by a faculty advisor from their academic major. Students from most undergraduate curriculums may apply for part-time or full-time internships and may earn from 6-15 free- elective credits. In order to apply to the program, a student must have a minimum GPA of 2.50 and junior or senior standing.

For more information, visit us on the first floor of Roosevelt Hall, online at [uri.edu/career](http://uri.edu/career) or call 401.874.2311.

**Chaplains.** The University chaplains are active in providing religious services and in counseling, advising campus groups, teaching, and programming. The chaplains represent the Roman Catholic, Jewish, Protestant, Orthodox Christian, Buddhist, and Muslim communities; referrals are available to representatives of other faiths. The chaplains work together to foster dialogue, understanding, and respect among people of different faiths and traditions. See [uri.edu/chaplains](http://uri.edu/chaplains).

**Counseling.** The Counseling Center, located in Room 217 of Roosevelt Hall, is staffed by professional counselors, psychologists, and social workers. The Center offers individual counseling and a variety of skill-building and support groups to help undergraduate and graduate students achieve their academic and life goals. The Counseling Center provides assistance to students in areas such as adjusting to college life, coping with stress, building satisfying relationships, planning for the future, and coping with depression, substance use, or other mental health challenges.

Counselors work closely, as appropriate, with other health care providers in Health Services. Additionally, some students contact the Counseling Center for help with concerns about a roommate or friend. Information shared in counseling is confidential. Center hours are Monday through Friday 8:30 a.m.-4:30 p.m. with extended hours until 6:30 p.m. on Tuesday.

To make an appointment, students may simply stop by the Counseling Center, or call and schedule a time to meet with a counselor. If you need help with an urgent matter, ask to speak to the counselor-on-call. Phone: 401.874.2288. website: [uri.edu/coun](http://uri.edu/coun).

**Disability Services for Students.** Disability Services for Students works with students and all units of URI to foster a welcoming, accessible environment. We promote academic success, self-advocacy, and equal opportunity through education, awareness, and ADA compliance. At URI, disability is considered an issue of cultural diversity.

Additional duties of the office include:

- recommend and coordinate reasonable accommodations (exam, course, program, housing, transportation), • encourage student development through self-advocacy and personal decision making,
- support student commitment to academic success and retention,
- provide information to faculty and administrators regarding the inclusion of persons with disabilities.

Please visit our website at [uri.edu/disability](http://uri.edu/disability) for detailed information about policies, procedures, and resources. We are happy to discuss specific concerns in person, by phone, or by email. Our office is located at 302 Memorial Union, Kingston, RI 02881. For more information, phone 401.874.2098 (TTY via R.I. Relay at 711), or email to [dss@etal.uri.edu](mailto:dss@etal.uri.edu).

**Health Services.** Located in the Potter Building, adjacent to the residence halls, Dr. Pauline B. Wood Health Services provides primary ambulatory care to students. Nurse practitioners and physicians see students by appointment Monday through Friday from 9 a.m. to 8 p.m. in the general medicine and women's clinics with laboratory, radiology, and pharmacy services available. Limited services are available on Saturdays, Sundays, and most holidays with physician and pharmacy coverage from noon to 4 p.m.

Specialists in surgery, internal medicine, dermatology, gynecology, and psychiatry hold regular clinics at the Potter Building. A travel/immunization clinic administers vaccines available from the pharmacy. Allergy injections are given, provided the vaccines are supplied by the student. Care provided at Health Services is billed to insurance companies. Your mandatory health service fee covers all office visits not covered by insurance. Lab and X-ray charges not covered by insurance are the responsibility of the student. Co-payment for pharmacy is expected at the time of service.

Hospital care is available in the local community, as is referral to specialists. All medical expenses incurred outside the University's Health Services are the responsibility of the student. Therefore, students are required to have adequate accident/sickness or health insurance. Students who choose a private physician assume responsibility for expenses incurred. See "Accident/Sickness Insurance" for additional details or consult the Health Services brochure, "To Your Health."

To promote personal health and well-being, health educators provide a variety of services: wellness clinics, outreach activities, awareness days, peer workshops, and nutrition education from a registered dietician.

An emergency medical service (URI EMS) staffed by student volunteer EMTs responds to campus emergency medical calls 24 hours a day and transports patients to Health Services or the South County Hospital emergency room during the academic year.

**Independent Students.** Independent or nontraditional students make up over 10% of URI's undergraduate population. Any students over the age of 23 who are either returning

to the University for a second degree or starting anew are eligible to benefit from the services provided at the Office of Student Life. The office is always on hand to lend individual support and ease an independent student's transition to college life. For more information on Independent Student Services, call 401.874.2101 or visit [uri.edu/student\\_life](http://uri.edu/student_life).

#### **Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ)**

**Center.** The LGBTQ Center at URI strives to create and maintain a welcoming, safe, supportive campus climate for all people, regardless of sexuality or gender. The LGBTQ Center works closely with students, staff, faculty, and community members to provide space, programs, and services that foster education, advocacy, support, and engagement. From our Coming Out Month activities in October to our Lavender Graduation ceremony in April, many are sure to find events that strike their interests. On April 16, 2014, URI broke ground for a new LGBTQ Center on Upper College Road. When the \$2.1 million, 4,300 square foot site is completed, URI's new center will be a safe and affirming place for all members of the community. URI is the first institution of higher education in the country to design and build a free standing LGBTQ Center. For more information, please call 401.874.2894, visit our website at [web.uri.edu/gender-sexuality](http://web.uri.edu/gender-sexuality), or visit our Center in Adams Hall 111 in person.

**Memorial Union.** The center for campus activities, the Memorial Union houses a wide variety of educational, social, cultural, and recreational services and facilities for both undergraduate and graduate students. These include meeting and conference rooms, lounges, study rooms, radio station, campus newspaper offices, game room, offices for student organizations, scheduling and information office, a mailroom for students living on campus, ballroom, optical shop, flower shop, convenience store, cafeteria, restaurant, pizza shop, and a coffee and pastry shop.

Among the services provided are a unisex hair salon, credit union, copy center, bookstore, computer store, computer lab, 193° Coffeehouse, and the Memorial Union Technical Productions (which offers technical services in sound and lighting).

An undergraduate student board of directors works with the director and staff of the Memorial Union/Student Involvement Office to determine policy for the Union and plan a full program of social, cultural, intellectual, and recreational activities.

**Multicultural Center.** Celebrating unity in diversity, the Multicultural Center invites all of its students, faculty, staff, administrators, alumni, and other friends to join in its work of creating a community of learners within and beyond URI. The Center is a place dedicated to developing a supportive and inclusive campus culture across the boundaries of culture, identity, and discipline. It collaborates with others in providing a variety of programs, activities, and services that help diverse learners systematically explore the ways we culturally construct identity (who we are), knowledge (what we mean), power (how we assert influence), community (how we relate and belong to each other), and culture (how we make meaning).

Located in the heart of campus, the Multicultural Center maintains a mission and vision grounded in the values upon which the theory and practice of multiculturalism were founded: social justice; learning; and personal, social, and cultural development. The Center's focus in valuing diversity is promoted through annual events such as Diversity Week, providing innovative workshops facilitated and attended by

faculty, staff, students, and the general community; Dr. Martin Luther King Jr. Week, emphasizing the importance of non-violence principles and the history of forces of positive change within diverse communities; and Diversity Awards, recognizing the many initiatives of cultural competency by members of the URI community. Counseling, programming, and other services are also provided by the staff of Multicultural Student Services. Phone: 401.874.2851. website: [uri.edu/mcc](http://uri.edu/mcc).

**Substance Abuse Prevention.** The mission of the URI Office of Substance Abuse Prevention Services is to continually monitor, measure, and improve our approaches to increase safety and reduce risks for members of our university community. Whether working individually with students or providing population-wide programs, our primary goal is to empower students to make healthy choices while encouraging environments conducive to academic and social success.

Recognizing that not everyone who abuses alcohol or other drugs necessarily requires or desires treatment, Substance Abuse Prevention Services (SAPS) offers resource materials and information so that students can make educated choices. Using a harm-reduction approach, SAPS addresses the causes and consequences of student substance use. Seeking help does not necessarily mean that you are an alcoholic or drug addict. Frequently, students find a single consultation appointment to be beneficial to them in making better decisions regarding their own substance use. For more information about SAPS, phone 401.874.5073 or **visit** [uri.edu/substance\\_abuse](http://uri.edu/substance_abuse).

**Talent Development.** URI also offers the Talent Development Program, a program of special interest to many minority and disadvantaged students. Talent Development was started in 1968 to help young people who otherwise could not attend the University. "TD" provides a special opportunity for minorities and disadvantaged persons.

Talent Development at URI includes a spring Saturday PREP Program and Pre-Mat, an intense six-week academic summer experience on the Kingston campus, which many TD students mark as a turning point in their lives. Upon successful completion of the TD summer program, each student arrives in Kingston in September as a URI student and a member of Talent Development. TD provides students with special academic advising, financial aid based on need, and a strong support community.

Any Rhode Island resident may apply for Talent Development. Specifically, the program looks for minority and/or disadvantaged students who, without TD and its support services, could not expect to be admitted to URI. Even those who finished high school a while ago, or have a GED, may still be eligible for Talent Development.

To find out more about Talent Development at URI or its application process, ask your guidance counselor, call 401.874.2901, or visit [uri.edu/talent\\_development](http://uri.edu/talent_development).

**Women's Center.** Female-identified students make up more than half of URI's total student population. The URI Women's Center, administered by the Office of Community, Equity, and Diversity, provides the necessary resources to help create an environment rich in role models and free of sexual inequities. In addition, it coordinates lectures, programs, and activities of special interest to those concerned with gender and leadership. Located at 22 Upper College Road, the Women's

Center includes a residential component for female-identified students committed to building community through leadership and service; a Violence Prevention & Advocacy Services Program; a mentoring program called WOWW (We're Offering Women Wisdom) for first-year students; the Women's Leadership Coalition; the Women of Color Network (WOCN) for faculty and staff; and a LBTQQ group for female-identified students. Phone: 401.874.2097. uri.edu/women\_center.

## Student Involvement

Social, recreational, and cultural arts programs are sponsored by many different offices and student organizations at the University. These events are funded by student fees, and opportunities abound for students to become involved in selecting and coordinating them. The Student Entertainment Committee sponsors an extensive series of social programs featuring concerts, local and regional musicians, other live entertainment, lectures, and films.

In addition to intercollegiate athletic teams, a number of organizations represent the University in competition, exhibitions, and public performances. The University Band, Chorus, and Orchestra are under music department direction, and students may receive credit for participation in any one of these. The University Theatre, under the direction of the Theatre Department, presents several plays each year. Cheerleaders are active at varsity football and basketball games and other special events and rallies.

Students publish a newspaper four times a week and a yearbook. Radio station WRIU, with local AM and FM reception that reaches all of Rhode Island and parts of Connecticut and Massachusetts, is student-run and operates 365 days a year. There is also a 24-hour student-run ambulance service.

Over 120 student organizations exist in which students can get involved. Covering a wide range, these organizations may be social, political, academic, religious, or media-related; several represent special-interest groups. There are also about 30 professional organizations on campus related to academic areas. Thousands of students participate in the activities coordinated by these organizations. For information, students are directed to Room 210 in the Memorial Union.

**Athletics and Recreational Services.** The Departments of Athletics and Recreational Services are committed to providing athletics and recreational opportunities to students, staff, and alumni. The departments seek to complement the University's academic goals by enhancing physical, emotional, and social well-being through leisure activities and lifetime involvement in sports.

The emphasis of the program is to provide opportunities that encourage the pursuit of lifetime activities, a sense of commitment and teamwork, and the development of personal character while maintaining an environment that values cultural diversity and gender equity among student athletes and department staff.

The intercollegiate athletics department sponsors 18 NCAA Division I programs for men and women. A member of the Atlantic 10 Conference in most sports, URI also holds membership in the CAA Football League (FCS). On the men's side, URI sponsors the following sports: baseball, basketball, cross country, football, golf, soccer, and indoor and outdoor track &

field. Women's intercollegiate teams participate in basketball, cross country, rowing, soccer, softball, volleyball, indoor and outdoor track & field, swimming & diving, and tennis.

Competitive club sport teams include equestrian, field hockey, gymnastics, men's and women's ice hockey, men's and women's lacrosse, roller hockey, men's rowing, men's and women's rugby, sailing, skiing, men's swimming, ultimate Frisbee, and men's volleyball. The Intramural Sports Program offers all-male, all-female, and coed teams according to yearly demand. Recent years have seen badminton, basketball, billiards, bowling, dodgeball, flag football, field hockey, floor hockey, golf, ice hockey, kickball, indoor and outdoor soccer, softball, and both beach and indoor volleyball.

The 7,657-seat **Thomas M. Ryan Center** is the cornerstone of URI's athletic complex and serves as the home of Rhode Island men's and women's basketball teams. The Ryan Center boasts three tiers of seating in the arena to bring all 7,657 seats within 74-feet of the court, creating a frenzied atmosphere. Every seat in the Ryan Center has a chairback, and there are eight luxury suites that overlook both the Meade Stadium football field and the Ryan Center basketball court. The 200,000-square foot arena combines the heart and spirit of venerable Keane Gym with the amenities, services, and conveniences of a modern arena. The **Bradford R. Boss Arena** is one of only two ice facilities in the state that operate for the entire year and are open for public skating.

The University has a number of other facilities for athletics and recreation. Mackal Field House and the Anna Fascitelli Fitness and Wellness Center contain fitness rooms complete with weight training and cardio equipment, a brand-new Mondo 200-meter track, and four basketball courts. Mackal also houses the athletics and recreational services departments' administrative offices.

Meade Stadium has served as the home of Rhody's football team since it opened in 1928. The west side of the stadium features chairback seating, and the suite level in the Thomas M. Ryan Center overlooks the entire field. In 2010, the east stands and press box underwent a full renovation project.

Opened in 1953 and named for URI's Hall of Fame men's basketball coach Frank W. Keane, the 3,385-seat Keane Gym is the site of Ram volleyball matches. Keane Gym was the home of the men's and women's basketball teams for 49 seasons until the Ryan Center opened its doors in 2003.

The Tootell Physical Education Complex offers an aquatic center with competitive and instructional programs; a varsity team weight room; a group exercise studio; and West Gym, available for basketball, volleyball, and badminton.

Bill Beck Field is the home of the URI baseball team. In November of 2007, a \$1-million donation initiated facility renovations designed to equip the Rams with one of the finest ballparks in all of New England, including a brand-new FieldTurf playing surface, a new backstop, scoreboard, fencing and bullpens, and an indoor batting facility along the right field side of Bill Beck Field.

Other athletic facilities at URI include a lighted soccer field, eight tennis courts, a softball field, Arrigan Sailing Center, Campanella Rowing Center, two beach volleyball courts, and practice fields.

**Center for Student Leadership Development.** Since its

founding in 1997, the CSLD has provided academic leadership courses and countless hours of leadership development training to URI students and the surrounding community. Through academic course offerings in the minor in leadership studies, internships, strengths-based leadership development training, and multiple programs throughout the year, the CSLD provides developmental opportunities for students to become informed, inclusive, and effective leaders in their careers, communities, family lives, and field of study. Programmatic highlights include the annual Leadership Institute weekend, the North Woods Challenge Course, the Women of Color dinner and conference, e-Lead, Omicron Delta Kappa honor society, the Student Organization Leadership Consultants, and group development consulting services. For more information, visit [mu.uri.edu/leadership](http://mu.uri.edu/leadership) or Room 210 of the Memorial Union.

**Student-Run Businesses.** The Memorial Union offers students a number of opportunities to run businesses under full-time supervision but with a large amount of independence. Enterprises such as the Memorial Union Technical Productions (sound and lighting) and the 193° Coffee House allow for management training and excellent work experience.

## Feinstein Providence Campus

While all URI students have access to all Kingston Campus opportunities described below, they also find a range of unique services at the nonresidential Feinstein Campus in Providence. For more information, call 401.277.5000 or visit [uri.edu/prov](http://uri.edu/prov).

## Confidentiality of Records

Procedures for the release and disclosure of student records maintained by the University of Rhode Island are in large measure governed by state and federal laws. Where the law is silent, the University is guided by the principle that the privacy of an individual is of great importance and that as much information in a student's file as possible should be disclosed to the student on request. A current or former student has the right to inspect and review official records, files, and data directly related to that student. This right does not extend to applicants, those denied admission to the University, or those who were admitted but did not enroll. Some records are not available to students.

Third parties, including parents and spouses, do not have access to a student's education records or to personally identifiable information from those records without the written consent of the student who specifies that the records be released or unless specifically authorized by law. The law does allow the release of such information and records in a number of cases without the written consent of the student, including the following: (i) notification of parents or guardians of a student under 21 years of age about an alcohol or other drug violation;

(ii) incidents involving certain crimes of violence; (iii) disclosures warranted by a health and safety emergency; (iv) disclosures to school officials, including contractors and outside parties, who have a legitimate educational interest as determined by the institution; (v) disclosures required by

lawful subpoena, court order, or other legal process.

Detailed guidelines for the release and disclosure of information from the student records are available from the **Office of Student Life**. These guidelines comply with the legal requirements of the Family Educational Rights and Privacy Act of 1974, as amended.

## University ID Card

Each student's University ID Card must be carried at all times on campus and presented upon request. Use of the card constitutes acceptance of all applicable terms and conditions. This card will remain the property of URI. Lost, stolen, or damaged cards must be reported immediately to the Campus Access Office (Room 216, Memorial Union).

## The Basics

### How to Read this Catalog

The following explanations pertain to the ways courses are represented throughout this catalog, especially in the sections entitled **Undergraduate Programs, Graduate Programs,** and **Course Descriptions.**

To see courses listed by semester, meeting time, or instructor, please log on to **e-Campus** and choose “Class Search.” Registration for classes also takes place through e-Campus.

#### COURSE NUMBERING

Courses numbered 001–099 are pre-freshman and special undergraduate courses, and do not carry bachelor’s degree credit. Those numbered 100–299 are lower-division undergraduate courses, and those numbered 300–

399 are upper-division undergraduate courses. The 400-level courses are generally limited to juniors and seniors majoring in that field, but are open to other advanced undergraduates and graduate students with permission.

Please note that enrollment in 200-level College of Engineering courses is restricted to engineering majors only. Exceptions can be made by permission of the department chair. Enrollment in 300-level and above College of Engineering courses is restricted to students who have been admitted to a degree granting college.

The 500-level courses are graduate courses for which a bachelor’s degree is usually a prerequisite, but qualified seniors and honors students are admitted with permission. These courses should make up the majority of course work for students working toward a master’s degree. Courses at the 600 level are advanced graduate courses. The 900-level courses are special types of graduate courses for which no degree credit is given. They include courses offered to remedy deficiencies as well as workshops, institutes, and courses offered one time only by visiting faculty.

Course numbers separated with a slash indicate either a sequence or two courses that are required to be taken concurrently. For full clarification, check the listings for those courses in the **e-Campus Course Schedule** and speak with an academic advisor.

The number in parentheses after the course name or code indicates the number of credits (e.g. the Art History course “Introduction to Art (3 crs.)” may also be abbreviated as “ARH 120 (3)”).

#### Course Codes

AAF | Africana Studies

AFS | Aquaculture and Fisheries Science

AMS | Applied Mathematical Sciences

APG | Anthropology

ARB | Arabic

ARH | Art History

ART | Art

AST | Astronomy

AVS | Animal and Veterinary Science

BCH | Biochemistry

BES | Biological and Environmental Studies

BIO | Biological Sciences

BIS | Bachelor of Interdisciplinary Studies

BME | Biomedical Engineering

BPS | Biomedical and Pharmaceutical Sciences

BUS | Business

CHE | Chemical Engineering

CHM | Chemistry

CHN | Chinese

CLA | Classics

CLS | Comparative Literature Studies

CMD | Communicative Disorders

COM | Communication Studies

CPL | Community Planning

CSC | Computer Science

CSF | Digital Forensics and Cyber Security

CSV | Community Service

CVE | Civil and Environmental Engineering

ECN | Economics

EDC | Education

EDP | Ph.D. in Education

EDS | Special Education

EEC | Environmental Economics

EGR | Engineering

ELE | Electrical Engineering

ELS | English Language Studies

ENG | English

ENT | Entomology

EVS | Environmental Sciences

FLM | Film Media

FOS | Forensic Science

FRN | French

GCH | Grand Challenges

GEG | Geography

GEO | Geosciences

GER | German

GRK | Greek

GWS | Gender and Women’s Studies

HBW | Hebrew

HDF | Human Development and Family Studies

HIS | History

HLT | Health

HPR | Honors Program

HSA | Health Services Administration

HSS | Human Science and Services  
 ISE | Industrial and Systems Engineering  
 ITL | Italian  
 ITR | Internships and Experiential Education  
 JOR | Journalism  
 JPN | Japanese  
 KIN | Kinesiology  
 LAN | Languages  
 LAR | Landscape Architecture  
 LAS | Latin American Studies  
 LAT | Latin  
 LET | Letters  
 LIB | Library  
 LIN | Linguistics  
 LRS | Labor Relations and Human Resources  
 LSC | Library and Information Studies  
 MAC | Master of Science in Accounting  
 MAF | Marine Affairs  
 MBA | Master's in Business Administration  
 MCE | Mechanical Engineering  
 MIC | Microbiology  
 MLS | Medical Laboratory Science  
 MSL | Military Science and Leadership  
 MTH | Mathematics  
 MUS | Music  
 NES | New England Studies  
 NEU | Neuroscience  
 NFS | Nutrition and Food Sciences  
 NRS | Natural Resources Science  
 NUE | Nuclear Engineering  
 NUR | Nursing  
 NVP | Nonviolence and Peace Studies  
 OCE | Ocean Engineering  
 OCG | Oceanography  
 OCS | Off Campus Study – Undergraduate  
 OCSG | Off Campus Study – Graduate  
 PHC | Pharmacy  
 PHL | Philosophy  
 PHP | Pharmacy Practice  
 PHT | Physical Therapy  
 PHY | Physics  
 PLA | Prior Learning Assessment  
 PLS | Plant Sciences  
 POR | Portuguese  
 PRS | Public Relations

PSC | Political Science  
 PSY | Psychology  
 RDE | Resource Development Education  
 RIC | Joint PhD Program  
 RLS | Religious Studies  
 RUS | Russian  
 SCM | School of Communications and Media  
 SOC | Sociology  
 SPA | Spanish  
 STA | Statistics  
 SUS | Sustainability  
 THE | Theatre  
 THN | Thanatology  
 TMD | Textiles, Fashion Merchandising, and Design  
 URB | Urban Affairs  
 URI | University of Rhode Island Freshman Seminar  
 WRT | Writing

Course descriptions including “Cross-listed as” indicate multiple departments or programs that offer the same course (e.g. “Cross-listed as (AAF), HIS 150” course is offered by both Africana Studies and History).

In the **Course Descriptions**, the information in parentheses after the full text of the course description tells the format and number of hours per week (e.g. “Lec. 3” means three hours of lecture). “Pre:” refers to a prerequisite. “S/U credit” signifies a course in which only grades of satisfactory or unsatisfactory are given.

Courses that meet general education requirements are designated with a letter in parentheses indicating the appropriate group, as follows:

- (A) | Fine Arts and Literature
- (FC) | Foreign Language/Cross-Cultural Competence
- (L) | Letters
- (EC) | English Communication (General)
- (ECw) | English Communication (Written)
- (MQ) | Mathematical and Quantitative Reasoning
- (N) | Natural Sciences
- (S) | Social Sciences

Courses that meet the general education diversity requirement are designated with a [D].

## Student Learning Outcomes

The University of Rhode Island expects that every academic program, as a consequence of the interaction between general education and a major, will lead the student to:

- think critically in order to solve problems and question the nature and sources of authority;
- use the methods and materials characteristic of each of the knowledge areas while understanding their interconnectedness;
- commit to intellectual curiosity and lifelong learning;

- maintain an openness to new ideas while utilizing the social skills necessary for both teamwork and leadership; and
- think independently, be self-directed, and take initiative based on informed choices.

For individual academic program student learning outcomes, go to the program website or visit: [uri.edu/assessment](http://uri.edu/assessment).

## Majors and Fields of Study

### UNDERGRADUATE MAJORS

For a list that includes areas of focus and live links to department websites, visit [uri.edu/admission/majors](http://uri.edu/admission/majors).

#### College of Arts & Sciences

Africana Studies (joint URI-RIC): B.A.  
 Anthropology: B.A.  
 Art: B.A., B.F.A.  
 Art History: B.A.  
 Chemistry: B.A., B.S.  
 Chemistry and Chemical Oceanography: B.S.\*  
 Chemistry and Forensic Chemistry: B.S.  
 Chinese: B.A.  
 Classical Studies: B.A.  
 Communication Studies: B.A.  
 Comparative Literature Studies: B.A.\*  
 Computer Science: B.A., B.S.  
 Economics: B.A., B.S.  
 English: B.A.  
 Film Media: B.A.  
 French: B.A.  
 Gender and Women's Studies: B.A.  
 German: B.A.  
 History: B.A.  
 Italian: B.A.  
 Journalism: B.A.  
 Latin American Studies: B.A.\*  
 Mathematics: B.A., B.S.  
 Music: B.A., B.M.  
 Philosophy: B.A.  
 Physics: B.A.\*, B.S.  
 Physics and Physical Oceanography: B.S.  
 Political Science: B.A.  
 Psychology: B.A., B.S.  
 Public Relations: B.A.  
 Sociology: B.A., B.S.  
 Spanish: B.A.  
 Theatre: B.F.A.

Writing and Rhetoric: B.A.

#### College of Business Administration

Accounting: B.S.  
 Entrepreneurial Management: B.S.  
 Finance: B.S.  
 General Business Administration: B.S.  
 Global Business Management: B.S.  
 Management Information Systems: B.S.\*  
 Marketing: B.S.  
 Supply Chain Management: B.S.

#### College of Engineering

Biomedical Engineering: B.S.  
 Chemical Engineering: B.S.  
 Civil Engineering: B.S.  
 Computer Engineering: B.S.  
 Electrical Engineering: B.S.  
 Industrial and Systems Engineering: B.S.  
 Mechanical Engineering: B.S.  
 Ocean Engineering: B.S.

#### College of the Environment and Life Sciences

Animal Science and Technology: B.S.  
 Aquaculture and Fishery Technology: B.S.  
 Biological Sciences: B.S.  
 Biology: B.A.  
 Cell and Molecular Biology: B.S.  
 Environmental and Natural Resource Economics: B.S.  
 Environmental Science and Management: B.S.  
 Geology and Geological Oceanography: B.S.  
 Landscape Architecture: B.L.A.  
 Marine Affairs: B.A., B.S.  
 Marine Biology: B.S.  
 Medical Laboratory Science: B.S.  
 Microbiology: B.S.\*  
 Nutrition and Dietetics: B.S.  
 Plant Sciences: B.S.  
 Wildlife and Conservation Biology: B.S.

#### College of Human Science and Services

Communicative Disorders: B.S.  
 Education: Elementary B.A., Secondary B.A., B.S.



Health Studies: B.S.  
 Human Development and Family Studies: B.S.  
 Kinesiology: B.S.  
 Textile Marketing: B.S.  
 Textiles, Fashion Merchandising, and Design: B.S.

### **College of Nursing**

Nursing: B.S.

### **College of Pharmacy**

Pharmaceutical Sciences: B.S.  
 Pharmacy: Pharm.D. (six years)

### **Alan Shawn Feinstein College of Continuing Education**

Applied Communications: B.I.S.  
 Business Institutions: B.I.S.  
 Health Services Administration: B.I.S.  
 Human Studies: B.I.S.

*\* This degree program is not accepting applicants. Search the online or print catalog to learn if the field of study is available under a different program.*

### **GRADUATE FIELDS OF STUDY**

#### **Master of Arts**

Communication Studies  
 Education  
 English  
 History  
 Marine Affairs  
 Political Science  
 Spanish  
 Special Education

#### **Master of Science**

Accounting  
 Biological and Environmental Sciences  
 • Cell and Molecular Biology  
 • Integrative and Evolutionary Biology  
 • Environmental and Earth Sciences  
 • Ecology and Ecosystems Sciences  
 • Sustainable Agriculture and Food Systems  
 Chemical Engineering\*\*  
 Chemistry  
 Civil and Environmental Engineering\*\*

Computer Science  
 Electrical Engineering\*\*  
 Environmental and Natural Resource Economics  
 Human Development and Family Studies  
 • College Student Personnel  
 • Human Development and Family Studies  
 • Marriage and Family Therapy  
 Kinesiology  
 Labor Relations and Human Resources  
 (M.S. or joint M.S./J.D.-RWU)  
 Mathematics  
 Mechanical Engineering  
 Medical Laboratory Science  
 Medical Physics  
 Neuroscience  
 Nursing  
 Nutrition and Food Sciences  
 Ocean Engineering\*\*  
 Oceanography  
 Pharmaceutical Sciences  
 Physics  
 Psychology: School  
 Speech-Language Pathology  
 Statistics  
 Systems Engineering\*\*  
 Textiles, Fashion Merchandising, and Design

#### **Doctor of Philosophy**

Applied Mathematical Sciences\*  
 Biological and Environmental Sciences  
 • Cell and Molecular Biology  
 • Integrative and Evolutionary Biology  
 • Ecology and Ecosystems Sciences  
 • Environmental and Earth Sciences  
 • Sustainable Agriculture and Food Systems  
 Business Administration  
 • Finance and Insurance  
 • Management  
 • Management Science  
 • Marketing  
 Chemical Engineering\*\*  
 Chemistry  
 Civil and Environmental Engineering\*\*  
 Computer Science  
 Education (joint URI-RIC)

Electrical Engineering\*\*

English

Environmental and Natural Resource Economics

Industrial and Systems Engineering\*\*

Marine Affairs

Mathematics

• Pure Mathematics

• Applied Mathematics

Mechanical Engineering

Neuroscience

Nursing

Ocean Engineering\*\*

Oceanography

Pharmaceutical Sciences

Physics

Psychology

• Behavioral

• Clinical

• School

### Professional Degrees

Doctor of Nursing Practice (D.N.P.)

Doctor of Physical Therapy (D.P.T.)

Master of Business Administration (M.B.A.)

Master of Environmental Science and Management (M.E.S.M.)

Master of Library and Information Studies (M.L.I.S.)

Master of Marine Affairs (M.M.A.)

Master of Music (M.M.)

Master of Oceanography (M.O.)

Master of Public Administration (M.P.A.) (joint URI-RIC)

Teacher Certification

### Post-Baccalaureate Certificate Programs

Chemical Engineering (Polymers)

Cyber Security

Digital Forensics

Electrical Engineering (VLSI)

Gender and Women's Studies

Geographic Information Systems and Remote Sensing (GIS/RS)

Interdisciplinary Neuroscience

Labor Relations & Human Resources

Library & Information Studies

Nursing

Textiles, Fashion Merchandising & Design

*\* This degree program is not accepting applicants. Search the online or print catalog to learn if the field of study is available under a different program.*

*\*\* This program includes the option of earning dual degrees from URI and from Technische Universität Braunschweig, Germany. For more information, visit [uri.edu/iep/info/graduate\\_iep](http://uri.edu/iep/info/graduate_iep).*

## Undergraduate Degrees

All programs aim at a balance of studies of the natural and social sciences, the humanities, and professional subjects. The courses and programs of study have been approved by national accrediting agencies and are accepted for credit by other approved institutions of higher education (see **Accreditation**).

Undergraduate students can earn the following degrees at URI: Bachelor of Arts

Bachelor of Science

Bachelor of Fine Arts

Bachelor of Landscape Architecture

Bachelor of Music

Bachelor of Interdisciplinary Studies (Feinstein College of Continuing Education)

URI's College of Pharmacy also offers a six-year entry-level program, leading to the Pharm.D. degree.

All Kingston freshmen who enter the University to earn a bachelor's degree are first enrolled in University College for Academic Success. All undergraduates at the University, whether at our Kingston or Providence campuses, have a wide choice of programs from which to choose a major, and our advising programs provide help in making this important decision and in choosing appropriate courses.

The University's undergraduate majors are listed in **Majors and Fields of Study**.

## Graduate Degrees

Graduate study at the University was inaugurated in 1907 with Master of Science degrees in chemistry and engineering. The Master of Arts degree was first awarded in 1951, and in 1960 the University awarded its first Doctor of Philosophy degree. Graduate work for professional degrees was initiated in 1962, when the degree of Master of Public Administration was first awarded. Today, students may earn the following degrees:

Master of Arts

Master of Science

Master of Business Administration

Master of Environmental Science and Management

Master of Library and Information Studies

Master of Marine Affairs

Master of Music

Master of Oceanography

Master of Public Administration  
 Doctor of Nursing Practice  
 Doctor of Philosophy

Doctor of Physical Therapy

The University also offers a joint program with Roger Williams University, the M.S./J.D. in labor relations and human resources. Additionally, the University cooperates with Rhode Island College in offering a joint Ph.D. degree in education.

The Graduate School has primary responsibility for administering policies and procedures relating to advanced study at URI. Graduate School policy is formulated by graduate faculty members, acting through their delegate body, the Graduate Council, which includes student members. Only the Graduate School or the Graduate Council can grant exceptions to the regulations for graduate study, which are explained in detail in the **Graduate Programs** section of this catalog and in the **Graduate School Manual**.

The University's graduate programs of study are listed in **Majors and Fields of Study**. Study and research in a combination of special areas is often possible, and some graduate programs actively encourage collaborative multidisciplinary work. Specific mention of these opportunities is included in individual program descriptions. Graduate-level course work applicable to a number of programs is offered in several locations throughout the state by the Alan Shawn Feinstein College of Continuing Education. In most cases, however, a portion of the courses must be taken on the Kingston Campus.

Students with a bachelor's degree from URI or another university with equivalent requirements and accreditation may be admitted for graduate study, providing their credentials meet the standards set by the Graduate School and the department in which they wish to study, and that facilities for study are available in their field of interest. Among the standards required for admission are an approximate undergraduate average of B or better and, where required, satisfactory scores on a nationally administered examination.

## University Manual

University regulations governing matters such as conduct, grading, probation and dismissal, academic integrity, withdrawal from the University, and graduation requirements are fully explained in the University Manual found at [uri.edu/facsen](http://uri.edu/facsen). Such rights and responsibilities are also described in the Student Handbook, which is available from the Office of Student Life and at [uri.edu/judicial](http://uri.edu/judicial).

## Accreditation

The University of Rhode Island is accredited by the New England Association of Schools and Colleges. In addition, certain courses and programs of study have been approved by national accrediting agencies.

The New England Association of Schools and Colleges is a nongovernmental, nationally recognized organization whose affiliated institutions range from elementary schools to collegiate institutions offering postgraduate instruction.

Accreditation of an institution by the New England Association indicates that it meets or exceeds criteria for the assessment of institutional quality periodically applied through a peer group review process. An accredited school or college is one that has the necessary resources available to achieve its stated purposes through appropriate educational programs, is substantially doing so, and gives reasonable evidence that it will continue to do so in the foreseeable future. Institutional integrity is also addressed through accreditation.

Accreditation by the New England Association is not partial, but applies to the University as a whole. As such, it is not a guarantee of the quality of every course or program offered, or of the competence of individual graduates.

Rather, it provides reasonable assurance about the quality of opportunities available to students who attend the University.

Inquiries regarding the status of an institution's accreditation by the New England Association should be directed to the school's administrative staff or to the association at 3 Burlington Woods Drive, Suite 100, Burlington, Massachusetts 01803; 781.425.7700 or 855.886.3272 (toll-free).

The national accrediting agencies that have approved the quality of certain course offerings and programs of study include the Accreditation Board for Engineering and Technology (ABET), Accreditation Council for Pharmacy Education (ACPE), Association to Advance Collegiate Schools of Business (AACSB), Commission on Accreditation for Marriage and Family Therapy Education, American Chemical Society Committee on Professional Training, Accreditation Commission on Education for Nutrition and Dietetics (ACEND), American Library Association, American Psychological Association, American Society of Landscape Architects, American Speech-Language-Hearing Association, Commission on Accreditation in Physical Therapy Education, Commission on Collegiate Nursing Education, National Association of School Psychologists, National Association of Schools of Music, and National Council for Accreditation of Teacher Education.

The University is also an approved member institution of the American Association of Adult and Continuing Education, the American Council on Education, the Association for Continuing Higher Education, the Association of American Colleges and Universities, the Association of Public and Land-Grant Universities, the Council for Higher Education Accreditation, the Council of Graduate Schools, the Institute for International Education, the Institute for the Recruitment of Teachers (IRT), the North American Association of Summer Sessions, the Northeast Alliance for Graduate Education and the Professoriate, the Society for College and University Planning, and the University Continuing Education Association.

## Undergraduate Admission

### Office of Admission

The Office of Admission strives each year to enroll a diverse undergraduate class of freshman and transfer students from the state of Rhode Island, as well as from other states and countries. We seek to enroll students who are prepared to be successful at the University, who possess a variety of talents and strengths, who are committed to becoming contributing members of the community, and who will be stimulated and challenged by doing undergraduate work in an environment that includes scholarly research and graduate study.

Students are selected for enrollment on the basis of a holistic review of all application materials; without regard to race, sex, religion, age, color, creed, national origin, disability, or sexual orientation; and without discrimination against veterans. The University has been authorized under federal law to enroll nonimmigrant foreign students.

### Prior to Admission

**Information Sessions.** The Admission staff offers information sessions and campus tours for prospective students and their families. Most of the academic colleges also offer information sessions. For details, check the website, [uri.edu/admission/visiting](http://uri.edu/admission/visiting). Follow the instructions on how to view the tour and information calendar, login, and register.

**Campus Tours.** Student tour guides conduct walking tours of the campus for visitors Monday through Friday and most Saturdays from September through May. There is also a **self-guided tour** on the website. Group tours for high schools and other organizations may also be arranged. For more information, call 401.874.7100 or refer to the **Special Tour Request Form**.

Tours of the Narragansett Bay Campus and the Graduate School of Oceanography may also be arranged. Call 401.874.6211 for details.

### Freshman Admission Requirements

Admission to the University of Rhode Island is competitive. Each applicant is given individual consideration. In the evaluation process we consider the rigor of the high school curriculum, academic performance, standardized test scores, extracurricular activities, employment, leadership, community service, and unique talents. The students offered admission for the fall of 2014 had an average GPA of 3.59/4.00, with an average SAT Math, Critical Reading, and Writing combined score of 1,663, and an average ACT composite score of 25.

A minimum of 18 units of college preparatory classes in high school are expected as follows: 4 in English, 3 in algebra and plane geometry, 2 in a physical or natural science, 2 in history or social science, 2 in the same foreign language, and 5 additional units to total 18. See [uri.edu/admission](http://uri.edu/admission) for more specific information.

All students are encouraged to select their additional units from areas including English, foreign languages, mathematics, social sciences, or laboratory sciences. The strongest applicants take the most rigorous secondary school curricula available to them.

Certain programs at URI are highly selective due to limited enrollment capacity. The following are additional requirements related to specific colleges and majors:

- We recommend that applicants to Engineering, Business, Chemistry, Computer Science, and Physics complete 4 units of mathematics (including precalculus or trigonometry).
- Engineering applicants must complete 4 units of mathematics (including precalculus or calculus), 3 units of physical science classes with hands-on laboratories (including 1 unit of physics, 2 other physical sciences, and chemistry is recommended).
- Nursing, Pharmacy, and Engineering applicants who submit complete applications by the December 1 Early Action deadline will be given preference for admission.
- Applicants to all music programs must audition and should contact the Department of Music at 401.874.2431 for audition dates and requirements.

Applications are not reviewed until all materials are received by the Office of Admission. These materials include:

- A completed Common Application
- Application fee of \$65
- Official high school transcript (sent by the school)
- List of senior courses (admission is contingent upon successful completion of all senior course work and graduation from high school)
- Official SAT or ACT Scores (MUST be sent electronically by the testing services: the URI ID code is 3919 for SAT and 3818 for ACT)
- Essay (pharmacy applicants must include an additional statement explaining their choice of major)
- At least one letter of recommendation (please limit to two); pharmacy applicants are required to provide two letters of recommendation

The Common Application sends an email confirming that a student's application has been submitted to the University of Rhode Island. URI then sends a letter acknowledging receipt of the application with instructions on how applicants must check the status of their application online (e-Campus). It is recommended that applicants check their status regularly to see whether any additional materials are requested, such as mid-year grades.

**Standardized Tests.** All domestic candidates for freshman admission must take the SAT or ACT. Applicants who have been away from formal studies for three or more years should contact the Admission Office about entrance requirements or refer to "Feinstein Providence Campus" in the "Undergraduate Admission" section of this catalog.

Applicants are encouraged to take the SAT or ACT as early as possible in their senior year; taking the test after January reduces the likelihood of a timely decision. Students are required to have their test scores submitted electronically to the University by the testing services. Full information concerning these tests may be obtained from local high schools and is available online at [collegeboard.com](http://collegeboard.com) or [actstudent.org](http://actstudent.org).

**Application Procedures.** Students should discuss their plans for study at the University with their guidance counselors as early as possible to establish realistic goals and program selections. The University is a member of the Common Application group. URI admission counselors will be glad to answer applicants' questions. Requests for information should be sent to [admission@uri.edu](mailto:admission@uri.edu). Applicants may also call 401.874.7100,

or visit the Admission website at [uri.edu/admission](http://uri.edu/admission).

Students may enroll at the beginning of the fall semester in September and at the beginning of the spring semester in January. Not all programs enroll new students in January. High school seniors are urged to submit applications, including first quarter grades, early in the academic year. Early Action applicants will receive a decision by the end of January. All other applicants will hear by March 31. The deadline for submitting fall term freshman applications is February 1. The deadline for spring term applications is November 1. Enrollment and housing deposits are due by May 1.

**Early Action and Merit Scholarships.** All applicants are considered for these scholarships by submitting a complete application by February 1. There is no separate scholarship application. To be considered for our highest scholarships, we recommend that you apply by the December 1 Early Action deadline. These scholarships are awarded to students who live anywhere in the U.S., as well as to international students. Minimum requirements for scholarship consideration are:

- A challenging curriculum
- GPA of 3.20/4.00
- Combined SAT score (critical reading and math) of 1050 or ACT of 23
- Involvement and leadership in school and/or community

Satisfaction of the minimum criteria listed here does not guarantee a scholarship; the overall applicant pool determines the degree of competition for these awards.

The latest date that applicants can take the SAT and meet the December 1 deadline is the November test date, and the October test is the latest date for the ACT. URI will always consider the applicant's highest score on each section of the SAT (to give the student the highest combined total). Scores from later test dates will not be considered for scholarship purposes. Most Early Action applicants receive their admission decision by the end of January. Early Action is non-binding. Merit scholarships are four-year awards (they are six-year awards for those in the Pharm.D. program), renewable each semester as long as you maintain continuous full-time enrollment (12 credits per semester) and a minimum GPA of 2.80. If a scholarship recipient's tuition classification changes, the award amount will also change to reflect the amount for the new tuition category.

**Early Enrollment/Admission.** Students who have completed their junior year of high school with superior records are eligible for early admission. A part-time study program may be arranged for students wishing to begin college study in their senior year while continuing their high school work.

Early admission students must have completed three years of English, three of mathematics, two of foreign language, two to three of social studies or history, and two of natural or physical science. Students must have the endorsement of their high school counselor or principal. Those interested should plan with their high school counselor early in their junior year, and direct further inquiries to the Office of Admission. An interview may be required.

Early admission candidates are encouraged to apply by the December 1 Early Action Deadline so that they may be considered for merit scholarships.

**Advanced Placement.** Advanced standing for freshmen is

granted to students who have completed college-level courses in a high school participating in the Advanced Placement Program and who have passed (with a score of 3 or better on most examinations) the CEEB Advanced Placement Examination. For more information about Advanced Placement credit, please refer to URI's website at [uri.edu/admission/advancedplace](http://uri.edu/admission/advancedplace).

**International Baccalaureate Degree Program.** URI awards credit for most higher level examinations taken in high school and passed with a score of 5, 6, or 7. Course credit is awarded at the discretion of individual departments. No credit is awarded for standard level examinations. Refer to URI's website at [uri.edu/admission/advancedplace](http://uri.edu/admission/advancedplace).

## Advanced Standing

In addition, students can take proficiency examinations administered by University departments to be granted advanced standing. Entrance with advanced standing can accelerate the completion of degree requirements or enrich the undergraduate program by allowing for additional elective or advanced courses.

**Proficiency Examinations.** Students showing evidence of advanced knowledge or who have taken "enriched" programs in high school may be exempt from certain courses and requirements if they take departmental proficiency exams. A student who successfully passes such an exam earns credits as well as exemption from the course. However, students who, by successfully passing proficiency examinations, have the general education requirements waived in writing, mathematics, and/or foreign languages or culture, must still complete the specified number of credits for their degree programs. Students interested in taking these exams should contact their academic dean. New students may obtain further information during orientation from their advisor in the University College for Academic Success.

**College Level Examination Program (CLEP).** Students who have been away from formal studies for three or more years may take CLEP General Examinations to demonstrate academically measurable learning acquired in nontraditional ways. URI students must secure prior approval from their academic dean to take the exams for credit. Transfer students may receive credit for CLEP General Examinations taken prior to enrollment at URI, provided that their scores meet URI standards and their academic dean judges that the CLEP credit does not duplicate other transfer credit.

Academic departments may use CLEP Subject Examinations as proficiency exams to test the student's mastery of the subjects taught by the department. A department that judges a CLEP Subject Examination to be a satisfactory proficiency exam decides what credit should be awarded within the department to students passing the exam, establishes the minimum score for credit, decides whether students must answer the optional essay questions supplied by CLEP, and decides whether students must pass a supplementary department test, such as a lab exam.

To register for a CLEP examination, contact 401.277.5160. For more information about transferring CLEP credit, go to [www.ritransfers.org/how-courses-transfer/how-courses-transfer-for-apclep/](http://www.ritransfers.org/how-courses-transfer/how-courses-transfer-for-apclep/).

## Home-Schooled Applicants

For those students who have been home-schooled, the requirements are the same as for students who have a traditional schooling profile. Those students who have had an established working relationship with a home-schooling agency that supplies curriculum outlines, and reviews and grades work completed, can submit a transcript from that agency for review. We consider the following information when making an admission decision for a home-schooled applicant:

- Comparative competencies of content through the completion of 18 prescribed units of work displayed on an official transcript (see **Freshman Admission Requirements**, previous section)
- Earned Grade Point Average
- Standardized testing results (SAT or ACT) that support the content competencies (URI will require SAT Subject exams if specific course content is unclear)

Students who have not worked with a home-schooling agency can submit the results of SAT subject exams in the following subjects to demonstrate competencies:

- Writing
- American History or World History
- Math Level C
- Biology, Chemistry, or Physics (select 2)
- Any foreign language (two units in the same language)

Other options for demonstrating course competency include transcripts showing completion of college courses covering the subject areas previously listed, results of Advanced Placement exams in those same subjects, or CLEP exam results. Home-schooled applicants are required to complete the Home-School Supplement of the Common Application.

## International Applicants

International applicants must meet all admission requirements previously listed, with the exception of the SAT or ACT, which is optional. Students seeking merit scholarships are encouraged to take the SAT or ACT. Policies regarding English proficiency differ for international students. Please review the information listed below.

**English Proficiency Requirements.** All international applicants whose first language is not English must provide proof of English language proficiency. Minimum TOEFL iBt is 79 and IELTS is 6.5. Applicants who do not have the English language proficiency minimum score (or who choose not to submit these scores) may be considered for conditional admission and can take intensive ESL classes through one of our English language partners. Additional information can be found at: [uri.edu/admission/InternationalHome.html#Conditional](http://uri.edu/admission/InternationalHome.html#Conditional).

Applicants who have attended a secondary school or post-secondary school where the language of instruction is English may be exempt from submitting an English proficiency examination depending upon their English grades and their Critical Reading and Writing SAT and/or ACT scores if submitted. This will be determined on an individual basis.

**Document Evaluation.** International transfer applicants must have university transcripts and other application materials formally evaluated by a credential evaluation agency. Please request a course-by-course evaluation and have an official

report (translated into English) sent directly to URI. A list of approved document evaluation agencies can be found at [naces.org](http://naces.org).

**Financial Documents.** After admission, international students are required to submit a completed Certificate of Financial Responsibility or demonstrate with a current bank statement that they possess funds for their first year, and that funds for subsequent years will be available. If government or reserve bank permission is required to transfer funds from the student's country to the United States, a notarized copy of the permission is required. No financial aid is available to international students, although they are eligible for consideration for merit scholarships. Inquiries from international students concerning nonimmigrant visas, transfers, funding, etc., should be sent to URI's Office of International Students and Scholars at [isoff@etal.uri.edu](mailto:isoff@etal.uri.edu). Additional information about these documents can be found on URI's website at the Office of International Students and Scholars: [uri.edu/iss/](http://uri.edu/iss/).

## Talent Development

In 1968, the URI Talent Development (TD) program was established to recruit and retain minority and disadvantaged applicants from Rhode Island. TD provides an opportunity for admission to URI, a summer program in residence on the Kingston campus, and consistent academic support throughout a student's undergraduate program. Financial aid is available for students accepted to TD; need is determined by the filing of the Free Application for Federal Student Aid (FAFSA). For more information, please visit [uri.edu/admission/talent-development](http://uri.edu/admission/talent-development). Interested students must submit the application by December 15 of their senior year in high school.

## Transfer Admission Requirements

Transfer students are those who have attempted 24 or more hours of transferable college course work after high school graduation. A minimum cumulative GPA of 2.50 is required, but most successful applicants have much higher GPAs. Certain programs may require a higher GPA or specific prerequisite courses.

Transfer applicants must submit official transcripts directly to URI from all colleges and universities attended, whether or not they expect or desire credit for such work after high school graduation. High school transcripts must also be submitted. Transfer candidates must be in good standing and eligible to return to the institutions they attended previously. Credit is not awarded for course work taken prior to admission to URI and disclosed after acceptance. Credit is given for courses in which the student earned a final grade of C or better. For information on deadlines and restricted programs, visit [uri.edu/admission/transferrequirements](http://uri.edu/admission/transferrequirements).

Credit transferred from other schools is limited by the following restrictions: 1) no more than half of the credits URI requires for graduation can be transferred from two-year institutions; 2) students must earn at URI at least one-half of the credits required for a major, at least one-half of the credits required for a minor, and at least one-fourth of the credits required for graduation; 3) only grades earned for course work at URI are included in the calculation of a student's grade point average. Additional requirements exist for numerous majors. Refer to the website at [uri.edu/admission/transfer-](http://uri.edu/admission/transfer-)

### requirements.

**Joint Admission.** The Joint Admission Agreement (JAA) is available to Community College of Rhode Island (CCRI) students who, prior to earning 30 credits, matriculate into one of the recognized JAA transition plans. Each transition plan specifies at least 32 credits that transfer to URI in fulfillment of general education requirements.

For first-time college students who intend to begin their college studies at CCRI and complete their bachelor's degree at URI, the Joint Admission Agreement (JAA) may make the transition more efficient. Depending on their intended major, they may be guaranteed admission to URI by enrolling in the JAA, earning a 2.4 Grade Point Average (GPA), and completing courses listed in a JAA Transition Plan. A total of no fewer than 60 credits will be accepted at URI through the JAA Program.

To aid students and their advisors in making appropriate selections, JAA transition plans are available on the RI Transfers website ([www.ritransfers.org/](http://www.ritransfers.org/)) and in the Transfer Guide for Students available at the same site. Only programs specified in these publications and sites as JAA programs with transition plans are included in this agreement.

## New England Regional Student Program

Through a cooperative plan sponsored by the New England Board of Higher Education, students from other New England states may enroll in a small number of selected programs at URI which are not offered in their own states. Certain programs at other New England state universities are open to Rhode Islanders on a reciprocal basis.

Visit [uri.edu/admission/newenglandprog](http://uri.edu/admission/newenglandprog) to see a list of URI regional majors by state. Students in approved regional programs will be charged tuition at a discounted rate. If at any time a student transfers out of the New England Regional Student Program, out-of-state tuition rates will apply.

Students who are applying for readmission through the Office of Enrollment Services must contact them to check on eligibility for Regional Tuition. They can be reached at 401.874.9500.

## Feinstein Providence Campus

Visit [uri.edu/prov](http://uri.edu/prov).

At the University's Feinstein Providence campus, students will discover several options:

- For the adult student, the Alan Shawn Feinstein College of Continuing Education (ASFCCE).

Applicants to ASFCCE are admitted under "performance-based admission" (PBA). For URI applicants without recent evidence of academic success, but with the potential to successfully complete college-level work, this represents an opportunity to pursue a college degree. PBA is available to applicants whose last formal, full-time educational experience occurred at least three years ago, and who have graduated from high school or earned an equivalency diploma. PBA is limited to students applying to ASFCCE for undergraduate degree programs. For more information, contact an academic advisor at the University's Feinstein Providence campus, Room 245, 401.277.5160. Visit [uri.edu/prov](http://uri.edu/prov) for more information about offerings through ASFCCE. Students intending to

transfer from Providence to programs at the Kingston campus should be aware of all requirements and discuss them with their advisor.

- For those interested in a fast track to a career in biotechnology, the Providence campus offers the Biotechnology Manufacturing Program.

The Biotechnology Manufacturing Program is offered as a part of the Bachelor of Science degree in Medical Laboratory Science in an intensive format that culminates in accelerated industry-based employment opportunities. See "Biotechnology Manufacturing Option" for more information or call 401.277.5050. Visit [uri.edu/prov](http://uri.edu/prov).

- For the high school senior seeking an education in an urban setting, the URI Providence campus offers another admission option:

Graduating high school seniors have the option to enroll at the Feinstein Providence campus as commuter students, a good choice for students who want a high quality URI education but prefer a nonresidential campus in the state's urban center. Because it is smaller and nonresidential, the Feinstein Providence campus has a reduced fee structure that gives commuter students a greater value for their tuition dollars. There are currently three majors for which traditional age students (18-22 year olds) can complete their courses of study entirely in Providence: psychology, communication studies, and human development and family studies. Other majors may require students to register for some or all of their upper-level courses in Kingston. Even if they have not yet decided on a major, students may elect to begin their studies at the Feinstein Providence campus immediately after they have graduated from high school. Application is made directly through the URI Admission Office at [uri.edu/admission](http://uri.edu/admission). Select Apply Now to access the Common Application, where you will be prompted to indicate your interest in the Providence Campus.

## Enrollment Services

### Introduction

The Office of Enrollment Services is comprised of Billing and Collections, Financial Aid, and Registration and Records. We provide academic and financial services to current and former students. We also provide academic support services to faculty.

Tuition, fees, and policies set forth in this catalog are subject to change without notice. All charges are billed by the semester and are due and payable upon receipt of the bill or by the due date indicated on the bill.

### Definitions

The amount of tuition and fees varies depending on whether the student is matriculated or nonmatriculated, on whether the student is enrolled in full- or part-time study, on whether the student is a legal resident of the state of Rhode Island, and on course sponsorship.

**Matriculated and Nonmatriculated Students.** All students who are seeking undergraduate degrees at the University must be admitted to matriculated status by the Office of Admission. Students who have received their baccalaureates and who wish to earn graduate degrees at the University must be admitted by the Graduate School as matriculated students. Persons who wish to enroll for courses at the University but are not interested in pursuing degrees must register as nonmatriculated students. See the **Undergraduate** and **Graduate** admission sections for application procedures.

**Full-Time and Part-Time Students.** Matriculated undergraduate students enrolled in 12 or more credits per semester are considered full-time students. Matriculated graduate students enrolled in nine or more credits per semester and teaching and research assistants are also considered full-time students.

Matriculated undergraduate students enrolled in 1 to 11 credits are considered part-time students. Matriculated graduate students enrolled in 1 to 8 credits who are not teaching/research assistants are also considered part-time students.

**Resident, Nonresident, and Regional Students.** A student who is a resident of the state of Rhode Island pays the in-state fee, but a student from another state or a foreign country who is in Rhode Island primarily for educational purposes, even though he or she remains in the state during vacation periods, is considered a nonresident and pays the out-of-state fee.

A minor student's parents or legal guardians must have been residents of the state for one year immediately preceding the first class day of the first term of a student's registration, in order for that student to claim resident student status. A nonresident student who reaches 18 years of age while a student does not, by virtue of that fact alone, become a resident student.

An "emancipated student" must establish the same bona fide residency for in-state tuition exemption. An emancipated student is one who has attained the age of 18, and whose parents have entirely surrendered the right to the care, custody, and earnings of the student and have not claimed the student as a dependent for tax purposes for two years. If any

of these conditions is not met, he or she is presumed to be an unemancipated student.

A member of the armed forces (on active duty) or his or her spouse stationed in the state on military orders shall be entitled to classification as a resident student during any semester, the first class day of which is encompassed by the orders.

Undergraduate students are classified as resident or nonresident by the dean of admission. A student may appeal the decision to the Board of Residency Review. Some international high school students who have lived in Rhode Island for at least one year and who meet particular requirements (laid out in the regulations adopted by the Board of Governors for Higher Education) may be eligible to pay in-state tuition and fees. Graduate students are classified as resident or nonresident by the dean of the Graduate School. A certificate of residence is included in the graduate self-managed application package.

Regional status is granted to students enrolled in the New England Regional Student Program, whereby students from other New England states may enroll in designated programs at URI that are not offered in their own states (see "New England Regional Student Program").

**Course Sponsorship.** Courses offered through the University's Kingston campus are considered Kingston-sponsored (except those offered at night). ASFCCE-sponsored courses are those courses offered through the Alan Shawn Feinstein College of Continuing Education at Kingston, Providence, and satellite locations.

### Financial Aid

Financial aid is money made available from federal, state, local, or private sources that helps students attend the postsecondary institutions of their choice. At the University of Rhode Island, these varied sources are administered by Enrollment Services in Green Hall. URI's financial aid programs are designed to serve students from the widest possible range of society, and all students are encouraged to apply.

In most cases, financial aid will be awarded in a "package" of grants (which do not have to be repaid), loans (which have to be repaid), and student employment opportunities (part-time jobs while attending school). The purpose is to assist the students in meeting the costs of attending the University. To continue receiving financial aid, it is necessary to reapply and demonstrate sufficient financial need each year as well as to maintain satisfactory academic progress.

Financial aid to students is awarded without regard to race, sex, religion, age, color, creed, national origin, disability, or sexual orientation.

**Financial Need.** A student does not have to be from a low-income family to qualify for financial aid, but does have to have "financial need." "Need" is the difference between what it costs to attend the University and what the student and family can contribute from financial resources. Parents, insofar as they are able, are expected to bear primary responsibility for financing a child's college education, and the student is also expected to earn a portion of the resources for college expenses, usually through summer employment.



**Eligibility.** Only U.S. citizens or eligible non-citizens are eligible to apply for financial aid. Foreign students desiring information about financial assistance should contact URI's Office of International Students and Scholars.

To be considered for financial aid, a person must have been accepted and enrolled at least half time (6 credits for undergraduates, 4.5 for graduate students) as a matriculated student at the University. Enrolled students must be making satisfactory progress toward their degrees according to the University's policy on satisfactory progress (see "Satisfactory Academic Progress" later in this section).

In general, a student who already has received a baccalaureate degree is considered eligible for only those aid programs listed as available to graduate students. This applies even if the student is pursuing a second undergraduate degree. For more information, please check with an Enrollment Services counselor.

**Application Procedure.** To apply for financial aid, students must complete a Free Application for Federal Student Aid (FAFSA), available online at [fafsa.ed.gov](http://fafsa.ed.gov). This form is also used to apply for state scholarships, including those for Rhode Island and Massachusetts. Residents of other states should check with their state scholarship or grant authority to inquire if another form is needed to apply for state scholarship funds.

The awarding of financial aid for the current academic year may require validation and documentation of all information submitted to Student Financial Assistance. Therefore, students must be prepared to submit the following information if asked: verification worksheets, official tax transcripts of their own and their parents' last U.S. income tax returns 1040/1040A/1040EZ, and any other documentation requested.

**Application Priority Dates.** The Free Application for Federal Student Aid should be filed online at [fafsa.ed.gov](http://fafsa.ed.gov) after January 1, and no later than March 1. Applications completed on or before March 1 will receive first consideration for financial aid awards; however, applications will be processed as long as funds remain available.

#### FEDERAL AID AVAILABLE

**Federal Pell Grants.** The Pell Grant, available to undergraduates, is designed to form the foundation of all financial aid received. Each applicant is issued a Student Aid Report, a copy of which is electronically sent to Enrollment Services if URI 003414 was put on the FAFSA. The amount of the Pell Grant is calculated according to the cost of attendance, the number of credits for which the student enrolls, and the Pell Grant Index printed on the Student Aid Report.

**Federal Supplemental Educational Opportunity Grant.** This program is intended to assist undergraduate students with the greatest financial need. First priority is given to students receiving Pell Grants.

**Federal Perkins Loan.** Eligibility is based on exceptional financial need. These loans have a simple interest rate of five percent annually. Interest does not accrue until nine months after graduation, termination of studies, or enrollment for less than half time.

**Nursing Student Loan Program.** This program is available to undergraduate students enrolled in the College of Nursing.

Long-term, low-interest loans become due and payable nine months after graduation or termination of nursing studies. The loans are designed to help financially needy students attain careers in nursing.

**Health Professions Student Loan Program.** This loan program is restricted to undergraduate students with financial need majoring in pharmacy.

**Federal Work-Study Program.** This federally supported program provides undergraduates with part-time employment during the school term and full-time employment during vacation periods. The jobs may be either with University departments, or with off-campus, nonprofit, nonsectarian, and nonpolitical agencies. Other institutionally funded employment is also available.

**The William D. Ford Federal Direct Loan Program.** All students who complete the FAFSA can participate in the William D. Ford Direct Loan program. Those students who meet the financial need criteria may receive in whole or in part a subsidized loan where the federal government pays all interest until six months after graduation, withdrawal, or a drop in enrollment status to less than half time. Unsubsidized loans are available for those students who do not qualify for the need-based subsidized William D. Ford Federal Direct Loan. Those eligible to borrow under the unsubsidized William D. Ford Federal Direct Loan Program include independent undergraduate students, graduate and professional students, and certain dependent undergraduate students. The same terms and conditions as for subsidized William D. Ford loans apply, except that the borrower is responsible for the interest that accrues while the student is still in school.

**The William D. Ford Federal Direct Loan Program for Parents.** Parents who have good credit may borrow up to the cost of education minus estimated and actual financial aid by submitting an application to Enrollment Services. If the loan is approved, it will be disbursed in multiple installments, usually at the beginning of each semester.

#### UNIVERSITY AID AVAILABLE

**University Grant.** The University provides grants to over 1,000 undergraduate students. To be awarded a University Grant, the student must demonstrate financial need and a satisfactory academic record.

**Arthur L. Hardge Memorial Grant.** This grant is awarded to economically and socially disadvantaged undergraduate residents of Rhode Island who participate in Special Programs for Talent Development.

**University Scholarships.** Scholarship awards require not only financial need but evidence of high academic potential. Some scholarships have specific restrictions, such as place of residence, major, and class year. See <http://web.uri.edu/catalog/files/URI-Privately-Funded-Scholarships-7-30-14.pdf> for a list of available scholarships.

**Athletic Grants.** These grants are made on the recommendation of the Athletics Department to athletes who meet established qualifications. These awards are based on athletic ability rather than on need. Students interested in such assistance should contact the department.

**Regular Student Employment.** Positions funded by the University are available to more than 1,500 undergraduate

and graduate students. Job postings are available at [uri.edu/es/students/finance/employment](http://uri.edu/es/students/finance/employment).

**University Loans.** Emergency loans are available to full-time undergraduate and graduate students. These loans are short-term in nature (14-90 days), and can be made only when there is a means of repayment. Application forms are available in Enrollment Services.

#### STATE AND OTHER SOURCES OF AID

Undergraduate residents of Rhode Island are encouraged to apply for state scholarships or grants. While both are based on need, the scholarships also require a strong academic record in high school. The Rhode Island State Scholarship and Grant Program is administered by the Rhode Island Higher Education Assistance Authority. Other states offer similar programs; for more information, contact your state's scholarship agency.

There are many additional sources of financial aid available to students who qualify: scholarships from private organizations, clubs, labor unions, fraternities, sororities, and businesses. Students should apply directly to the source if they believe they qualify.

#### SATISFACTORY ACADEMIC PROGRESS (SAP)

**For the most up-to-date version of this policy on Satisfactory Academic Progress ("SAP"), visit [uri.edu/es/students/finance/standards.html](http://uri.edu/es/students/finance/standards.html).**

#### FOR STUDENTS RECEIVING FEDERAL FINANCIAL AID

Federal regulations require all institutions that administer Title IV student assistance programs to monitor the academic progress towards a degree or certificate of students applying for funds. All University of Rhode Island students who have completed a Free Application for Federal Student Aid (FAFSA) and wish to be considered for Title IV federal aid as well as selected other types of assistance must meet the criteria stated in the policy. Programs governed by these regulations include:

- Federal Pell Grant
- Federal Work Study
- Federal Supplemental Educational Opportunity Grant
- Federal Perkins Loan
- Health Professions Loan
- Nursing Student Loan
- The William D. Ford Federal Direct Subsidized Loan
- The William D. Ford Federal Direct Unsubsidized Loan
- The William D. Ford Federal Direct Parent Loan for Undergraduate Students (PLUS)
- Most private loans
- University of Rhode Island grant and scholarship programs (including Centennial and Talent Development programs)
- R.I. State Scholarship programs (including Academic Promise and College Crusade)

#### ELIGIBILITY

Your financial aid eligibility is based on satisfactory academic progress (SAP) standards that the University of Rhode Island's

office of Enrollment Services is required by the U.S. Department of Education to establish, publish, and apply. The office of Enrollment Services measures your academic performance and enforces SAP standards to ensure that you, as a financial aid recipient, progress toward graduation. If you fail to meet these standards, you become ineligible to receive financial aid until you comply with all requirements.

Financial aid recipients will be reviewed for satisfactory progress at the end of the spring semester after grades are posted. A student who does not meet the satisfactory academic progress standards will be terminated from financial aid assistance. An aid-terminated student is ineligible for any further financial aid, including student loans, until satisfactory academic progress is re-established. Readmission to a program or removal from academic probation does not automatically constitute eligibility for federal aid.

#### SAP STANDARDS—UNDERGRADUATE STUDENTS

In addition to maintaining good standing within your college, your academic performance must meet two main SAP components:

**Qualitative Standard**—This component is represented by your cumulative grade point average. Your cumulative GPA must be a minimum of 2.00 after successfully completing 60 credits or your fourth term of enrollment, whichever comes first.

**Quantitative Standard**—The quantitative component requires you to complete your degree within a maximum timeframe. The ratio between attempted and completed credits determines your credit completion ratio. You are eligible to receive financial aid for a maximum timeframe of 150 percent of the published degree credits required to complete your program. For example, if your undergraduate degree program requires 120 degree credits, you are eligible for financial aid up to 180 attempted credits (program restrictions apply). Each year, your cumulative credit completion ratio is calculated to ensure that you have earned at least 67% of the credits you attempted to maintain your aid eligibility.

A grade of I or NW is not acceptable. Students who fail to complete at least 67% of attempted credit hours because of (I) incomplete or NW grades, or who withdraw from all classes after receiving financial aid, will have their financial aid terminated.

**Transfer Credits**—These credits are counted in the total attempted and earned credits.

**Withdrawals**—All credit for which a student is registered beyond the drop period will be included in the measurement.

**Repeated Course**—If you repeat a course, credits for each time you register will be added to the attempted/earned credit totals. However, only the most recent grade received will be used in the calculation of your cumulative GPA.

**Appeal Process**—A student who is declared ineligible to receive aid for not maintaining SAP may appeal the decision to the SAP committee within 15 days of receipt of the notification. If there are mitigating circumstances that resulted in the student's inability to make SAP, the student should write a letter of appeal documenting the circumstances and submit the letter to the Satisfactory Progress Appeals Committee, c/o Enrollment Services, 6 Rhody Ram Way, Kingston, RI 02881.

Before an appeal will be considered, the student must have an active FAFSA on file for the semester for which they are requesting financial aid, and not be dismissed from the University. If you will need more than one term to comply with the SAP policy (a minimum cumulative GPA of 2.0 and be completing at least 67% of cumulative credit hours attempted), you must provide a detailed academic plan approved by your advisor. The academic plan must establish criteria for success on a term by term basis in order to show that you are progressing toward degree completion and satisfaction of the SAP policy. Per Federal regulations, if your appeal is approved, you are allowed to receive financial aid for one semester only. If you meet the conditions set forth in your approval letter, you may continue to receive aid for subsequent semesters.

If your appeal is denied through this process, you will be notified in writing and will not receive financial assistance for the next period of enrollment. You may regain your financial aid eligibility by enrolling in and completing enough credits to meet the qualitative and the quantitative standards described in the policy. The decision of the SAP committee is final.

## SAP Standards—Graduate Students

In addition to maintaining good standing within your college, your academic performance must meet two main SAP components:

**Qualitative standard**—As a graduate student, you must maintain a minimum cumulative GPA of 2.00 for the entire enrollment period.

**Quantitative standard**—The quantitative component requires you to complete your degree within a maximum timeframe.

As a Ph.D. candidate, you must complete your degree within seven calendar years of being admitted to your doctorate program (program restrictions apply). Your progress within this maximum timeframe will be reviewed annually at the end of each spring semester. At this time, your cumulative credit completion ratio is determined to ensure that you have completed at least 67% of all credits attempted to maintain your financial aid eligibility. If you are unable to complete your degree within this timeframe, you may appeal for an exemption.

As a graduate student pursuing a Masters degree, you are eligible to receive financial aid for a maximum timeframe of 5 years after the date you are first enrolled as a graduate student at the University. Your progress within this maximum timeframe will be reviewed annually at the end of each spring semester. At this time, your cumulative credit completion ratio is determined to ensure that you have completed at least 67% of all credits attempted to maintain your financial aid eligibility. If you are unable to complete your degree within this timeframe, you may appeal for an exemption. A grade of I (Incomplete) or NW is not acceptable. Students who fail to complete at least 67% of attempted credit hours because of (I) Incomplete or NW grades, or who withdraw from all classes after receiving financial aid, will have their financial aid terminated.

Master's and doctoral students who have completed all

course requirements including thesis research shall be considered to be making satisfactory progress at least at the half-time rate if they are registered for at least one thesis credit and have written permission from the Dean of the Graduate School.

**Appeal Process**—A student who is declared ineligible to receive aid for not maintaining SAP may appeal the decision to the SAP committee within 15 days of receipt of the notification. If there are mitigating circumstances that resulted in the student's inability to make SAP, the student should write a letter of appeal documenting the circumstances and submit the letter to the Satisfactory Progress Appeals Committee, c/o Enrollment Services, 6 Rhody Ram Way, Kingston, RI 02881. Before an appeal will be considered, the student must have an active FAFSA on file for the semester for which they are requesting financial aid, and not be dismissed from the University. **If you will need more than one term to comply with the SAP policy (a minimum cumulative GPA of 2.0 and be completing at least 67% of cumulative credit hours attempted), you must provide a detailed academic plan approved by your advisor. The academic plan must establish criteria for success on a term by term basis in order to show that you are progressing toward degree completion and satisfaction of the SAP policy.** Per Federal regulations, if your appeal is approved, you are allowed to receive financial aid for one semester only. If you meet the conditions set forth in your approval letter, you may continue to receive aid for subsequent semesters. If your appeal is denied through this process, you will be notified in writing and will not receive financial assistance for the next period of enrollment. You may regain your financial aid eligibility by enrolling in and completing enough credits to meet the qualitative and the quantitative standards described in the policy. **The decision of the SAP committee is final.**

## GRADUATE FELLOWSHIPS, ASSISTANTSHIPS, AND SCHOLARSHIPS

Detailed information (stipends, allowances, tenure, etc.) on graduate fellowships, assistantships, and scholarships is available from the Graduate School Office and online at [uri.edu/gsadmis](http://uri.edu/gsadmis). Fellowships and scholarships are awarded by the Graduate School to students selected from nominations submitted by department chairpersons. Students are advised to request nomination for these awards by the chairperson of the department in which they plan to study or in which they are currently enrolled.

Graduate assistants are expected to register for a minimum of six and a maximum of 12 credits per semester. Students who hold scholarships, fellowships, or assistantships are not eligible for additional employment unless written permission is received from the Graduate School.

Graduate students have access to a national computerized database of fellowships and other financial assistance opportunities available to students pursuing advanced degrees, completing dissertation research, or seeking postdoctoral positions.

**Fellowships.** Fellowships are awarded to graduate students in recognition of their achievement and promise as scholars. They are intended to enable students to pursue graduate studies and research without rendering any service to the University.

URI Diversity Graduate Fellowships are awarded by the Graduate School to students from minority and underrepresented groups. URI Foundation Minority Fellowships are also available to students from minority and underrepresented groups, with nominations usually made by departments to the Graduate School.

Special Fellowships are supported by various industrial firms, private foundations, and individuals, and are usually restricted to students in particular areas of study and research. The stipends and supplemental allowances of these fellowships are not uniform.

URI Fellows receive a stipend for the academic year and have tuition, health insurance, and the registration fee paid from University funds. URI Fellows are responsible for the remaining fees. Those wishing to be considered for fellowships must have their application file completed no later than February 1.

**Graduate Teaching Assistantships and Research**

**Assistantships.** Assistantships are awarded to full-time graduate students to provide them with teaching and research training. Assistants may be required to provide service for up to 20 hours per week. Appointments are initiated by department chairpersons. To be eligible for such appointments, students must first be admitted as degree candidates. Applications for assistantships should be completed by February 1. Appointments are announced in early April.

Departmental Teaching Assistants assist, under supervision, with department instructional and/or research activities. No more than ten hours per week will be in classroom contact.

Research Assistants are assigned to individual research projects sponsored either by the University or an outside agency. On supported research contracts and grants, the graduate research assistants are expected to devote 20 hours per week to research activities.

Teaching and research assistants receive a stipend for the academic year. In addition, tuition (12 credits maximum), 20% of the required standard fees, and health insurance are paid from University funds for each semester of the academic year of the appointment. The student is responsible for the remaining fees. Additional remuneration is given for appointments during the summer, although this cannot be guaranteed. Stipends and tuition remissions for students appointed to partial assistantships will be prorated for the period of the appointment. The student will be responsible for the remainder of the full-time tuition and fees. The same policy applies to assistantships terminated during the academic year.

Tuition Scholarships. These scholarships cover tuition and registration fee and are awarded by the Graduate School from University funds. These scholarships are awarded to qualified students demonstrating financial need. Nominations for these scholarships are made by individual departments.

**Tuition and Fees**

<b>Matriculated Full-Time Students</b>		
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Tuition Per Year		
Undergraduate (ASFCCE and Kingston)		
Rhode Island residents	\$10,878	
Out-of-state residents	26,444	
Regional students		
admitted prior to fall 2006	16,318	
admitted fall 2006 or later	19,038	
Graduate (ASFCCE and Kingston)		
Rhode Island residents	\$11,532	
Out-of-state residents	23,606	
Regional students	17,298	
<b>Mandatory Fees Per Year</b>		
(1) Full-time undergraduate students enrolled in seven or more Kingston-sponsored credits, graduate students enrolled in five or more Kingston-sponsored credits, and graduate teaching and research assistants:		
Undergraduate		
Registration Fee	\$60	
Student Health Services Fee	496	
Student Services Fee	990	
Technology Fee	82	
Accident/Sickness Insurance	1,873	
(may be waived with proof of comparable coverage)		
<b>TOTAL</b>	<b>\$3,501</b>	
<b>Graduate</b>		
Registration Fee	\$60	
Student Health Services Fee	496	
Student Services Fee	804	
Technology Fee	82	
Accident/Sickness Insurance	1,873	
(may be waived with proof of comparable coverage)		
<b>TOTAL</b>	<b>\$3,315</b>	
(2) Full-time undergraduate students enrolled in less than seven Kingston-sponsored credits and graduate students enrolled in less than five Kingston-sponsored credits, who are not teaching or research assistants:		
<b>Undergraduates and Graduates</b>		
Registration Fee	\$60	
ASFCCE Activity Fee	40	
Technology Fee	82	
<b>TOTAL</b>	<b>\$182</b>	
<b>Matriculated Part-Time Students</b>		
Tuition Per Credit		

<b>Undergraduate (ASFCCE and Kingston)</b>		
Rhode Island residents	\$453	
Out-of-state residents	1,102	
Regional students		
admitted prior to fall 2006	680	
admitted fall 2006 or later	793	
<b>Graduate (ASFCCE and Kingston)</b>		
Rhode Island residents	\$641	
Out-of-state residents	1,311	
Regional students	962	

<b>Mandatory Fees Per Semester</b>	
(1) Part-time undergraduate and graduate students enrolled in only Kingston-sponsored courses:	
Registration Fee	\$30
Activity Fee	28
(undergraduate students only)	
Graduate Tax	5
(graduate students only)	
Student Services Fee	
Undergraduate	\$36 per credit
Graduate	\$36 per credit
Technology Fee	\$3 per credit
(undergraduate and graduate)	
(2) Part-time undergraduate and graduate students enrolled in only ASFCCE-sponsored courses:	
ASFCCE Activity Fee	\$20
Registration Fee	30
Technology Fee	\$3 per credit
(3) Part-time undergraduate and graduate students enrolled in ASFCCE and Kingston-sponsored courses:	
ASFCCE Activity Fee	\$20
Registration Fee	30
Activity Fee	28
(undergraduate students only)	
Graduate Tax	5
(graduate students only)	
Student Services Fee	
(Kingston-sponsored courses only)	
Undergraduate	\$36 per credit
Graduate	\$36 per credit
Technology Fee	\$3 per credit
(undergraduate and graduate)	

<b>Nonmatriculated Students</b>		
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Tuition Per Credit	Resident	Non-Resident
001-499 Level Courses	\$453	\$1,102
500 Level and Above Courses	641	1,311
<b>Mandatory Fees Per Semester</b>		
Registration Fee	\$30	
Activity Tax	15	
Technology Fee	\$3 per credit	
Student Services Fee		
(Kingston-sponsored courses only)		
Undergraduate	\$36 per credit	
Graduate	\$36 per credit	

**MANDATORY FEES**

**Student Services Fee.** This fee is mandatory for all full-time students enrolled at the Kingston campus, both undergraduate and graduate. The student services fee covers the cost of the Memorial Union, transportation, Fitness and Wellness Center, and capital projects. The undergraduate fee supports funds that are distributed to the Student Senate for a wide variety of student programs and activities. The fee paid by full-time graduate students supports the above and, instead of the undergraduate Student Senate, the Graduate Student Association.

**Health Services Fee.** The health fee is mandatory for all full-time Kingston undergraduate and graduate students, and optional for matriculating students at the Alan Shawn Feinstein College of Continuing Education. All international students are assessed this fee regardless of enrollment location or credit load. Part-time, matriculating students who choose to receive their health care at URI Health Services can be assessed this fee upon request, as well as the student accident/sickness insurance fee (which may be waived with proof of comparable coverage). The health fee covers the cost of the following:

- routine office visits with URI staff providers (the full cost of visits if insurance doesn't cover the cost and/or co-pay expenses in situations where insurance covers a portion),
- ambulance/emergency transport services (by URI EMS),
- pharmacy (most over-the-counter medicines, small co-pay for prescriptions for acute care, medications for chronic conditions at 50 percent of cost), • administrative services provided at Health Services, and
- health education.

**Accident/Sickness Insurance.** It is URI policy that full-time Kingston students as well as all international students and their dependents have current health insurance to provide coverage for unexpected, extended, and expensive care resulting from accidents and illnesses that are not covered by the Student Health Services fee. All full-time Kingston students and all international students and their dependents are required to purchase school health insurance unless evidence of comparable coverage in another plan is provided to

the University through a completed waiver form. Waivers are done on line at [uri.edu/health](http://uri.edu/health). Questions should be referred to the Health Services Insurance Office at 401.874.4755.

To waive the Accident/Sickness Insurance, a student must complete and electronically submit the waiver to Health Services each year, prior to the published deadline. Unless the waiver is received and accepted, the student is responsible for the billed amount. The Accident/Sickness Insurance is optional for non-international part-time matriculating students and ASFCCE matriculating students. Students who elect insurance coverage through the University are also required to pay the Health Services fee each semester that they are registered students, regardless of the number of credits they are carrying.

**Technology Fee.** This fee is mandatory for all students taking courses at URI, at all campuses, including students taking courses online. The technology fee covers the cost of various University technology expenses.

## Additional Fees

**Books and Supplies.** All students—both undergraduate and graduate—should expect extra expenses each academic year for books and supplies and should allow for additional expenditures for travel and personal needs.

**Credit Overload.** A credit overload fee will be charged to all matriculated undergraduate students who register and/or enroll in excess of 19 credits. This fee is equivalent to the per-credit rate given for part-time undergraduate students. Matriculated graduate students who register and/or enroll in excess of 15 credits will be billed at the per-credit rate given for graduate students. Students with combined enrollment at both the Kingston and ASFCCE campuses will also be assessed the credit overload fee if enrollment exceeds the credit limits stated above.

**Enrollment Deposit.** An enrollment deposit of \$300 is required from all Kingston undergraduate students accepted and is applied to the first-term bill. The fall term enrollment deposit is 100 percent refundable through May 1, provided that the student sends written notification of intent to withdraw (mail to URI Office of Admission, 6 Rhody Ram Way, Kingston RI 02881). After May 1, the fall term enrollment deposit is not refundable. The spring term enrollment deposit is not refundable.

**Off-Campus Study.** Undergraduate students taking courses at another institution for credit at URI pay a fee of \$483 per semester. (See "Off-Campus Study.")

**Graduate Continuous Registration.** Graduate students maintaining continuous enrollment and registered for no credit (CRG 999) are required to pay a fee of \$671 per semester.

**Transcripts.** A transcript service fee of \$45 is assessed to all students in their first semester of enrollment at the University.

**Courses.** A course fee may be charged for certain undergraduate and graduate courses. Tier I fees are \$25, Tier II fees are \$55, and Tier III fees are \$75 (per course).

Undergraduate engineering students pay a program fee of \$451 per semester if attending full-time, or \$38 per credit if attending part-time. Undergraduate nursing students pay a program fee of \$750 if attending full-time, or \$63 per credit if

attending part-time, commencing in their second year. Undergraduate pharmaceutical sciences students pay a program fee of \$1,375 per semester commencing in their third year. Pharm.D. students pay a program fee of \$3,250 per semester commencing in their third year. Graduate physical therapy students pay a program fee of \$1,800 per semester.

Expenses connected with class trips and practice teaching are charged to the students concerned.

Students taking applied music courses are charged an additional fee of \$350 for a one-credit course (half hour of a private lesson per week) and \$700 for courses offering two, three, four, or six credits (one hour of a private lesson per week). Applied music courses for which students are charged an additional fee are MUS 110, 210, 310, 410, and 510.

Beginning in the sophomore year, student nurses must purchase authorized uniforms and nursing equipment. The approximate cost is \$300.

**Graduation.** All newly matriculated students will be charged a one-time fee of \$110 for graduation documents. In addition, master's degree candidates must pay a thesis-binding fee of \$18, and doctoral candidates must pay dissertation-binding and microfilming fees of \$88. These fees are due before candidates submit their theses or dissertations for approval by the Graduate School.

## Late and Special Fees

**Late Registration.** A late registration fee of \$75 is charged to students whose registration is not completed before the first Monday following the first day of classes.

**Late Payment.** Unpaid balances following the term bill due date are subject to late payment/billing penalties which are based upon the outstanding amount due. The penalty is also applied to students who register late effective as of the end of the add period (first two weeks of classes) until date of registration and payment. The late payment fee is not cancelled nor reduced without presentation of written evidence of University error signed by an official of the University. Late payment fees are: \$10 per month if the balance is over \$50 and under \$400;

\$15 per month if the balance is between \$400 and \$999.99; \$25 per month if the balance is \$1,000 or more.

**Returned Payments.** A \$20 returned payment fee is assessed with each check or electronic payment that is unsuccessfully transacted and returned by the bank.

**University Monthly Payment Plan.** The University offers a monthly payment plan to assist students and parents in meeting term bill obligations. A nonrefundable application fee is assessed upon enrollment. Please visit the Enrollment Services website at [uri.edu/es](http://uri.edu/es) to review the current monthly payment plan application fees.

**Partial Payment.** A \$30 fee is assessed when partial payments are received following the term bill due date.

**Collection Agencies.** Term bills that are not fully paid by the end of the semester are subject to collection activity by outside agencies.

**Reassessment of Fees Policy.** Fees are reassessed and adjust-

ed according to credit enrollment, student status, residency, course level, and course sponsorship. This results from drop/add transactions and status changes processed during the add period. The dropping of credits after the add period will not reduce term bills. Students anticipating fee adjustments must complete all drop/add transactions by the reassessment deadline. This policy pertains but is not limited to downward billing adjustments, including the dropping of credit overload courses; a change in student status from full-time to part-time; a reduction in part-time courseload; and/or the assessment of program fees and course fees, if charged.

## Tuition Waivers

The University of Rhode Island accepts tuition waivers from senior citizens, unemployed individuals, and disabled veterans; prerequisites are described below. Matriculated students who qualify for waivers must apply for financial aid, and any aid received (except loans) must be applied toward the amount waived. All other costs of attendance are to be paid by the individual student.

**For Senior Citizens.** Any Rhode Island resident senior citizen who submits evidence of being 60 years of age or over and of having a household income of less than three times the federal poverty level will be allowed to take courses at any public institution of higher education in Rhode Island with the tuition waived.

**For the Unemployed.** Any individual who submits evidence of currently receiving unemployment benefits from the state of Rhode Island, of having a household income of less than three times the federal poverty level, and of not being claimed as a dependent by a parent (or someone else), will be allowed to pursue course work at any public institution of higher education in Rhode Island with the tuition and registration fee waived; this waiver also applies to any Rhode Island resident who submits evidence of residency and of currently receiving unemployment benefits from another state. To be eligible for the waiver, the student must have been collecting benefits within 60 days before the first day of classes.

**For Disabled Veterans.** Any Rhode Island resident who submits evidence from the Department of Veteran Affairs of having a service-related disability of at least 10 percent will be allowed to take courses at any public institution of higher education in Rhode Island with the tuition waived.

## Housing and Dining Options and Fees

A comprehensive description of the University's undergraduate on-campus residence halls, suites, and apartments, and all associated housing fees, is available at [housing.uri.edu](http://housing.uri.edu). To speak to a representative about on-campus housing for undergraduate students, please call 401.874.4151. Please note that residents of the University's residence halls and suites are required to purchase a Resident Meal Plan. For more information on resident meal plan options and fees, please visit [uri.edu/dining](http://uri.edu/dining). To speak to a representative about the University's dining plans, please call 401.874.2055.

**Housing and Dining Contract.** The University's Housing and Dining Contract is an annual and binding contract that is in effect for the entire academic year. Please note that a non-refundable housing fee is required at the time of application to

reserve a room. The housing deposit for all eligible students, including freshmen, is \$200. This housing application fee will be applied toward the resident's annual housing fee. Housing and dining fees for residents of the University's residence halls, suites, and apartments will appear on each resident's term bill; payment is due upon receipt of this bill. Students are encouraged to make their housing deposits online via e-campus. Checks made payable to the University of Rhode Island can also be accepted by the Office of Enrollment Services.

Residents who elect to vacate the University's residence halls, suites, or apartments before the end of the contract period, for any reason other than dismissal from the University, may be subject to a contract cancellation fee for both the housing and dining portions of their contract. In addition, they will be billed for their actual use of the housing facilities as well as their dining plan, in accordance with the respective housing and dining refund policies.

URI is a nonsectarian institution, and resources are not available to construct special diet kitchens for religious, health, or personal reasons. A nutritionist reviews extreme medical conditions. Some medical conditions may be accommodated. Residents requesting a medical variance from the meal plan requirement must submit for approval a Medical Variance Report, completed by a physician, to URI Dining Services. To obtain this application form, contact the Campus Access Office at 401.874.2055. The University housing and dining systems operate on a computerized entry system using URI student ID cards and hand geometry readers. The student ID must be presented at all resident dining facilities.

## Telecommunications Fee

There is a \$256 telecommunications fee assessed to each resident of the University's residence halls, suites, or apartments.

## University Refund Policies

Refunds of payments made or reductions in amounts due to the University shall be made to students who officially withdraw or take a leave of absence according to the following scale: during the first two weeks, 80 percent; during the third week, 60 percent; during the fourth week, 40 percent; during the fifth week, 20 percent; after five weeks, none.

Students receiving Federal Title IV funds, i.e., Federal Pell grants, Direct Stafford Loans, Perkins loans, Federal PLUS loans, Federal Supplemental Educational Opportunity grants, or other Title IV assistance programs are subject to the federal return of funds regulation. The regulation states that Federal Title IV funds must be returned according to a pro-rata formula based upon the amount of time spent in school up to the 60th percentile of attendance. Thereafter, federal disbursements are not adjusted. For example:

Assume that a student withdraws during the third week of school after attending 20 days and the term bill has been paid entirely by a Direct Stafford loan. If the semester consists of 100 days, 80 percent of the loan must be returned to the loan fund since the student only attended 20 percent of the semester. However, the student's bill is reduced by only 60 percent per the University's refund policy as stated above. The student will be responsible for the difference.

Personal payments and outside scholarships and loans are not considered for refund until the term bill balance is fully paid.

Students who take a leave of absence are subject to the same federal return of Title IV funds policy as are students withdrawing from the University.

**Attendance Period.** For refund purposes under both policies, the attendance period begins on the first day of classes and ends on the official date of withdrawal or leave of absence. If an official date is not known, the last known date of attendance is used. Students who withdraw or take a leave of absence during the add period (the first two weeks of classes) are assessed tuition and fees based upon the highest number of credits for which they are registered during this period.

The Accident/Sickness Insurance fee is not refundable unless the fee is waived, regardless of the date of withdrawal, since the student is covered for the entire academic year. The fee is cancelled, however, if the student withdraws prior to the first day of classes.

**Indebtedness to the University.** Failure to make full payment of all required fees or to resolve other debts to the University (for example, unreturned athletic equipment, overdue short-term or emergency loans, lost library books, debts to the Department of Housing and Residential Life for damages, and obligations required by the University Student Discipline System) may result in denial of registration for the following semester and/or disenrollment. Appropriate departments will provide the student with notice of the debt, reason for it, and a review, if requested. Students must fulfill all financial obligations to the University before receiving transcripts or a diploma.

## Registration Policies

All students must register for courses through Enrollment Services via URI's online e-Campus system in order to be properly enrolled.

Matriculated (official degree-seeking) students generally register in April and October for the following semester. However, freshmen and transfer students entering in the fall semester may register at specified dates during the summer as part of summer orientation.

Students are expected to register for courses before classes begin. Those who are unable to do so may enroll as late registrants via the e-Campus system or at Enrollment Services during the first two weeks of classes. A late registration fee shall be charged to students whose registration is not completed before the first Monday following the first day of classes (see "**Late Fees**"). Additional information is available from Enrollment Services.

**Nonmatriculating Students.** The Non-Degree Student Application Form is available on the web at [uri.edu/es/forms/pdf/reg/Non-Degree\\_Application\\_Form.pdf](http://uri.edu/es/forms/pdf/reg/Non-Degree_Application_Form.pdf); or contact Enrollment Services for registration instructions. Registration for nonmatriculating students begins after matriculated students have registered.

**Course Schedule.** The Course Schedule is available on e-Campus in April and October for the fall and spring semesters. The University reserves the right to cancel courses offered in the Course Schedule.

**Payment of Fees.** Arrangements must be made with Enrollment Services for complete and timely payment of tuition and/or fees. If during the semester it becomes apparent that a student has not met his or her financial responsibilities to the University, sanctions will be imposed. Sanctioned students may not be allowed to receive transcripts or register for future semesters.

**Drop and Add.** Students are permitted to continue to add courses through the first two weeks of classes only. Courses offered by the Alan Shawn Feinstein College of Continuing Education may be added by the prescribed deadline.

A student may drop a course after the end of the drop period only in exceptional circumstances and with authorization of the academic dean of his or her college. In addition, a course may be dropped by official procedures determined by the Office of Enrollment Services (e-Campus) on or before the end of the third week of classes (Drop Period) with no mark on a student's transcript. Courses may be dropped through e-Campus between the fourth and the end of the sixth week of classes (Withdrawal Period) and will be recognized on a student's transcript with a "W." After the end of the sixth week (Late Withdrawal Period), a student may drop a course only in exceptional circumstances and only with authorization of the dean of the college in which the student is enrolled. Such drops will also be recognized on a student's transcript with a "W." If the student has not dropped a course by the end of the withdrawal period the instructor must submit a grade. However, courses dropped after the end of the second week of classes will not affect the fees that have been assessed (see "**Late and Special Fees**").

**Auditing.** When you audit, you have permission to attend a course without taking it for credit. (Auditing is not permitted in noncredit courses.) You may be admitted to a class on a space-available basis with the instructor's consent as indicated by his or her signature on an audit authorization form, which must be filed in Enrollment Services before the end of the add period. The instructor will determine the extent to which you may participate in class activities. Your name will not appear on official class rosters, and the course will not be noted on your grade report or permanent academic record. Note: You must be enrolled in at least one other course to be permitted to audit a course without additional fees.

**Off-Campus Study.** A full-time student who wishes to study at another college and use that course work to satisfy graduation requirements at URI may register for off-campus study (OCS undergraduate students and OCSG graduate students). The student must obtain signed approval for the off-campus courses from the dean of his or her college. Off-campus study includes summer sessions, one or two semesters at another American university, or study abroad. A student may not ordinarily study off campus during senior year. Students who wish to maintain registration eligibility while studying off campus must register for off-campus study for each semester of absence from URI, or take an official leave of absence for that period.

**Veterans Benefits.** Full information describing these can be obtained from your base education officer or the VA Regional Office, 380 Westminster Street, Providence, RI 02903; in the U.S., call 800.827.1000.

Veterans enrolled in Kingston who are eligible to receive VA educational benefits must notify Enrollment Services in person. In order to satisfy VA regulations, students who receive VA



educational benefits must report all changes in academic status to the veterans' registration clerk in Enrollment Services.

Recipients of VA educational benefits are governed by the same University policies as are all other students.

**Transcripts.** Students can obtain a copy of their transcripts via the e-Campus system or by submitting a written request to Enrollment Services. Transcripts will not be issued to students who have unpaid financial obligations to the University.

**Change of Address.** It is the responsibility of the student to report changes of local or home address to Enrollment Services. Students may update their address information through the e-Campus system.

**Required Identification.** In order to obtain a University ID card and be certified for employment, students must possess a photo identification card, such as a driver's license, and a certified copy of their birth certificate. A valid passport serves both purposes.

**Readmission.** Students formerly enrolled at the University and seeking re-entry may obtain applications for readmission at the Office of Enrollment Services: [uri.edu/es/menus/onlineform](http://uri.edu/es/menus/onlineform). All applications for readmission must be submitted to Enrollment Services no later than August 15 for the fall semester, and December 31 for the spring semester.

**Email.** The University of Rhode Island has established email as one of the official means of communication with faculty, staff, and students on important academic and administrative matters. To ensure that each member of the University has access to this important form of communication and that students can be reached through a standardized channel when needed, faculty and staff are asked to activate an email account (address) on the University's [my.uri.edu](http://my.uri.edu) server. Students are required to do so. All official University communications will be sent to this official University email address.

#### **CONFIDENTIALITY OF RECORDS.**

Procedures for the release and disclosure of student records maintained by the University are in large measure governed by state and federal laws. For details of URI's policies, see [uri.edu/es/acadinfo/acadyear/confidentiality](http://uri.edu/es/acadinfo/acadyear/confidentiality).

## Health Questionnaire

After students pay their enrollment desposit to the Univer-

sity, Health Services sends a new student packet including information about a secure website for an "online student health" module. The module is available once the student has registered for classes. Each student is asked to promptly complete and enter a health questionnaire which provides basic background information for the URI Electronic Health Record prior to arrival on campus. Each entering student must also provide an immunization record signed by a licensed health care provider giving the dates of immunizations to protect against rubella (German measles), rubeola (measles), and mumps (MMR), hepatitis B, and varicella (chicken pox), in addition to a tetanus-diphtheria (Td) booster within ten years (per Section 23-1-18(9) of the general laws of Rhode Island). This immunization record is included in the mailing to new students, or can be downloaded from [health.uri.edu](http://health.uri.edu) under "new student packet." Students failing to comply with this requirement will face sanctions and will be unable to register for classes.

## Undergraduate Programs

The University aims to provide students with a range of knowledge and skills which can, with appropriate motivation and initiative, be used in a variety of ways after graduation.

The undergraduate programs offered at the University of Rhode Island are presented by college.

Study options vary from the traditional liberal education to programs that are heavily vocationally oriented. Successful completion of any course of study at the University, however, does not guarantee that the student will find either a specific kind or level of employment.

Students interested in the career opportunities related to particular programs of study are encouraged to consult University College for Academic Success advisors, the appropriate department chairperson, or the Center for Career and Experiential Education.

## Overall Requirements

### Introduction

This section deals with academic requirements, opportunities, and policies for undergraduates that are University-wide rather than college-related.

Consistent with its policy of allowing the greatest latitude possible in course selection, the University offers a wide choice to fill its general education requirements and encourages students to select free electives that cross departmental and college lines.

NOTE: The University administration may alter, abridge, or eliminate courses and programs of study. While every effort is made to keep this catalog current, not all courses and programs of study listed may be available at the time of student matriculation. Similarly, course and program requirements may be changed from time to time. In all cases, every effort will be made to accommodate individual students whose exceptional circumstances may make it difficult or impossible to meet the changed requirements. Changes in the academic calendar may also be made when deemed in the best interests of the University.

### General Education Learning Outcome Objectives

In academic and non-academic settings, with respect to fine arts and literature, humanities and letters, the natural sciences, and the social sciences, students will be able to ...

- **identify** basic concepts, theories, and developments;
- **recognize** issues, as well as aesthetic and literary elements and forms;
- **ask** questions appropriate to the modes of inquiry;
- **collect** information relevant to the questions raised; and
- **analyze** the information in order to address the questions or solve problems.

For individual academic program student learning outcomes, go to the program website or visit: [uri.edu/assessment](http://uri.edu/assessment).

### General Education Requirements

The University believes that all undergraduate students, regardless of their degree programs, need experience in the study of fundamentals that builds on the student's previous education and continues through the undergraduate years and beyond. All bachelor's degree students, with the exception of students enrolled in the College of Engineering, follow the same University-wide general education requirements. While general education requirements for all students are selected from the same list of approved courses, there are possible variations based on the student's major. Students should consult specific college and departmental requirements and discuss the requirements with an advisor. In their first semester, all entering freshmen and new transfer students with fewer than 24 credits are required to take URI 101: A Freshman

Seminar, including community service provided by the Feinstein Enriching America Program (see **Course Descriptions**).

The purpose of general education at the University of Rhode Island is to lay a foundation for the lifelong enrichment of the human experience and for a thoughtful and active engagement with the world. This foundation is built on recognition of the complexity of nature, society, and the individual. The objective of general education is to introduce students to the fundamental dimensions of this complexity and to develop an appreciation of different ways of understanding it and different cultural responses to it.

Corresponding with its goals, the general education program is divided into the following core areas:

**English Communication.** Six credits in English communication, at least three of which must be in a course designed specifically to improve written communication skills.

**Fine Arts and Literature.** Six credits in courses on artistic and literary expression and interpretation.

**Foreign Language/Cross-cultural Competence.** Six credits or the equivalent in course work related to communicating across cultures.

**Letters.** Six credits in courses that address the wisdom and traditions of the past and present in a global setting.

**Mathematical and Quantitative Reasoning.** Three credits in a course on mathematical or quantitative skills and their application.

**Natural Sciences.** Six credits in courses on the interrelationships of the natural world.

**Social Sciences.** Six credits in courses related to the study of human behavior in social, economic, cultural, and political contexts.

Because particular skills are essential to a thoughtful engagement with the world, each general education course incorporates opportunities to practice three (3) or more of the following skills: reading complex texts, writing effectively, speaking effectively, examining human differences, using quantitative data, using qualitative data, using information literacy, and engaging in artistic activity.

In addition, the University has a commitment to providing students with the opportunity to examine diversity within and across national boundaries and requires that at least two of the courses taken as part of a student's general education program must be designated as diversity [D] courses. Only one course in a foreign language may be applied to the diversity requirement. Since these diversity courses may be selected from any of the general education core areas, this requirement does not increase the total number of credits in the general education program.

Specific courses that may be used to meet these requirements are listed below. If a course is countable in more than one core area, a student may count the course in only one core area. For an explanation of course codes, see **How to Read This Catalog**.

**English Communication:** Writing (**ECw**): BIS 100\*; ELS 112, 122; HPR 112, 326; WRT 104, 106, 201, 227, 235, 302, 303, 304 [D], 305 [D], 333; General (**EC**): COM 100 [D], 108, 110 [D]; ECN 108; LIB 120, 220; PHL 101; SUS 108.

**Fine Arts and Literature (A):** AAF 247 [D], 248 [D]; ART 101, 103, 207; ARH 120 [D], 251 [D], 252 [D]; CLA 391 [D], 395 [D], 396 [D], 397 [D]; CLS 160 [D]; ENG 110 [D], 160 [D], 241 [D], 242 [D], 243 [D], 245 [D], 247 [D], 248 [D], 251 [D], 252 [D], 260 [D], 262 [D], 263 [D], 264 [D], 265 [D], 280 [D], 317 [D], 355 [D], 357 [D]; FLM 101 [D], 203 [D], 204 [D], 205 [D]; FRN 309 [D], 310 [D], 320 [D], 392 [D], 393 [D]; GCH 101; GWS 317 [D]; HPR 124, 125, 201A, 202A, 324, 325; LAR 201; MUS 101 [D], 106 [D], 111, 292 [D], 293 [D]; PLS 233, 335 [D]\*; RUS 391 [D], 392 [D]; SPA 305 [D], 306 [D], 307 [D], 308 [D], 320 [D]; THE 100, 181, 351 [D], 352 [D], 381, 382, 383.. Please note: the College of Arts and Sciences requires one course in fine arts and one course in literature. See **Basic Liberal Studies Requirements**.

**Foreign Language/Cross-cultural Competence (FC):** This requirement shall be fulfilled in one of the following ways: 1) demonstration of competence through the intermediate level by a proficiency examination or by successfully completing the 104 level in a living language or the 302 level in a classical language or by completing ARB 100 (6credits) (students who fulfill this requirement through an examination cannot earn course credit for graduation; students who earn less than six credits in fulfilling the requirement should apply credits to the elective or major areas); 2) a two-course sequence in a language previously studied for two or more years in high school through at least the 103 level in a living language or 301 in a classical language appropriate to a student's level of competence (e.g., 102 and 103, 102 and 301; 131 and 103; 103 and 104; 301 and 302); 3) course work in a language not previously studied (or studied for less than two years in high school) through the beginning level. All modern and classical language courses used to fulfill these options carry the [D] designation; 4) study abroad

in an approved academic program for one semester; 5) majoring in a foreign language; 6) two courses in cross-cultural competence selected from the following list: FRN 309 [D], 310 [D], 320 [D], 392 [D], 393 [D]; HIS 132 [D], 171 [D], 172 [D], 178 [D], 180 [D], 311 [D], 327 [D], 374 [D], 375 [D], 379 [D]; HPR 201F, 202F; LET 151L [D], 151Q [D], 151R [D]; NRS 300 [D]; PHL 331 [D]; RLS 131 [D]; SPA 320 [D]; TMD 224 [D]. Six credits of a full-semester approved Intercultural Internship in a foreign country through the Office of Internships and Experiential Education may be substituted for cross-cultural competence courses. Formally registered international students, students with a recognized immigrant status, and students who are naturalized citizens may be exempt from the foreign language or cross-cultural competence requirement at the discretion of the dean of the student's academic college.

**Letters (L):** AAF 150 [D], 201 [D], 355 [D], 356 [D]; APG 327; BIS 392 [D]; CLS 160 [D]; COM 246 [D]; EGR 316 [D]; ENG 110 [D], 160 [D], 243 [D], 251 [D], 252 [D], 280 [D], 317 [D], 355 [D], 356 [D]; GCH 102; FRN 392 [D], and 393 [D]; GWS 220 [D], 315 [D], 317 [D], 320 [D], 325 [D]; HIS 110 [D], HIS 111 [D], 112, 113 [D], 114 [D], 116, 117, 118 [D], 130 [D], 132 [D], 141 [D], 142 [D], 145 [D], 146 [D], 150 [D], 160 [D], 171 [D], 172 [D], 176 [D], 178 [D], 179 [D], 180 [D], 304, 305, 310 [D], 311 [D], 314, 323 [D], 327 [D], 332 [D], 333 [D], 340 [D], 341 [D], 346 [D], 351 [D], 355 [D], 356 [D]; 374 [D], 375 [D], 379 [D]; HPR 107, 201L, 202L, 307; JOR 110 [D]; LAR 202 [D]; LET 151 approved topics [D]; LIB 220; NUR 360 [D]; PHL 101, 103, 204, 210 [D], 212 [D], 215, 217 [D], 235, 314, 316 [D], 321, 322, 323 [D], 325 [D], 328 [D], 331 [D], 346, 355; PSC 341, 342; PSY 310; RLS 111 [D], 125, 126, 131 [D]; THN 360.

**Mathematical and Quantitative Reasoning (MQ):** BUS 111; CSC 101, 201; HPR 108, 201M, 202M; MTH 105, 106, 107, 108, 109, 111, 131, 141, 142, 208; STA 220.

**Natural Sciences (N):** AFS 190, 210, 211; APG 201 [D]; AST 108, 118; AVS 101 [D]; BCH 190; BIO 101, 102, 105, 286 [D]; BIS 391\*; BPS 201, 203; CHM 100, 101, 103, 112; EGR 109, EGR 133; GCH 103; GEO 100, 102, 103, 110, 113, 120; HPR 109, 201N, 202N, 309; MIC 190; NRS 100, 190; NFS 207, 210; NUR 143 [D]; OCG 110, 123, 131, 200; PHP 143 [D]; PHY 109, 111, 112, 185, 186, 203, 204, 205, 273, 274, 275; PLS 150, 190, 233; TMD 113.

**Social Sciences (S):** AFS 132; AVS 132; APG 200 [D], 202, 203 [D], 301 [D]; BIS 390 [D]\*; COM 108; CPL 202 [D]; ECN 100 [D], 108, 201, 202, 306, 381 [D]; EDC 102 [D]; EEC (REN) 105, 310, 356; GCH 104; GEG 101 [D], 104 [D]; 202 [D]; GWS (WMS) 150 [D], 320 [D]; HDF 225; HPR 110 [D], 201S, 202S, 310; HSS 130 [D]; JOR 110 [D]; KIN 123 [D]; LIN 200 [D]; MAF 100, 220 [D]; NUR 114 [D], 143 [D], 150 [D], 160 [D]; PHP 114 [D], 143 [D]; PLS 143 [D]; PSC 113 [D], 116 [D], 201 [D]; PSY 103 [D], 113 [D], 232 [D], 235 [D], 254 [D], 255 [D]; SOC 100 [D], 212 [D], 230 [D], 240 [D], 242 [D]; SUS 108; TMD 224 [D].

All students must meet the curricular requirements of the colleges in which they plan to earn their degrees. Some colleges require that students select specific courses from the lists given for the various general education components. Therefore, students must refer to the requirements specified for their programs.

In the colleges of Arts and Sciences, the Environment and Life Sciences, and Human Science and Services and for the Bachelor of Interdisciplinary Studies, credits within a student's own major may not be counted toward general education requirements in fine arts and literature, letters, natural sciences, or social sciences. In other colleges, credits within a student's professional college may not be counted toward any general education requirements. However, courses that serve as prerequisites for a major can be used to fulfill the general education requirements.

Students in the Honors Program can receive general education credit for honors sections of courses that have been approved for general education credit.

Transfer students can receive general education credit for courses taken at other institutions as long as such credits are in courses equivalent to courses given general education credit at URI.

\*Courses not approved to meet general education requirements for Arts and Sciences students.

## Other Academic Requirements

Certain basic courses are required in many curriculums for transfer from University College for Academic Success into a degree-granting college in the junior year. These are listed in the curriculums of the individual colleges.

The responsibility for meeting all course and credit requirements for the degree rests with each individual student. Students who desire to accelerate their programs and receive credit for courses taken at other institutions must have prior approval from their academic deans. (The Board of Education's policy on articulation and transfer between state institutions of higher education defines exceptions to this regulation. See "Transfer Policies," Appendix F of the University Manual.)

Students desiring to take courses in the University's five- or six-week Summer Session shall be limited to seven credits of course work. The limit may be exceeded only if approved in the case of a matriculating University student by the student's academic dean or the Graduate Dean, if applicable, and in the case of any other student by the dean designated to oversee the Summer Session.

## Capstone Experiences

A capstone experience integrates course work throughout the undergraduate major program. Capstone experiences include courses, internships, portfolios, senior theses, research/design projects, etc. They are scheduled for the senior year. Capstone experiences may be either required or simply recommended. See your program of study for more information.

## Minor Fields of Study

Undergraduate students may declare a "minor" field of study. Requirements for a minor may be satisfied by completing 18 or more credits in: 1) any one of the University-approved minors; 2) a curriculum other than the student's major; or 3) related studies from more than one department under the sponsorship of a qualified faculty member.

To declare a minor, a student must have the approval of the department chairperson of the minor field of study and the dean. Faculty sponsorship is required for the third option listed above. (Non-business students wishing to obtain a departmental minor in the College of Business Administration should expect to take the six courses over a period of two years. Admission is on a space-available basis only, and therefore not guaranteed.)

A minimum grade point average of 2.00 must be earned in the minor courses, and at least 12 of the 18 credits must be at the 200 level or above. At least half of the credits required for the minor must be earned at the University of Rhode Island. General education requirements may be used for the minor, but no course may be used for both the major and minor field of study. Minor courses may not be taken on a pass-fail basis.

Application for the minor must be filed in the academic dean's office no later than the beginning of the student's final semester or term, but may be filed as early as the first semester of the junior year. (Filing for a minor earlier than the junior year is subject to approval by the student's degree-granting college.)

### DEPARTMENTAL MINORS

Descriptions of requirements for approved departmental minors may be found in the departmental sections of this catalog.

### INTERDEPARTMENTAL MINORS

Descriptions of approved **interdepartmental minors** may be found in the Interdepartmental Minors section of this catalog. For more information about minors available within each field of study, visit the website or contact the dean's office of the relevant college.

## Preprofessional Preparation

Competition for seats in graduate professional schools is keen, and a superior academic record throughout college is necessary for admission to these schools. Since requirements for the professional schools vary in their "essential" and "recommended" subjects, students should consult the catalog of the professional school and then plan their undergraduate programs accordingly.

Those seeking careers as social workers can enroll as majors in sociology, including in their curriculum the social welfare courses. A basic foundation for graduate study, whether directed toward college teaching or research careers, can be provided through any of the liberal arts or science majors. The Bachelor of Arts curriculum provides specific majors for those planning to become journalists or public school teachers.

**Health Professions—Premedical, Predental, and Pre-veterinary Programs.** The URI Health Professions Advisory Committee (HPAC) helps students preparing for medical school, dental school, veterinary school, or physician assistant programs. URI's Health Professions Advisory Committee offers students academic counseling and information on the admissions process. For details, visit [uri.edu/hpr/pre-health/index.shtml](http://uri.edu/hpr/pre-health/index.shtml).

**Prelaw Studies.** For students who plan professional study of law, guidance and program advice are provided by the Prelaw Advising Coordinator, Lawrence Rothstein ([ler@uri.edu](mailto:ler@uri.edu); 401.874.2730) and by several prelaw advisors. Students should contact Professor Rothstein as soon as possible after admission to the University to be placed on the Prelaw Society email discussion listserv LAWURI. For more information, visit [uri.edu/arts/psc/prelaw.html](http://uri.edu/arts/psc/prelaw.html).

**Teacher Education Programs.** The University of Rhode Island offers a variety of academic programs leading to teacher certification at both the undergraduate and the graduate levels. For more information, see the specific academic program in which you are interested in the "Curriculum" section of this catalog. The School of Education and the Office of Teacher Education provide the coordination, planning, evaluation, and promotion of all teacher education programs at the University. For details about admission to URI's teacher education programs, and about earning certification to teach, visit the website of the Office of Teacher Education: [uri.edu/hss/education/index\\_ote.html](http://uri.edu/hss/education/index_ote.html)

**Honor Societies.** The University has chapters of a number of national honor societies, invitation to which is recognition of scholarly accomplishment. Several societies recognize scholarship over a wide range of disciplines: Phi Beta Kappa, a national liberal arts honor society; Phi Eta Sigma, a national honor society for first-year students; the National Society for Collegiate Scholars, a national honor society for first- and second-year students; and Phi Kappa Phi and the Golden Key, national honor societies for general scholarship. More specialized honor societies include Alpha Epsilon Delta (Health Professional Honor Society), Alpha Kappa Delta (sociology), Alpha Sigma Lambda (continuing education), Beta Alpha Psi (accounting), Beta Gamma Sigma (business), Beta Phi Mu (Beta Iota chapter, library science), Chi Epsilon (civil engineering), Eta Kappa Nu (electrical engineering), Gamma Kappa Alpha (Italian), Triota (gender and women's studies), Kappa Delta Pi (education), Kappa Omicron Nu (O Alpha Mu chapter,

family and consumer studies), Lambda Pi Eta (Beta Gamma chapter, communication studies), Lambda Tau (medical technology), Omicron Delta Epsilon (economics), Omicron Delta Kappa (leadership), Onyx (African-American scholarship), Order of Omega (fraternity/sorority), Phi Alpha Theta (history), Pi Kappa Lambda (Zeta Epsilon chapter, music), Phi Lambda Sigma (pharmacy-peer recognition), Phi Sigma Iota (foreign languages, literature, and linguistics), Pi Delta Phi (French), Pi Mu Epsilon (mathematics), Pi Sigma Alpha (Gamma Epsilon, political science), Pi Tau Sigma (mechanical engineering), Psi Chi (psychology), Rho Chi (pharmacy), Sigma Alpha Pi (leadership and success), Sigma Delta Pi (Spanish), Sigma Iota Epsilon, Sigma Lambda Alpha (landscape architecture), Sigma Pi Sigma (physics), Sigma Theta Tau (nursing), and Tau Beta Pi (engineering).

## Honors Program

**Honors Program.** The University Honors Program offers motivated students opportunities to broaden their intellectual development and strengthen their preparation in major fields of study. The program consists of courses in analytical thinking skills that prepare academically talented students to get the most from classes throughout their undergraduate years, a colloquium that brings distinguished authorities to campus from across the nation, special tutorials in major concentrations of study, and independent research projects under the guidance of a faculty sponsor. Honors courses at the 100 and 200 levels treat general topics and usually count for general education credit in particular divisions. Those at the 300 and 400 levels are more specialized and often are used to fulfill the requirements of a major.

Students may take honors work if they meet the following standards: Sophomores, juniors, and seniors must have earned at least a 3.30 cumulative grade point average at URI; transfer students must have received a GPA of 3.30 or better at their previous institution to be eligible for honors courses; incoming freshmen must have earned a grade point average of 3.40 or higher in high school and must have a combined score of 1,100 on the critical reading and math portions of the SAT exam. Other interested freshmen should submit a copy of their high school transcript and a recommendation from a faculty member to the Honors Program; the program director will then determine individual eligibility based on these materials. Under special circumstances, these eligibility requirements may be modified with the permission of the Honors Program director.

Eligible students may participate in the Honors Program in one of two ways: they may take honors courses on an occasional basis, registering for any number or pattern of courses that interest them; or they may do honors work on a regular basis, meeting the specific requirements to receive the transcript notation "Completed the University Honors Program." To achieve this certification a student must complete a minimum of 18 honors course credits that meet the following requirements: 1) three credits of Honors Seminar at the 100 or 200 level; 2) three credits of Honors Colloquium (HPR 201 or 202); 3) three credits of Honors Tutorial at the 300 or 400 level; 4) six credits at the 400 level, which may be either six credits of Senior Honors Project (HPR 401, 402) or three credits of Senior Honors Project (HPR 401) and three credits of Senior Honors Seminar (HPR 411/412, or other approved Senior Seminar);

5) three additional honors credits taken at any level; and 6) a 3.30 grade point average for honors courses and a 3.30 cumulative grade point average.

The Honors Program houses the National Scholarships Office, which prepares students for prestigious national and international scholarship competitions and advises students who wish to pursue postgraduate degrees in the health professions. To learn more about this and other Honors opportunities, please visit [uri.edu/hpr](http://uri.edu/hpr).

## Special Academic Opportunities

**Honors Program.** (See Honors Program section of this catalog.)

**Marine and Environment-Related Programs.** Interest in marine science and oceanography at the University dates back to the mid-1930s. Over the past three decades, this strong emphasis on marine studies has extended to environmental topics, developing into an array of undergraduate programs in the natural, physical, and social sciences.

There are dozens of majors with a marine or environmental focus, especially within the College of Engineering and the College of the Environment and Life Sciences. Several of the majors are offered jointly with the Graduate School of Oceanography, which also offers undergraduates a minor in oceanography (see "Interdepartmental Minors").

Undergraduates are encouraged to explore opportunities at the Narragansett Bay Campus for active participation in the oceanographic sciences. Juniors and seniors may spend an entire semester at the University's Bay Campus pursuing their individual marine interests, for which they receive full academic credit. They work as part of a research team in the laboratory and in the field under the direct guidance of the Graduate School of Oceanography faculty.

Working with academic advisors, students can identify their majors and select the courses best suited to their individual academic objectives and career goals.

**Military Science and Leadership (Army Reserve Officers' Training Corps or "ROTC").** Military Science and Leadership (Army ROTC) is one of the nation's top leadership programs. For details, see the College of Arts and Sciences within this catalog or visit [uri.edu/artsci/msc/](http://uri.edu/artsci/msc/).

**New England Land-Grant Student Exchange Program.** Students with special academic interests can take advantage of the talent and resources available at the region's state universities without having to become a degree candidate at another institution. Under a cooperative agreement, URI students can study for one or two semesters at the other New England land-grant institutions if they wish to take a course, a sequence of courses, or part of a program not available at URI. Students participating in this program pay their normal URI tuition and fees and maintain their status as URI students. Advisors and members of the University College for Academic Success staff have more information about this program and its requirements.

**Rhode Island Interinstitutional Exchange.** Full-time students matriculated at one of the public institutions of higher education in Rhode Island may enroll for a maximum of seven credits of their full-time schedule per semester for study at

one of the other public institutions at no additional expense. Each institution will determine and maintain the integrity of the degree to be awarded. Students will be subject to the course selection process applicable at the receiving institution. Off-Campus Study and Feinstein College of Continuing Education Special Programs courses are not included in this program, nor are students who are taking courses only during Summer Session. Students interested in this arrangement should contact Enrollment Services.

**Summer Sessions.** The University provides a full range of undergraduate and graduate course offerings during two five-week sessions on the Kingston and Providence campuses. Courses begin immediately after Commencement and are offered during day and evenings as well as on-line. Summer intensives are offered at varying dates in the alternate session, and a number of special programs, including study in foreign countries, internships, and clinical placements, are available. Students may attend either or both campuses and enroll in any summer session. Students who are not matriculated at URI who are expecting to apply summer credit to their academic degree program are advised to obtain prior approval from their home campus before registering. Maximum course load is seven credits per summer session, including simultaneous courses in the alternate session. Exceptions are allowed with permission of the student's academic dean.

**Winter J-term Session.** The University provides a unique range of undergraduate and graduate course offerings during the winter session. This mini-semester, approximately in the 3 week period between January 2 and the day before the spring semester begins, consists of credit-bearing courses that offer new value-added experiences to students not possible during standard semesters. Examples may include but are not limited to: travel courses (domestic and international); gateway courses or modules to help students catch up; experiential learning opportunities, including student research, projects, service learning, and internships; high-demand laboratory and/or clinical courses; and popular general education or other existing courses. Maximum course load is 4 credits. Students who are not matriculated at URI who are expecting to apply Winter J-term credit to their academic degree program are advised to obtain prior approval from their home campus before registering. Federal financial aid is not available, however discounted tuition is offered. Registration occurs in the fall semester. Winter J-term courses will be shown on student transcripts. Students are not eligible to graduate in this Winter J-term session. However, students completing their final course during this session should confirm spring graduation eligibility with their Dean's Office prior to registration.

## Grades

**Grades and Points.** Student grades are reported as A, A-, B+, B, B-, C+, C, C-, D+, D, and F. The unqualified letter grades represent the following standing: A, superior; B, good; C, fair; D, low grade, passing; F, failure; S, satisfactory; U, unsatisfactory; NW, enrolled—no work submitted.

Grades are given grade point values as follows: A, 4.00 points; A-, 3.70 points; B+, 3.30 points; B, 3.00 points; B-, 2.70 points; C+, 2.30 points; C, 2.00 points; C-, 1.70 points; D+, 1.30 points; D, 1.00 points; F and U, 0 points. P, S, and NW are not calculated in the grade point average.

Final grade reports are made available to all students via the e-Campus system. Midsemester grade reports are made available to all freshmen via the e-Campus system at the midpoint of each semester. These midterm reports are intended to alert freshmen to their academic status and to aid in advising. Midterm grades are not recorded on permanent academic records, nor are they figured into grade point averages.

A grade may be reported as "incomplete" only when course work has been passing but not completed due to illness or another reason that in the opinion of the instructor justifies the report of incomplete. Undergraduate students must make arrangements with the instructor to remove the incomplete by the following midsemester. Incomplete grades not removed from an undergraduate student's record by the end of two years will remain on the student's permanent record.

Students are required to make up failures in required courses. The course should be repeated when next offered. No limit is placed on the number of times a course may be repeated, but the credit requirement for graduation is increased by the number of credits repeated. Students are not required to make up failures in elective courses.

Certain courses do not lend themselves to precise grading, and for these courses only S (satisfactory) or U (unsatisfactory) will be given to all students enrolled. S/U courses are labeled as such in the course descriptions in this catalog. S/U courses are not counted as courses taken under the Pass-Fail option.

**Pass-Fail Grading Option.** This plan encourages undergraduate matriculated students to increase their intellectual breadth and discover aptitudes in new areas of knowledge. A matriculated undergraduate student above the freshman level who is not on probation may register under this plan for courses considered to be free, unattached electives by the college in which he or she is enrolled. Courses designated in the student's curriculum as degree requirements, general education requirements, and military science courses may not be included. Nonmatriculating students are not eligible for the pass-fail grading option.

A student choosing to take a course under this plan must notify his or her advisor, academic dean, and the Office of Registration and Records, in writing, prior to the end of the add period of each semester. The instructor is not informed.

Grades will be P (pass) or F (fail). The P grade is credited toward degree requirements but not included in the grade point average. The F grade is calculated in the same manner as any other failure. A student may change from the P-F option to grade by notifying Registration and Records in writing before mid-semester.

A student may elect no more than three P-F courses a semester and no more than two P-F courses during a summer.

**Second Grade Option.** Undergraduate students may exercise a second grade option by repeating a course in which the student earned a C- or lower. Only courses that fall within the student's first 30 attempted credits taken at the University may be selected for this option. Students must exercise this option no later than the next two semesters for which the student registers after completing 30 credits. Transfer students may exercise the second grade option for courses taken during their initial semester at the University. This option must be exercised during the next two semesters for which they register after their initial semester. Only the grade earned when

the course was repeated will be used in the calculation of a student's grade point average, and only the credits earned for the repeated course will apply toward the graduation requirements. All grades earned for a given course shall remain on a student's permanent academic record. Please note that all grades earned while attending the university shall be used in the calculation of Graduation with Distinction, this includes any courses utilizing the Second Grade Option. To take advantage of this option, students must obtain approval from their academic deans and submit the appropriate form to Enrollment Services prior to midterm of the semester in which the course is being repeated. The second grade option may be used only once per course.

### Dean's List

Undergraduate matriculated students who have achieved certain levels of academic excellence are honored at the end of each semester by inclusion on the Dean's List. The Office of Registration and Records will publish lists of students who have attained the required grade point average.

A full-time student may qualify for the Dean's List if he or she has completed 12 or more credits for letter grades and achieved a 3.30 grade point average.

A part-time student may qualify for Dean's List if he or she has accumulated 12 or more credits for letter grades and achieved a 3.30 grade point average.

### Probation and Dismissal

A student will be placed on scholastic probation if his or her overall cumulative grade point average falls below 2.00. For purposes of determining dismissal of part-time students, scholastic standing committees will consider an accumulation of 12 credits as the minimum standard for one semester's work.

A student will be dismissed for scholastic reasons when he or she has a deficiency of eight or more grade points below a 2.00 average after being on probation for the previous semester. A student on probation for the second successive semester who has a deficiency of eight or fewer grade points below a 2.00 average will continue on probation. At the end of the third semester of probation, a student will be dismissed. Students who obtain less than a 1.00 average in their first semester will be dismissed automatically.

A student subject to dismissal will be so notified by the dean, after which he or she will have five days to file a written appeal with the dean.

**Academic Integrity.** Students are expected to be honest in all academic work. The University expects that all course papers, theses, and dissertations will be prepared, and all examinations taken, in conformance with accepted standards of academic integrity. This includes the proper citation and attribution of all material that is not the original product of the writer. It is the student's responsibility to determine the appropriate style used in his or her discipline for presentation of material derived from other sources and to adhere to it scrupulously in all written presentations. Instructors have the explicit duty to take action in known cases of cheating or plagiarism. For details, consult the University Manual at [uri.edu/facsen](http://uri.edu/facsen) and the Student Handbook at [uri.edu/judicial](http://uri.edu/judicial).

### Leave of Absence

Occasionally, students are forced to take a semester or two off because of circumstances beyond their control. Others find they simply need a break from studying. For these students, taking a leave of absence might be wise. Students who have an approved leave of absence for a semester or a year may register for the semester in which they plan to return without applying for readmission. Undergraduate students can apply for a leave of absence through Enrollment Services.

### Withdrawal from the University

A student who wishes to withdraw from the University prior to the end of the semester or summer session shall do so according to procedures established by Enrollment Services. If the withdrawal process is completed satisfactorily and the student has cleared all financial obligations to the University, the date of withdrawal will be noted on the student's permanent academic record. No grades for the current semester will be recorded.

Students who withdraw from the University after the last day of classes but before a semester ends will be graded in all courses for which they are officially registered. If a student withdraws from the University after midsemester, grades will be recorded for any course that has an officially specified completion date prior to the date of withdrawal.

A student who withdraws from the University after midsemester and who seeks readmission for the next semester will be readmitted only with approval of the Scholastic Standing Committee for the college or school in which registration is desired.

### Graduation Requirements

To graduate, a student must have completed the required work for the curriculum in which he or she is enrolled with the minimum cumulative grade point average established by that curriculum. (If no minimum cumulative grade point average is specified by the curriculum, students must have an overall cumulative grade point average of at least a 2.00). In addition, students must abide by community standards as defined in the University Manual and Student Handbook.

The work of the senior year has to be completed at the University of Rhode Island. Exceptions must be approved by the faculty of the college in which the student is enrolled.

For all undergraduate majors, one half of the total number of credits needed in a given major must be earned at the University of Rhode Island.

Any student who has met the requirements for a second bachelor's degree may be granted two bachelor's degrees and issued two diplomas.

Any student who has met the requirements for two separate majors within any single bachelor's curriculum has earned a double major and may have both fields listed on his or her permanent record.

Each undergraduate college has specific procedures for student requests for exceptions to courses of study or to other degree requirements or academic rules. Undergraduate stu-



dents who seek exceptions to any University rule pertaining to their academic circumstances, including degree requirements and courses of study, may contact the offices of their respective college deans.

Students who complete at least 60 credits of their work at the University are eligible to graduate with distinction. Grades in all courses attempted at the University, including those utilizing the second grade option will be included in the calculation of the grade point average for graduation with distinction. Those who attain a cumulative grade point average at the time of graduation of at least 3.30 are recognized as graduating cum laude. Those who achieve a cumulative grade point average of at least 3.50 graduate magna cum laude, and those who attain a cumulative grade point average of at least 3.70 graduate summa cum laude.

## Interdepartmental Minors

See descriptions of approved interdepartmental minors below. For more information about minors available within each field of study, visit the website or contact the dean's office of the relevant college.

### Africana Studies

Students who declare Africana studies as a minor are required to take two core courses: AAF 201 and 202 (six credits). In addition, students select four electives (12 credits) from the following: AAF 360, 390, 410; APG 313; COM 333; ECN 386; ENG 247, 248, 362, 363, 364, 474; HIS 150, 384, 388; and PSC 408. Students who want to use other courses that have as their central focus some aspect of the black experience may do so with permission from the program director.

For a description of the degree program for the major, see **Africana Studies** in the College of Arts and Sciences section.

### Asian Studies

Students who declare a minor in Asian studies are required to complete 18 credits including at least two courses (6 credits) from the following: HIS 171, 172, 374, 375; PHL 331; PSC 377; RLS 131. The remaining 12 credits may be selected from the preceding group or from the following: BUS 317/COM 354; CHN 101, 102, 103, 104, 111, 112, 113, 114, 205, 206, 215, 216, 305, 306, 307, 314, 315, 316, 320, 401, 421, 422, 497, 498; COM 361, 461, 491, 492; HIS 391, 481, 495; JPN 101, 102, 103, 104; LAN 191, 192, 193, 194, 205, 206; PSC 303, 455, 456. At least 12 of the 18 credits must be taken at the 200 level or above. Students interested in the minor should contact Professor Timothy George in the History Department. A member of the Asian Studies Advisory Committee will then be assigned as the advisor for the minor and will assist the student to fulfill its requirements.

### Biological Sciences

Students who declare biology as a minor must take BIO 101/103, BIO 102/104, and MIC 211 or MIC 201. The remaining courses may be selected from BCH 311 and any BIO or MIC course. At least 18-20 credits are required, and at least 12 of the 20 credits must be taken at the 200 level or above.

For a description of the degree program for the major, see **Biological Sciences** in CELS.

### Community Planning

The minor in Community Planning is for those students in all fields who wish to expand their knowledge of the processes of community planning and development while completing their education at URI. The minor is designed to encourage or improve the student's professional knowledge of community planning and development issues. The minor requires a total of 18 credits. Nine of the 18 credits are the required courses and the remaining are elective courses.

CPL 410 is the required introductory core course for the minor. In addition, each student is required to complete six credits from the following list: CPL 391, 434, 450, 485, and 538.

A maximum of 3 credits of CPL 391 can be applied toward the required courses of the minor. Alternatively, three credits of CPL 391 can be applied toward the elective courses in the minor.

Successful completion of nine credits of elective courses from the following list is required in consultation with the community planning minor advisor, Professor Farhad Atash: AAF/PSC 410, 466; CPL/GEG 202; CPL 391, 392, 397; CVE 346; ECN 402; GEG 101, 104, 200, 202; HDF 418, 424, 434, 440; LAR 201, 202; MAF 465, 475, 484; NRS/CPL 300; NRS 415, 450; PHL 318; PSC 221, 402; and SOC 214, 240. These elective courses cannot be simultaneously counted toward a major.

The Department of Landscape Architecture in the College of the Environment and Life Sciences administers this minor. Interested students should contact Professor Farhad Atash in the West Tower Office of Rodman Hall (third floor), 401.874.2982 or [fatash@mail.uri.edu](mailto:fatash@mail.uri.edu).

### Comparative Literature Studies

Students who declare comparative literature studies as a minor must earn 18 credits distributed as follows: six credits in comparative literature studies at the 200 level or above; 12 credits from literature courses in comparative literature, English, or languages, of which six credits must be in one national literature either in the original language or in translation. Students majoring in English or languages may not count courses in their major toward this minor.

### Film Media

See **Film Media** in Arts and Sciences.

### Forensic Science

Students who declare a minor in forensic science must complete 18 credits including two credits of CHM 391, three credits of CHM 392 (Introduction to Criminalistics), and three credits of research or a practicum related to forensic science. The practicum can be in the form of participating in a Forensic Science Partnership research project or internship on or off campus. The remaining 13 credits may be selected from the following: APG 300\*, 350\*; APG/PSY 405\*, 417; BCH/BIO/ASP/PLS 352\*; BCH/MIC 403; BCH/BIO 437\*, 451\*; BCH 481\*, 482\*, 484\*; BIO 242\*, 244\*; BIO 381/ENT 385\*, BIO 382/ENT 386\*; BMS 225\*, 313, 322, 325, 326, 416, 525, 530\*, 535\*, 544, 546; CHE 332\*, 333, 438\*, 491, 539\*, 576; CHM 226\*, 228\*, 412\*, 414\*, 425\*; COM 215; DHY/CMD/PHT 440\*; ENT 411 or 511\*; GEO 103, 320\*, 321\*, 554\*; PHP 316, 318, 324; PLS/ASP 355\*; PLS 361\*; PSC 472\*; PSY 254\*, 335\*, 460, 466, 479; SOC 216, 230, 370, 420\*; SOC/PSC 274\*; TMD 303\*, 313\*

(asterisked courses have prerequisites not included in this program; students are responsible for completing these prior to enrolling in the course).

Courses required for a student's major cannot also be used to satisfy the minor requirements. It is suggested that no more than two courses in the minor be from any one department and that all students take at least one chemistry course in addition to CHM 391. Students interested in this minor should contact Professor Jimmie Oxley, Department of Chemistry.

## Gender and Women's Studies

See **Gender and Women's Studies** in Arts and Sciences.

## Geography

The minor in geography is designed to enhance student spatial skills. Global awareness is a fundamental component of many programs of study here at URI. It is a critical element in developing spatial literacy. The required courses for the minor include GEG 101 (3 credits) and three of the following (9 credits): GEG 104, 200, and 511.

Six credits of electives are chosen from the following list in consultation with the geography advisor, Professor William Gordon: AAF/PSC 410, 466; APG 203; CPL 410; GEG 202, 350; GEO 103, 210; HIS (a state, regional, or national history course); OCG 123; PSC 116, 377, 403, 407, and 408. These courses cannot be double-counted for a student's academic minor and major.

The Department of Landscape Architecture, within the College of the Environment and Life Sciences, administers this program. Interested students should contact Professor William Gordon in the East Tower Office of Rodman Hall (third floor), 401.874.5108 or [wgordon@uri.edu](mailto:wgordon@uri.edu).

## Gerontology

The program in gerontology is a University-wide program that promotes study, teaching, and research in aging. It also maintains relationships with state and local agencies serving Rhode Island's older population. This affords opportunities for research, internships, and field experiences to students interested in the problems of aging.

The Bachelor of Science program in human development and family studies is the recommended major for gerontology. There is also the opportunity for students taking their major studies in a number of areas to do a less specialized study in aging by declaring a minor in gerontology. This must be done no later than the first semester of the senior year. It requires 18 or more credits in aging-related studies approved by the program in gerontology and the college in which the student is registered.

HDF 314 (Introduction to Gerontology) is required for either specialization. Undergraduate gerontology courses include NFS 395; HDF 431 and 440; and SOC 438. Also relevant are HDF 421, 450, 480; NUR 349, 360; and BIO 242.

It is important to take courses that fulfill degree requirements from the beginning. Students who wish to specialize in aging are advised to contact the program in gerontology early in their University studies.

## Hunger Studies

This minor intends to prepare students for leadership roles in understanding and eradicating hunger. Requirements include 18 credits (at least 12 at the 200-level or above), nine of which will be core courses, including the introductory course HSS 130; up to three 1-3-credit internships; and a 3-credit capstone course which will include one credit for portfolio development. No course may be used for both the major

and minor. Courses in general education may be used for the minor.

All courses must be taken for a grade, except for the internship and portfolio credits, and a grade of 2.00 or better must be earned in each graded course. To declare this minor, a student must have the approval of a program advisor and an academic advisor. For more information, contact Professor Kathleen Gorman, Director, **Feinstein Center for a Hunger Free America**, Ranger Hall, 309.

Core courses: 9 credits; HSS/PSY 130 (4 credits), Internship (total of 3 credits), HDF 434 (3-credit capstone, 1 credit for portfolio development). Optional: URI 101 with a focus on hunger/social justice (1 credit).

Electives: 9 credits; may be focused on a particular theme. Approved electives include CPL 210; CPL/NRS 300; NFS 276, 394, 395; HDF 357, 489G; HSS 120; PHL 217; PLS 305; PSC 221.

## International Development

The international development minor is available to undergraduates interested in employment overseas or in domestic enterprises with international operations.

Students choosing this minor must complete 18 credits, with a maximum of six credits at the 100 or 200 level. Students must complete the following: 1) NRS 300 (three credits); 2) language or culture (six to nine credits), to be met by the completion of at least six language credits through the intermediate level (103 or 104) or placement in the conversation and composition level (205 or 206) and completion of at least six credits in the same language or culture cluster (placement for course work is determined by the Educational Testing Service exam as administered by the University's Department of Modern and Classical Languages and Literatures in the following languages: French, Spanish, German, and Russian; the University also offers Portuguese and selected other languages that, with permission, could satisfy the requirement; six credits are allowed in the general education requirements for language and culture); 3) an approved internship (three to six credits) providing international development experience during the junior or senior year (NRS 487); and three credits of an advanced-level seminar (NRS 496). See "**Courses of Instruction**" later in this catalog for descriptions of NRS 300, 487, and 496.

The College of the Environment and Life Sciences administers this program; interested students should contact Professor David Abedon in Natural Resources Sciences, Coastal Institute, Kingston, Room 113, 401.874.4655.

## International Relations

The minor in international relations is designed to provide a basic grounding in theory and practice of international affairs for students with an interest in global issues. Drawing upon upper-level courses in economics, history, and political science, the program integrates existing course offerings and provides a focused option in international affairs.

Students must complete a minimum of 18 credits, drawn from the required courses and options outlined below. Please note that students are responsible for completing any necessary prerequisites before enrolling in these courses. One common

prerequisite for the political science courses is PSC 116—Introduction to International Politics. Required courses may not be offered every semester, so please contact your advisor before your senior year. Requirements include PSC 211, ECN 338 or PSC 422, and one of the following capstone courses: PSC 408, 416, 417, 422, 431, 434, 435, 481, 544, 580, 581, and 584. The capstone course cannot be used to meet any other requirement within the minor.

In addition to the required courses, students must take at least one course from each of the following groups, for a total of 18 credits: international relations theory (PSC 300, 350, 417, 431, 434, 435, 544, 546, 580, and 584); international political economy (ECN 305, 338, 344, 363; PSC 402, 403, 422, 521, 581, and 595); comparative government (HIS 332, 333, 374, 375, 381, 382, 384, 388; PSC 201, 320, 321, 377, 408, 410, 415, 416, 481, and 584).

The Department of Political Science administers this program; interested students should contact Professor Marc Hutchison, Professor Nicolai Petro or Professor Richard McIntyre.

## Justice, Law, and Society

Students declaring a minor in justice, law, and society must complete a minimum of 18 credits from among the courses listed below. At least three credits must be completed in each of the three groups. Several of the courses have prerequisites not included in this program; students are responsible for completing these prerequisites prior to enrolling in the course. Other courses, such as topics courses, may be approved for credit by the program coordinator. Interested students should contact Professor Leo Carroll in the Department of Sociology and Anthropology. Criminal Justice: HDF/SOC 437; PSC/SOC 274; PSY 254, 261, 335, 460, 465, 466; SOC 230, 330, 331, 370, 420; SOC/PSC 476; GWS 370, 401. Law: ECN 337, 415; ENG 356; PHL 430; PSC 388, 369, 472. Social Justice: AAF 201; APG 311, 322; ECN 305, 386; GWS (WMS) 150, 310, 402; HIS/AAF 150, 355, 356; HIS 328, 344, 346, 349, 352, 366, 367; PHL 210, 217, 314, 318; PSC 441; PSY 480; SOC 240, 242, 413, 428, 438.

## Labor Studies

The labor studies minor is available to students interested in employment issues and the problems faced by working people in the United States and abroad. Students declaring this minor are required to complete 18 credits including LRS 480, Seminar in Labor Studies. The remaining 15 credits can be selected from HIS 349; BUS 344, 444; SOC 241, 336, 320, 350, and 432; PSC 369, 472, and 498; ECN 338, 368, 381, and 386; and COM 460 or other courses approved in consultation with Schmidt Labor Research Center faculty. The labor studies minor is administered by the Schmidt Labor Research Center. Information can be obtained from Professor Richard Scholl in the center, Hart House, 36 Upper College Road, 401.874.2239.

## Leadership Studies

The minor in leadership studies is based on a broad cross-disciplinary philosophy of leadership. The goal is to prepare students for leadership roles and responsibilities. The minor will provide students with opportunities to develop and enhance

a personal philosophy of leadership that includes understanding of self, others, and community as well as the acceptance of responsibility inherent in community membership. The curriculum is focused on expanding students' knowledge, skills, and understanding of specific leadership theories, concepts, and models in applied settings.

The minor includes the following three areas: education that consists of exposure to leadership theories, concepts, and models; leadership training that is directed at skill areas in leadership; and developmental aspects that require academic and co-academic experiences and reflection intended to empower students to mature and develop greater levels of leadership complexity, integration, and proficiency.

To declare a minor in leadership studies, a student must first visit the Center for Student Leadership Development (CSLD) in the Memorial Union to begin the enrollment process, and then inform his or her major academic advisor. A program advisor will facilitate the student's process through the minor, and help assure that class, internship, and portfolio requirements are completed.

Leadership minors must complete 18 or more credits related to leadership offered by more than one department. Requirements include a core of nine credits as follows: 1) a choice of an introductory course (HDF 190 or HDF 290); 2) a choice of a capstone course (BUS 441/COM 402 or HDF 412); 3) an internship with specific requirements including conceptual understanding, skill development through experience and feedback, and personal awareness, assessment, and growth; each internship requires 80 hours of fieldwork; the specific internship course will depend on the student's particular major or depend on the specific supervisor and/or advisor for the internship site; 4) a one-credit portfolio course. The portfolios are multidimensional collections of work that reflect the students' experiences in and out of the classroom as they relate to leadership knowledge, training, and experiences. The student's program advisor will work with the student on the development of the portfolio as an ongoing project.

Students will also choose nine elective credits from several approved courses. Other courses may be appropriate and may be added to this list with the approval of the Leadership Advisory Committee: AAF 300; BUS 340, 341, 342, 441, 442, 443; COM 100, 202, 208, 210, 220, 221, 302, 308, 322, 351, 361, 383, 385, 402, 407, 413, 421, 422, 450, 451, 461, 462; CSV 302; GWS (WMS) 150, 310, 350; HDF 190, 290, 291, 412, 413, 414, 415, 416, 417, 437, 450; HPR 118, 203, 412; KIN 375; MSL 201, 202, 301; PSC 304, 369, 504; PHL 212; SOC 300/GWS (WMS) 350; THE 221, 341.

Visit [mu.uri.edu/leadership](http://mu.uri.edu/leadership) for a complete, up-to-date list.

For more information on this minor, contact the Center for Student Leadership Development, Memorial Union, room 210, 401.874.5282.

## Medieval Studies

The interdisciplinary Undergraduate Minor in Medieval Studies offers students the opportunity to acquire an understanding of the historical, cultural, and social forces of the Middle Ages (approximately 500 to 1500 C.E.). The societies of medieval Europe and its Mediterranean neighbors began the first universities, established the nation-state, developed extended

fictional narrative and the idea of romantic love, and laid the foundations of modern science, constitutional government, banking, and capitalism. Augustine, Dante, Aquinas, Saladin, Frederick II, Saint Louis, Maimonides, Averroes, Al-Ghazali, Innocent III, Joan of Arc, and Christine de Pizan, amongst many others, have made their mark on modern thought and cultural practice. In many ways, the Middle Ages contributed to the world that today's students have inherited and need to understand.

Undergraduates who contemplate applying for the minor should contact the Undergraduate Advisor, Professor Joëlle Rollo-Koster, to discuss their interests and needs.

A minor requires a minimum of 18 credits with at least 12 credits at the 200-level or above. A minimum grade point average of 2.00 is required in the minor and at least half the credits in the minor must be taken at URI. Minors require approval of the department chair.

#### MINOR REQUIREMENTS

**STRONGLY RECOMMENDED:** HIS 112 Medieval Europe and LAT 101 (6 credits); the remaining 12 credits can be chosen amongst the following courses:

ARH 251 Introduction to Art History: Ancient-Medieval

ARH 356 Medieval Art

ENG 478 Medieval Authors

ENG 381 Topics in Medieval and Renaissance Literature (can be repeated once with change of topic) ENG 382 Medieval and Renaissance Authors (can be repeated once with change of topic)

ENG 535 Old English

HIS 112 Medieval Europe

HIS 176 Islamic History to 1492

HIS 304 Western Europe HIS 305 The Renaissance HIS 308 Medieval Women

HIS 379 The Jews of Islamic Lands

HIS 401 Advanced Topics in European History (with medieval focus) HIS 495 Seminar in European History (with medieval focus)

ITL 395 Dante in English

ITL 301 Civilization of Italy (from the Middle Ages to the Renaissance) ITL 325 Introduction to Italian Literature

ITL 455 Selected Italian Authors (with medieval focus) ITL 481 Dante in Italian

PHL 322 Medieval Philosophy

LAT 101-102-301-310 (310 is a one credit course attached to another 3-credit course in which the student reads part of the reading list in Latin)

Students will also have the possibility to choose a Directed Study: 3 credits, in one of the proposed fields: Art History, English, French, History, Italian, Latin, and Philosophy, with the approval of the appropriate instructor. For example, if taken with the history department it would be HIS 391.

## New England Studies

New England Studies is an 18 credit minor. Students must take either NES 200 or 300 and elect at least one course from each of the following four categories. Aesthetic Dimensions: ENG 347. Cultural Patterns: APG 317; ENG 337; PSC 221.

Historical Dimensions: HIS 335, 346, 362. Physical Dimensions: BIO 323, BIO 418; GEO 101; NRS 301, 302. Permission can be obtained from the Committee for New England Studies to use any rotating topics course, seminar, etc., whose focus is on some aspect of New England as a substitute for any of the above courses. The minor in New England Studies is coordinated by the Art Department. Interested students should contact Professor Ron Onorato at 401.874.2769 or [ronorato@uri.edu](mailto:ronorato@uri.edu).

## Nonviolence and Peace Studies

Students who declare a minor in nonviolence and peace studies should complete a minimum of 18 credits, as follows: 1) NVP 200, a one-credit colloquium course on Nonviolence and Peace Studies; 2) a nonviolence training experience such as one of the two-day workshops offered by URI's Center for Nonviolence and Peace Studies (or training offered by the American Friends Service Committee, Fellowship of Reconciliation, or similar organization), combined with three credits of directed reading/independent study focused on the history, theory, and application of nonviolence. Credits may be earned in HDF 498, HIS 391, HPR 401 or 402, PHL 499, PSC 455 or 456, PSY 489, SOC 498 or 499, and should be chosen in consultation with the student's advisor for the minor and other faculty;

3) a minimum of one of the following three-credit courses in individual/interpersonal peace processes: COM 221, 422; HDF 450; HPR 107, 110; PSY 479Y, 479H; or SOC 408; 4) a minimum of one of the following three-credit courses in societal/global peace processes: AAF/PSC 380; COM 310, 361; ECN 386; HPR 411; PHL 217; SOC 318; and 5) additional related courses totaling a minimum of 18 credits for the minor, such as AAF/SOC 240, 336; AAF/HIS 359, 366; AAF/SOC 428; COM 310, 322, 421, 461; ECN 381; GWS (WMS) 150, 310, 350, and 351; HDF 230; HIS 328, 349; PSY 103, 334, 335; PSY/SOC 430; SOC 216, 230, 274, 330, 331, 370, 413, 420, 452. Students are responsible for meeting applicable prerequisites for courses in the minor, or for obtaining the instructor's permission to take a course.

Interested students should contact Professor Charles Collyer in the Department of Psychology (401.874.4227 or [collyer@uri.edu](mailto:collyer@uri.edu)).

## Oceanography

The minor in oceanography is available to students interested in scientific understanding of the ocean, including its role in controlling the environment in which we live, its usefulness as a resource, and the importance of marine area protection and sustainability.

Students choosing this minor must complete 18 credits, at least 9 of which must be from OCG courses. Courses may not be taken on a pass-fail basis (except for OCG 493/494). The following course requirements must be met:

1) One OCG course and up to one other course from the following 100-level course list: CHM 100; GEO 103; MAF 100, 120; OCG 110, 123, 131. 2) One of these three general oceanography courses: OCG 123, 401, 451. 3) The remaining 7-12 credits from the following courses: APG 413; BIO 345, 360, 418, 455, 457, 469, 475, 495; EVS 366; GEO 277, 450, 465; MAF 330, 415, 461, 465, 471, 482, 484, 490, 511; MCE 354; OCE 301, 307, 310, 311, 471; OCG 420, 440, 480, 493/494, 501, 506, 517, 521, 540, 561. Permission of the program administrator is needed if OCG 493 or 494 is used to satisfy requirement 3 (above). Other courses may be substituted, at the request of the student and with permission of the program administrator. The Graduate School of Oceanography (GSO) administers this program. Interested students should contact GSO Associate Dean David Smith at **401.874.6172** or [assoc\\_dean@gso.uri.edu](mailto:assoc_dean@gso.uri.edu).

## Public Relations

Students can minor in public relations by completing 18 course credits from communication studies, journalism, and marketing, as specified. Communication studies majors take any WRT course in addition to their general education requirement, PRS 491, JOR/PRS 340, BUS 365, and two additional marketing courses. Journalism majors take COM 210, 302, 351, BUS 365, and two additional marketing courses. Marketing majors take any WRT course in addition to their general education requirement, PRS 340, 491, and COM 210, 302. Other majors take two applicable courses in communication studies, journalism, and marketing. Interested students should contact Regina Bell (401.874.2857).

## Special Populations

This interdepartmental minor gives students the opportunity to explore theory and gain practical experience through working with people who have special needs. This includes people who have disabilities (physical, emotional, mental, or educational) or are different socioeconomically, behaviorally, or culturally. A minimum of 18 credits may be earned by taking the required courses (HDF 200 or PSY 232; PSY 442), a minimum of three credits in supervised field experience, and a minimum of nine credits of selected electives.

Courses are chosen in consultation with an advisor from one of the participating departments: Communication Studies; Education; Nutrition and Food Sciences; Human Development and Family Studies; Nursing; Kinesiology; Psychology; Sociology and Anthropology; Textiles, Fashion Merchandising, and Design; or Theatre. The College of Human Science and Services administers the program.

## Sustainability

In addition to fulfilling all the basic requirements for a minor (see **Minor Fields of Study**), students declaring a minor in sustainability complete the following four requirements:

- 1) A "synthesis course" selected from a series of courses that focus on principles of sustainability (AFS/BCH/MIC/NRS/PLS 190; BIO 262; COM 315; GEO 100; HPR 411; MAF 100, 220, 330, 465; NRS 100; OCG 110, 123; 3 credits).
- 2) An internship that includes hands-on sustainability experience on campus or in the community. Course can include

research, service learning, and/or leadership. Minimum of 3 credits. Course can be repeated for up to 6 credits. Students may elect to take an internship offered from within a given major. Some majors have generic internship courses in which students may seek approval for from 3-6 credits (e.g. COM 471/472; ITR 301/302; NRS 487); others would need to use the Center for Career and Experiential Education to arrange for an appropriate internship of from 3-12 credits, only 3 of which would be required for the minor. (For more information, see [uri.edu/uc/internships](http://uri.edu/uc/internships)). Use of the internship activity to fulfill requirements of the minor requires approval by the sustainability minor coordinator(s).

(3) Elective courses selected from the following approved lists, with at least one course from each of the three core areas (9 credits): ECONOMICS: EEC 105, 205, 310, 345, 440, 441; ECN 201, 202. SOCIAL EQUITY/JUSTICE: APG 203; COM 410, 415, 462; HPR 319; NFS 207; SOC 242, 318, 350, 413, 438, 452, SOC/AAF 240, 336, 428. ENVIRONMENT: AFS 102, 120; BIO 101/103, 467; CHM 100; GEO 103; LAR 444, 445; NFS 276; NRS 223, 300, 361, 401/501, 411/511, 414/514, 445/545; OCG 131; PLS 306, 311, 324; TMD 226.

(4) A capstone course requiring submission of a brief proposal describing the intended work and how it relates to sustainability, the associated course, and the faculty sponsor. The faculty member may well be simply signing off on a course that s/he teaches as part of a regular workload (COM 455/HPR319; MAF 472, 475; NRS 496; NRS/MAF 527; OCG 480/580; PSC 403), or may be agreeing to sponsor the student's work in a special studies arrangement, which could be an add-on to the internship or could stand alone. The sustainability minor coordinator(s) must approve the proposed capstone course.

The Sustainability Minor Committee is consulted on the appropriateness of capstone courses, internships, and the addition of any new courses to the minor. For more information, contact **Professor Judith Swift**, 401.874.4739, or [uri.edu/artsci/com/swift/sustainability/](http://uri.edu/artsci/com/swift/sustainability/).

## Thanatology (Death, Dying, and Bereavement)

The interdisciplinary minor in thanatology provides a basic understanding of loss, death, dying, and grief.

Students are required to take 18 credits (12 of which are at the 200 level or above) in the following core areas: thanatology (minimum of 9 credits); communications, counseling, gerontology and psychology (minimum of 3 credits); and ethics, philosophy and religion (minimum of 3 credits). Courses may be selected from the following approved list. Thanatology: HDF/THN 421, 471; HPR 119; NUR 527; NUR/THN 360, 424, 425, 526, 529; PHP 460; PSC 440. Communications, Counseling, Gerontology, and Psychology: COM 100, 221, 251, 324, 325, 361, 422; HDF 314, 430, 450, 535; PSY 113, 232, 399. Ethics, Philosophy, and Religion: PHL 103, 212, 314, 328, 346, 401 (when related to thanatology); RLS 111, 125, 126, 131, 151. Other related courses: Independent study related to thanatology, i.e. HDF 498, NUR/THN 390 (check with faculty advisor), HPR 401/402 and other HPR coded courses (when related to thanatology). For additional information, see [web.uri.edu/nursing/thanatology](http://web.uri.edu/nursing/thanatology). For academic advisement and course approvals, and to declare a thanatology minor, contact Professor Carolyn Hames ([chames@uri.edu](mailto:chames@uri.edu)) in the College of Nursing.

## Underwater Archaeology

To obtain a minor in underwater archaeology, students must take 18 credits in history, historical archaeology, anthropology, classical archaeology, oceanography, and marine policy, at least 12 of which must be at the 200 level or above. The required courses and options are outlined below.

Students must take HIS/APG 490, and either APG 417 or ARH 475 (six credits). Students are encouraged to take these required 400-level courses toward the end of their program of studies. In addition, students must take one course from each of the following four groups: classical archaeology/material culture (ARH 251, 354, 475; ARH/APG 465); anthropology (APG 202, 203, 302, 303, 319, 417; APG/MAF 413); history (HIS 130, 389, 390, 396); oceanography/marine policy (OCE 110, 123, 401, 451; MAF 100, 220).

Interested students should contact Professor Rod Mather in the History Department (401.874.4093 **or** [rodmather@mail.uri.edu](mailto:rodmather@mail.uri.edu)).

## Writing

See **Writing and Rhetoric** in Arts and Sciences.

## Colleges

- University College for Academic Success
- Arts and Sciences
- Business Administration
- Engineering
- Environment and Life Sciences
- Human Science and Services
- Nursing
- Pharmacy
- Alan Shawn Feinstein College of Continuing Education



# University College for Academic Success

## Introduction

Jayne Richmond, Dean

Linda Lyons, Assistant Dean

Dania Brandford-Calvo, Director, International Education

David Hayes, Coordinator, Academic Enhancement Center

Sarah Miller, Coordinator, Feinstein Civic Engagement Program

John Rooney, Coordinator, Transfer Resource Center

Kimberly Washor, Director, Center for Career and Experiential Education

**University College for Academic Success (UCAS)** is where all students will find support as they enter the university. All new students are enrolled in UCAS, regardless of major, until they matriculate to the academic college from which they will graduate. We provide academic advising to all majors, including a focus on those who are undecided about their major. We also provide support in the many aspects of undergraduate education that will help students to be successful, such as internships, career advising, service learning, study abroad and national student exchange, transfer resources and assistance with becoming better learners. We are here to support the journey from admission right through to graduation. We focus on getting the first years off to a great start with our freshmen seminars and orientation, early alert and mentoring programs, and continue this support through the undergraduate years, helping students to find the right majors and careers that will lead to success.

For more information, visit [uri.edu/uc](http://uri.edu/uc) or call 401.874.2993.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

## Undergraduate Orientation

Visit [web.uri.edu/newstudent/orientation](http://web.uri.edu/newstudent/orientation).

**New Student Orientation.** All new first-year undergraduate students attend a two-day orientation to plan their academic programs, meet with an academic advisor and register for first-term classes, learn about URI, and begin to acquire the skills essential for successful transition from high school and home to the University community. Admitted students begin receiving orientation registration materials in April.

Parents and family members of new students are invited to attend a specialized family orientation program, which coincides with New Student Orientation.

**Transfer Orientation.** This one-day program is designed to acquaint transfer students with some of the unique features and procedures of the University. Students meet with academic advisors and register for first-term classes.

**Orientation for International Students.** The Office of International Students and Scholars (OISS) has implemented an orientation program and ongoing workshops to provide assistance in personal, academic, and financial matters to our international community and their dependents. Through this venue, OISS contributes to the University of Rhode Island's commitment to a global perspective. Staff members are available to help students adjust to life at the University and in the United States. For more information, email [issoff@etal.uri.edu](mailto:issoff@etal.uri.edu).

## Academic Enhancement Center

**Academic Enhancement Center.** Located on the 4th floor of Roosevelt Hall the AEC supports academic achievement for students in all majors.

The AEC's trained undergraduate and graduate staff offer interactive Supplemental Instruction (SI) sessions for selected courses and small group tutoring in all academic areas (by appointment and on a walk-in basis). Students may seek AEC services for specific courses or assignments, or for general academic coaching and assistance with organizational skills such as time management, effective listening, note taking, or test taking. The AEC also helps organize and facilitate study groups, and provides study group materials to students and faculty who wish to organize their own study groups. Workshops on study skills and organizational skills are offered by appointment to campus groups. Additionally, AEC staff work with faculty and staff to strengthen connections between classroom and lab learning and AEC services.

Up-to-date information on services available, office hours, tutor and teaching assistant schedules, tutor profiles, and special announcements can be found on the AEC website, at [uri.edu/aec](http://uri.edu/aec).

Visit [harrington.uri.edu](http://harrington.uri.edu) for information about the Writing Center, located within the AEC and administered by URI's Department of Writing and Rhetoric, part of the Harrington School of Communication and Media.

## Feinstein Civic Engagement Program

Established by a generous endowment from Rhode Island philanthropist Alan Shawn Feinstein in 1995, the Feinstein Civic Engagement Program promotes the integration of service with academic study in order to enhance student learning and involvement with communities and their agencies. First-year students are introduced to civic engagement through their required URI 101 course. Other programs include Americorps: Scholarships for Service; Clearinghouse for Volunteers; Feinstein Enriching America Program; First Book URI; URI S.A.V.E.S.; and Service Learning Courses. For more information go to [uri.edu/experience/volunteer/](http://uri.edu/experience/volunteer/) or contact the Feinstein Civic Engagement Program at 401.874.7422.

## International Students

Visit [uri.edu/iss](http://uri.edu/iss).

The Office of International Students and Scholars (OISS) provides services for all internationals holding F and/or J nonimmigrant visa designations. OISS serves approximately 500 international visiting scholars, graduate and undergradu-

ate students (degree and non-degree) and their dependents, from as many as 59 different nations. OISS is responsible for communicating and interpreting statutes, rules, and regulations that derive from the Department of Homeland Security, Department of State, Department of Justice, and the United States Citizenship and Immigration Services (formerly known as the Immigration and Naturalization Services). OISS also disseminates information pertinent to international visitors from the RI Division of Motor Vehicles, the Internal Revenue Service, and the Social Security Administration.

The staff at OISS is committed to providing valuable and comprehensive services to our international community. OISS also provides workshops and cross-cultural programming events for students, their dependents, and scholars. The center serves as a cross-cultural meeting place, hosting social events and recreational trips. A comfortable lounge is equipped with many amenities and is open to any URI student or URI student organization. We cosponsor events with civic clubs, such as Rotary International, the Rhode Island Association of International Advisors, and New England Land Grant Colleges International Advisors.

For more information, contact [issoff@etal.uri.edu](mailto:issoff@etal.uri.edu) or call 401.874.2395.

## English Language Studies

Visit [uri.edu/international](http://uri.edu/international).

Non-native-speaking students who want to continue to perfect their English so as to enhance their chances of success in their studies may do so by taking courses in the English Language Studies Program. ELS 112 and 122 are two regularly offered courses that count toward the written communication requirement in the general education program. Students who need these courses are strongly urged to take them in their freshman year. Students can also take ELS 312 and 322 to strengthen their oral English skills.

## National Student Exchange Program

Visit [uri.edu/international](http://uri.edu/international).

The National Student Exchange (NSE) program offers URI students the opportunity to study at more than 180 participating colleges and universities in 55 states, U.S. territories, and Canadian provinces, paying in-state rates or URI tuition while maintaining their status as URI students. NSE offers the opportunity to explore new geographical areas, experience academic diversity, and study under different educational and social circumstances in various parts of North America. Financial aid is available to participants. For further information, contact the Office of International Education and National Student Exchange in the International Student Center at 401.874.5546.

## Study Abroad

Visit [uri.edu/international](http://uri.edu/international).

The Office of International Education and National Student Exchange sponsors University programs abroad, helps students make arrangements for foreign study, and maintains information about overseas study programs. The office also assists in the evaluation of credits from study abroad. The University

sponsors exchange programs with universities in Denmark, England, France, Germany, Japan, Korea, Mexico, Norway, and Spain, and URI is a member of several consortiums that enable URI students to participate in programs throughout the world. URI also participates in the New England-Quebec and New England-Nova Scotia exchange programs, making study available on an exchange basis at any of 21 English- and French-speaking universities in these Canadian provinces.

Many of these exchange programs make study abroad available to URI students at a modest cost. The study abroad director and advisors help students who wish to participate in these or other approved academic programs in choosing the appropriate programs, obtaining prior approval for courses to be taken abroad, and retaining matriculated status at URI during their absence from campus. Most forms of financial aid are applicable to study abroad. For more information, contact the Office of International Education and National Student Exchange.

Email: [oie@etal.uri.edu](mailto:oie@etal.uri.edu). Website: [uri.edu/international](http://uri.edu/international). Phone: 401.874.5546.

## Center for Career and Experiential Education (CCEE)

Visit [uri.edu/career](http://uri.edu/career)

The Center for Career and Experiential Education (CCEE) engages students and alumni in a high quality personal and professional educational experience, from admission through employment. Career and internship advisors provide self assessments, searching and networking strategies, resume development and internship information sessions. The center offers RhodyNet, an online database of job and internship opportunities and events for our students and alums.

We also offer classes for career development (ITR 300) that engage students in self-reflection and work place skill development. This course helps students to increase awareness of the professional decision-making process, explore career choices, and expand understanding the relationship between education and the world of work. Students study key career development theories and learn how to integrate self-knowledge into occupational and life decisions, set goals, and devise strategies to attain these goals.

The academic internship program (ITR 301-304) provides students with full-time or part-time experiential learning opportunities (fall, spring, and summer). The program is designed for motivated students who wish to apply classroom learning to field experiences in career related settings. Student interns are supervised by a qualified professional at their placement site and by a faculty advisor from their academic major. Students from most undergraduate curriculums may apply for part-time or full-time internships and may earn from 6-15 free- elective credits. In order to apply to the program, a student must have a minimum GPA of 2.50 and junior or senior standing.

For more information, visit us on the first floor of Roosevelt Hall, online at [uri.edu/career](http://uri.edu/career) or call 401.874.2311.

## Courses that Support Student Academic Success

CSV 301: Course-based Community Service – PRA: (1-3 crs.) Learning through a community service experience related to course content. Experience defined by a job description and learning contract; includes orientation and reflection. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. Concurrent enrollment in a course that offers community service experience. May be repeated for a maximum of 6 credits. S/U only.

CSV 302: Community Service at URI – PRA: (1-4 crs.) Learning through a community service project that addresses a specific community need at the University. Project proposed and supervised by an instructor, and varies each semester. Includes mandatory seminar. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. May be repeated for a maximum of 8 credits.

CSV 303: Service In The Community – PRA: (1-4 crs.) Learning through a community service project that addresses a specific need in the off-campus community. Project proposed and supervised by an instructor and varies each semester. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. May be repeated for a maximum of 8 credits. S/U only.

EDC 279: Career Development Seminar – SEM: (1 cr.) Individualized approach to career concerns, skill identification, self-awareness, career development theory, decision making. Emphasis on understanding long- and short-term goals. (Seminar)

HDF 298: Contemporary Issues in Student Development – SEM: (1-3 crs.) Student leadership models and practices in various student development settings, such as Student Affairs, Student Life, Residential Life, University College, and Health Services. (Seminar) May be repeated for a maximum of 6 credits.

ITR 300: Career Planning: Concepts and Skills – SEM: (1-3 crs.) Identify personal strengths, interests, and professional values related to career exploration. Develop professional job and internship search skills.

ITR 301: Field Experience I – PRA: (3-12 crs.) Field experience gained at placement site through participation in the ITR program. The experience will be defined by a job description and learning contract arranged by the ITR director between the student intern, the intern's faculty advisor, and the relevant agency supervisor. (Practicum) Pre: junior or senior standing, a minimum quality point average of 2.50, participation in the ITR program, and permission of faculty advisor. May be repeated for a maximum of 24 credits. S/U credit.

ITR 302: Field Experience II – PRA: (3-12 crs.) Field experience gained at placement site through participation in the ITR program. The experience will be defined by a job description and learning contract arranged by the ITR director between the student intern, the intern's faculty advisor, and the relevant agency supervisor. (Practicum) Pre: junior or senior standing, a minimum quality point average of 2.50, participation in the ITR program, and permission of faculty advisor. May be repeated for a maximum of 24 credits. S/U credit.

ITR 303: Colloquium I – SEM: (3 crs.) Seminar format. Discussions of issues and problems raised by internship experiences in public service agencies. (Seminar) Pre: concurrent enroll-

ment in 301 for 303. Required for and open only to students enrolled in the ITR program.

ITR 304: Colloquium II – SEM: (3 crs.) Seminar format. Discussions of issues and problems raised by internship experiences in public service agencies. (Seminar) Pre: concurrent enrollment in 302 for 304. Required for and open only to students enrolled in the ITR program.

URI 101: Planning for Academic Success - SEM: (1 cr.) Introduces first-year students to the traditions of higher education and academic culture and to significant societal and personal issues that bear on developing goals for the undergraduate years. Required of all new freshmen and new transfer students with less than 24 credits. May not be repeated for credit.

## Arts and Sciences

### Introduction

Winifred E. Brownell, Dean Nancy Eaton, Associate Dean Patricia J. Morokoff, Associate Dean Earl N. Smith III, Assistant Dean Jonathan L. Blaney, Business Manager

The College of Arts and Sciences has two main objectives: to enable all students to understand our intellectual heritage, the physical and biological world in which we live, and our social, economic, and political development; and to provide programs of professional education in selected fields as well as a strong foundation for graduate study. The college has programs of study leading to the following degrees: Bachelor of Arts, Bachelor of Science, Bachelor of Fine Arts, and Bachelor of Music.

For information on prelaw, pre-physical therapy, premedical, pre dental, preveterinary, and teacher education programs, see **Preprofessional Preparation**.

For more information, visit [uri.edu/artsci](http://uri.edu/artsci) or call 401.874.2566.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

### Curriculum Requirements

In order to earn a degree in the College of Arts and Sciences, the student must meet requirements in three main areas: the major, Basic Liberal Studies, and electives. A description of these areas follows.

1. **The Major.** Every student is required to specialize in a particular area or discipline called the major. The requirements for each major vary from field to field, and are described in this section. Any student who has met the requirements for two separate majors within the Bachelor of Arts, Bachelor of Science, Bachelor of Fine Arts, or Bachelor of Music degree programs in the College of Arts and Sciences has earned a double major and may have both fields listed on the transcript.

In order to meet graduation requirements, a student must maintain a 2.00 grade point average in all courses required for his or her major. This restriction applies in every case, unless a different policy is explicitly stated in the description of the degree program. At least half of the total number of credits needed in a given major must be earned at the University of Rhode Island.

**Curricular Modifications.** In consultation with the advisor, and with the approval of the department chairperson, a student will be permitted to modify the normal requirements of the major. The decision of the department chair is final. Requirements outside the major may be modified only with approval of the Scholastic Standing and Petitions Committee of the College of Arts and Sciences. Petition forms are available in the Office of the Dean. Minimum grade point average and total credit requirements are not petitionable.

2. **Basic Liberal Studies.** In the College of Arts and

Sciences, general education requirements are called Basic Liberal Studies and are required of all students. This series of courses is intended to ensure that students have educational experiences that will help them to become informed and responsible participants in society and contribute to the full development of their individual capabilities. The Basic Liberal Studies program embodies the philosophy and fundamental knowledge that characterizes an arts and sciences education.

The following courses are approved by the College of Arts and Sciences to fulfill Basic Liberal Studies requirements. For an explanation of course codes, see *How to Read This Catalog*.

#### English Communication

Writing (ECw): ELS 112, 122; HPR 112, 326; WRT 104, 106, 201, 227, 235, 302, 303, 304 [D], 305 [D], 333.

General (EC): COM 100 [D], 108, 110 [D]; ECN 108; LIB 120, 220; PHL 101; SUS 108.

#### Fine Arts and Literature

Fine Arts: ARH 120 [D], 251 [D], 252 [D]; ART 101, 103, 207; FLM 101 [D], 203 [D], 204 [D], 205 [D]; FRN 320; HPR 124, 201A, 202A, 324 (311); LAR 201; MUS 101 [D], 106 [D], 111, 292, 293 [D]; PLS 233; SPA 320; THE 100, 181, 351 [D], 352 [D], 381, 382, 383.

Literature: AAF 247 [D], 248 [D]; CLA 391 [D], 395 [D], 396 [D], 397 [D]; CLS 160 [D]; ENG 110 [D], 160 [D], 241, 242, 243 [D], 245, 247 [D], 248 [D], 251, 252, 260 [D], 262, 263 [D], 264 [D], 265 [D], 280 [D], 317 [D], 355 [D], 357 [D], 358 [D]; FRN 309 [D], 310 [D], 320 [D], 391 [D], 392 [D], 393 [D]; GCH 101; GWS 317 [D]; HPR 125, 201A, 202A, 325 (312); RUS 391 [D], 392 [D]; SPA 305 [D], 306 [D], 307 [D], 308 [D], 320 [D].

**Foreign Language and Cross-Cultural Competence** See Basic Liberal Studies requirements below: Letters

AAF 150 [D], 201 [D], 355 [D], 356 [D]; APG 327; BIS 392 [D]; CLS 160 [D], 235; COM 246; EGR 316; ENG 110 [D], 160 [D], 243 [D], 280 [D], 317, 355 [D], 356 [D]; FRN 391 [D], 392 [D], 393 [D]; GCH 102; GWS 220 [D], 315 [D], 317 [D], 320 [D], 325; HIS 110 [D], 111 [D], 112, 113 [D], 114 [D], 116, 117, 118 [D], 130 [D], 132 [D], 141 [D], 142 [D], 145 [D], 146 [D], 150 [D], 160 [D], 171 [D], 172 [D], HIS 176 [D], 180 [D], 304, 305, 310 [D], 311 [D], 314, 323 [D], 327 [D], 332 [D], 333 [D], 340 [D], 341 [D], 346 [D], 351 [D], 355 [D], 356 [D], 374 [D], 375 [D]; HPR 107, 201L, 202L, 307; JOR 110 [D]; LAR 202 [D]; LET 151; NUR 360 [D]; PHL 101, 103, 204, 210 [D], 212 [D], 215, 217 [D], 235, 314, 316 [D], 321, 322, 323 [D], 325 [D], 328 [D], 331 [D], 346, 355; PSC 341, 342; PSY 310; RLS 111 [D], 125, 126, 131 [D].

#### Mathematical and Quantitative Reasoning

BUS 111; CSC 101, 201; HPR 108, 201M, 202M; MTH 105, 106, 107, 108, 111, 131, 141, 142, 208; MTH/PSC 109; STA 220.

#### Natural Sciences

AFS 190, 210, 211; APG 201 [D]; AST 108, 118; AVS 101 [D]; BCH 190; BIO 101, 102, 105, 286 [D]; BPS 201, 203; CHM 100, 101, 103, 112; EGR 133; GCH 103; GEO 100, 102, 103, 110, 113, 120; HPR 109, 201N, 202N, 309; MIC 190; NFS 207, 210; NRS 100, 190; OCG 110, 123, 131, 200; PHY 109, 111, 112, 185, 186, 203, 204, 205, 273, 274, 275; PLS 150, 190; TMD 113.

#### Social Sciences

AFS 132; APG 200 [D], 202, 203 [D], 301 [D]; AVS 132; COM 108;

CPL 202; ECN 100 [D], 108, 201, 202, 306, 381 [D]; EDC 102 [D]; EEC (REN) 105, 310, 356; GCH 104; GEG 101 [D], 104 [D], 202; GWS 150, 320; HDF 225;

*HPR 110 [D], 201S [D], 202S, 310; HSS 130 [D]; JOR 110 [D]; KIN 123 [D]; LIN 200 [D]; MAF 100, 220; NUR 114, 143, 150 [D], 160; PHP 114, 143; PSC 113 [D], 116 [D], 201; PSY 103 [D], 113 [D], 232 [D], 235 [D], 254 [D], 255 [D]; SOC 100 [D], 212 [D], 230 [D], 240 [D], 242 [D]; SUS 108; TMD 224.*

**3. Electives.** Electives are courses that are not included in the Basic Liberal Studies or major requirements, and that students may freely select to earn the total number of credits required for graduation. Many students use their elective credits to develop a second major or a minor field of study (see Minor Fields of Study).

**Course Load.** No student may take more than 19 credits per semester without permission from the dean.

Students on academic probation are limited to 15 credits.

**Repeating Courses for Credit.** Unless otherwise stated in the course description, a course may not be repeated for credit. Credit can be counted only once toward the total credits required for graduation.

**Study Abroad.** Students eligible for the Study Abroad option to fulfill the Basic Liberal Studies Foreign Language and Culture requirement must enroll for full-time study in an approved academic program for one semester. Summer programs are not approved for this option. Students must successfully complete a minimum of six credits to have their requirement satisfied.

**Graduation.** It is the responsibility of the student to be familiar with University and College requirements and to file for graduation with the Office of the Dean. Deadlines for filing are as follows:

May Graduation—October 1

August Graduation—March 1

December Graduation—May 1

Seniors completing their final course work off-campus must file a Senior Off-Campus Study Form with the Office of the Dean and should file for graduation before leaving campus.

## Basic Liberal Studies Requirements

Courses used to fulfill these requirements must be selected from the list approved by the College of Arts and Sciences (see previous page). Basic Liberal Studies requirements are designed only for students in the College of Arts and Sciences, but they also fulfill the University's General Education requirements. Courses in a student's major may not be used to fulfill requirements in Fine Arts and Literature, Letters, Natural Sciences, or Social Sciences. Students completing a double major, however, may use courses from one major of their choice to fulfill these requirements.\*

### BACHELOR OF ARTS

English Communication: 6 credits (3 must be in a writing course; the other 3 may be in another writing course at the 200 level or higher or may be selected from the general communication courses)

Fine Arts and Literature: 6 credits (3 in Fine Arts; 3 in Literature)

Foreign Language/Cross-Cultural Competence: 6 credits

Choose one of the following options:

- Two-course sequence in a language studied for two or more years in high school through at least the 103 level in a modern language or 301 in a classical language
- Demonstration of competence through the intermediate level by examination or by successful completion of 104 (or higher) in a modern language or 302 in a classical language
- Two-course sequence in a language not previously studied (or studied for less than two years in high school) through the beginning level (101, 102)
- Study abroad in an approved academic program for at least one semester. Summer programs, including the URI in England program, will not satisfy this requirement.

Letters: 6 credits\* (Must be from multiple disciplines.)

Mathematical and Quantitative Reasoning: 3 credits

Natural Sciences: 6 credits\* (Must be from multiple disciplines.)

Social Sciences: 6 credits\* (Must be from multiple disciplines.)

### BACHELOR OF SCIENCE, BACHELOR OF FINE ARTS, AND BACHELOR OF MUSIC

English Communication: 6 credits

(3 must be in a writing course; the other 3 may be in another writing course at the 200 level or higher or may be selected from the general communication courses)

Fine Arts and Literature: 6 credits

(3 in Fine Arts; 3 in Literature)

Foreign Language/Cross-Cultural Competence: 6 credits

Choose one of the following options:

- Two-course sequence in a language studied for two or more years in high school through at least the 103 level in a modern language or 301 in a classical language
- Demonstration of competence through the intermediate level by examination or by successful completion of 104 (or higher) in a modern language or 302 in a classical language
- Two-course sequence in a language not previously studied (or studied for less than two years in high school) through the beginning level (101, 102)
- Study abroad in an approved academic program for at least one semester. Summer programs will not satisfy this requirement.

• Two courses in cross-cultural competence selected from the following list: FRN 309 [D], 310 [D], 320 [D], 391, 392; HIS 132 [D], 171 [D], 172 [D], 180 [D], 311 [D], 327 [D], 374 [D], 375 [D]; HPR 201/202F; NRS 300; NUR 160; PHL 331 [D]; RLS 131 [D]; SPA 320 [D]; TMD 224 [D]. Six credits of a full-semester approved

Intercultural Internship in a foreign country through the Center for Career and Experiential Education may be substituted for cross-cultural competence courses.

Letters: 6 credits

Mathematical and Quantitative Reasoning: 3 credits

Natural Sciences: 6 credits

Social Sciences: 6 credits

\* Students may use only one course per discipline (as identified by the course code) to fulfill requirements in Letters, Natural Sciences, and Social Sciences, except that students earning both a B.A. and another degree are exempt from this rule. For an explanation of course codes, see How to Read This Catalog.

## Bachelor of Arts

The Bachelor of Arts curriculums provide a general cultural background and an opportunity to major in any one of 31 fields of study.

Each candidate for a B.A. degree must meet certain minimum curricular requirements in quantity and quality. These requirements include at least 120 passed credits, with at least 42 credits in courses numbered 300 or above, and an overall grade point average of at least 2.00. In addition to meeting the requirements of the Basic Liberal Studies program, each candidate must complete a major and a number of elective courses. The major totals 27-36 credits.

The B.A. major is the discipline or subject area in which the degree is granted. It may include not only required courses within the major department but also courses in related subjects. Students should declare this major before the end of their fourth semester.

The major comprises no fewer than 27 nor more than 36 credits. These, however, are exclusive of any credits that are outside the major department but may be required by that department as prerequisites. Including such prerequisites, the major may not exceed 39 credits.

Students may earn up to 15 credits in their major department in addition to those required for the major as identified by course code, counting as electives those credits earned in excess of the major requirements. Any credits in excess of this number in the major will not count toward the 120 credits required for graduation.

At least half of the credits in the major must be earned at URI.

Majors include: Africana studies, anthropology, art (history and studio), chemistry, Chinese, classical studies, communication studies, comparative literature studies\*, computer science, economics, English, film media, French, gender and women's studies, German, history, Italian, journalism, Latin American studies\*\*, mathematics, music (music, jazz studies, and music history and literature), philosophy, physics\*\*, political science, psychology, public relations, sociology, Spanish, and writing and rhetoric.

\*As of June 2010, admission to the Bachelor of Arts (B.A.) program is suspended. For program details, please refer to the **2010-2011 URI Catalog**. The minor is still available (see **Interdepartmental Minors**).

\*\*As of June 2009, new admissions to this program have been suspended. For program details, please refer to the 2009-2010

URI Catalog.

## Bachelor of Science

The Bachelor of Science curriculums are professionally oriented and, in general, meet the accreditation standards of national professional associations.

All candidates for the B.S. degree must fulfill the requirements of the Basic Liberal Studies program and complete a major of 30-55 credits within a department or program. In addition, a department may require for its major certain courses in other departments, with the stipulation that these courses may still be applied to the Basic Liberal Studies program requirements. Students must earn an overall grade point average of at least 2.00. No more than 130 credits can be required in a program. At least half the credits in the major must be earned at URI. Each major within the B.S. curriculum has certain specific requirements, as listed in the following sections.

Majors include: chemistry, chemistry and chemical oceanography\*, chemistry and forensic chemistry, computer science, economics, mathematics, physics, physics and physical oceanography, psychology, and sociology.

\*As of June 2009, new admissions to this program have been suspended. For program details, please refer to the 2009-2010 URI Catalog.

## Bachelor of Fine Arts

URI's Bachelor of Fine Arts curriculums provide the opportunity to discover and develop creative capacities in the fine arts. The emphasis is on richness of program and quality of experience rather than the development of isolated skills. All candidates for the B.F.A. degree are required to meet the requirements of the Basic Liberal Studies program and to earn an overall grade point average of at least 2.00. At least half the credits in the major must be earned at URI.

Majors include: art and theatre.

## Bachelor of Music

The Bachelor of Music curriculum is designed to prepare qualified students for careers in the field of music. Students may select one of three majors depending on their aims and abilities. Admission requirements for the music education program are described in "Teacher Education Programs" in **Preprofessional Preparation** and in "Education" (Admission Requirements).

All candidates for the B.M. degree are required to meet the Basic Liberal Studies requirements and to earn an overall grade point average of at least 2.00. At least half the credits in the major must be earned at URI. Students are expected to attend department-sponsored events each semester.

Majors include: music composition, music education, and music performance (see "Music" in the alphabetical descriptions of majors later in this section).

All areas provide for a good background in academic subjects, and each curriculum contains courses for the development of sound musicianship and excellence in performance. An audition conducted by members of the Music Department is

required for permission to register for work toward the B.M. degree. The music education curriculum includes courses in educational psychology, conducting, methods, and a teaching internship that leads to state certification for teachers.

The total number of credits required for graduation is 124 for music composition, 128 for music education, and 124 for music performance.

## Arts and Sciences Undergraduate Programs

### Africana Studies

Faculty: Professor Quainoo, interim director. Professors Dilworth, OkekeEzigbo, and Weisbord; Associate Professors Harris, and Schwartz; Assistant Professor Ferguson; Adjunct Faculty Barber, McCray, and Smith.

The Africana program is an interdisciplinary program offered jointly by URI and Rhode Island College. Students in this program may take courses at either institution to fulfill major requirements. Students may also choose to study abroad in affiliated programs in the following countries: Belize, Cape Verde, and Ghana. Programs related to the African diaspora may also qualify for AAF credit. The major's objective is to broaden students' intellectual and global experiences through the study of Africa and African diaspora.

Students selecting this major must complete a minimum of 30 credits including AAF 201 and 202. Six credits must be selected from each of the following areas: history and politics (AAF 290, 300; AAF/HIS 150, 359, 388; AAF/PSC 380, 408, 410, 415, 466; PSC 372; WMS 351); arts and humanities (AAF/ARH 330, 331; AAF/ENG 247, 248, 360, 362, 363, 364, 474); and social and behavioral science (AAF 300; AAF/COM 333; COM 310A, 465). The remaining 6 credits must be chosen from courses approved for the above groups.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above. A minor is also available (see Africana Studies) in Interdepartmental Minors.

### Anthropology

The Department of Sociology and Anthropology offers the degree of Bachelor of Arts (B.A.) in anthropology.

Faculty: Professor Peters, chairperson. Professor Poggie; Assistant Professors Bovy, Dunsworth, and GarciaQuijano; Professors Emeriti LaVelle and Loy.

Students desiring to major in anthropology must complete a total of 30 credits (maximum 45 credits) in anthropology including introductory courses: APG 200, 201, 202, and 203 (12 credits); methods courses: APG 300, 302, 412, or 417 (3 credits); theory courses: APG 401 (3) and APG 327 or 417 (3), for a total of six credits. Note: APG 417 may be taken to fulfill either the methods or theory requirement, but not both. The remaining nine credits may be from any APG course. No more than six credits in independent study and/or field experience courses may be used toward the 30 credits required for the major.

It is strongly recommended that anthropology majors take at least one course in inferential statistics (e.g., STA 308 or 409), complete a foreign language through the intermediate level, and gain computer proficiency. Early in the junior year, students who plan to go on to graduate school should meet with their advisor for curricular counseling.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above. In order to transfer into the anthropology program from University

College, a student must have completed at least 24 credits and have earned a minimum of a 2.00 GPA.

### Arabic

The Department of Modern and Classical Languages and Literatures offers a number of undergraduate courses in Arabic.

Faculty: Assistant Professor Magidow

### Art and Art History

The Department of Art offers a Bachelor of Arts (B.A.) degree with a major in either art or art history, and a Bachelor of Fine Arts (B.F.A.) degree in art.

Faculty: Professor Onorato, chairperson. Professors Dilworth, Hollinshead, Matthew, Pagh, Richman, and Wills; Associate Professors Anderson and Hutt; Professors Emeriti Calabro, Fraenkel, Holmes, Klenk, Leete, and Roworth.

#### BACHELOR OF ARTS

Art. It is recommended that students intending to major in art plan to complete foundation studio courses (ART 101, 103, 207) and one art history course (ARH 251 or 252) in the freshman year. For graduation, a minimum of 36 credits in the major (maximum 51) must be completed, including: studio courses ART 101 (3), 103 (3), and 207 (3); art history courses ARH 251 (3), 252 (3); and two art history electives (6) at the 300 level or above, one of which must be selected from the following modern or contemporary art courses: ARH 331, 361, 362, 364, 374, 375, 376, 377, 380 (with topic approved by chair), 480 (with topic approved by chair).

Students must participate in ART 002, Sophomore Review, in the first semester of their sophomore year. Sophomore review is a special evaluation set up to provide individual studio art majors with timely feedback from the art department faculty once they have completed the foundation courses (ART 101, 103, 207) and are ready to take more advanced and specialized studios. Eligible students are Sophomore or Junior ART majors (BA or BFA) who have completed ART 101, 103, and 207 with at least a 2.3 GPA in those classes.

Eligible students should: Register for ART 002 in the first semester possible (freshman may register in the spring semester for the Fall sophomore review). They should prepare a portfolio of 15 but no more than 20 of their best works from the Foundation courses. A student should fill out the Statement of Purpose form available in the Department office or website when registering for the course.

An additional six (6) credits must be selected from one of the following sequences of studio courses: ART 204, 304; 213, 314; 214, 315; 215, 316; 221, 322; 231, 332; 233, 334; 243, 344. This sequence must be completed by the end of the junior year. An additional three (3) credits of studio art on the 200 or 300 level must be selected.

In the senior year, an additional six (6) credits must be selected from 300 level studio courses (except 301) or ART 405. Many students choose to do an internship in their junior or senior year. Consult with your advisor before registering for ART 307 Art Internship.

A total of 120 credits is required for graduation. Students must



fulfill the requirements of the Basic Liberal Studies program and take 24–39 credits in art and 12 credits in art history. Of the 120 credits required for graduation, 42 credits must be in courses numbered 300 or above.

**Art History.** It is recommended that students intending to major in art history plan to complete a minimum of six credits in the history of art by the end of the sophomore year. For graduation, students must complete a minimum of 30 credits (maximum 45 credits) in art history, including ARH 251 and 252 (6). At least 12 credits must be taken from ARH 354, 356, 359, 361, 362, 365. An additional six credits must be taken from the preceding group or one or more 200 or 300 level ARH courses except ARH 300 or 371. An additional six credits must be taken at the 400 level. At least three of these credits must be taken from ARH 461, 475, 480. It is recommended that students who expect to pursue graduate studies in art history take ARH 469 or 470.

It is recommended that students majoring in art history achieve intermediate level proficiency in at least one foreign language. Students anticipating graduate study in art history may need proficiency in a second foreign language. Students are also encouraged to enroll in courses in art studio, history, literature, music, and philosophy.

A total of 120 credits is required for graduation. Students must fulfill the requirements of the Basic Liberal Studies program and take 30–45 credits in art history. Students may use an approved course in art studio to satisfy Basic Liberal Studies requirements. Of the 120 credits required for graduation, 42 credits must be in courses numbered 300 or above.

### **BACHELOR OF FINE ARTS**

It is recommended that students intending to enter the B.F.A. program complete foundation courses (ART 101, 103, 207) and one art history course (ARH 251 or 252) in the freshman year. B.F.A. majors should complete a minimum of 24 credits in ART courses by the end of the sophomore year.

Students in the B.F.A. program must complete a minimum of 72 credits in the major. Art courses required of all majors include ART 101 (3), 103 (3), 207 (3), and 405 (3). An additional 18 credits must be selected from 200 level ART courses, and an additional 27 credits must be selected from 300 or 400 level ART courses.

Students must participate in ART 002, Sophomore Review, in the first semester of their sophomore year. Sophomore review is a special evaluation set up to provide studio art majors with timely feedback from Department faculty once they have completed the foundation courses (ART 101, 103, 207) and are ready to take more advanced and specialized studios.

Eligible students are Sophomore or Junior ART Majors who have completed ART 101, 103, and 207 with at least a 2.3 GPA in those classes.

Eligible students should: Register for ART 002 in the first semester possible (freshman may register in the spring semester for the Fall sophomore review). They should prepare a portfolio of 15 but no more than 20 of their best works from the Foundation courses. A student should fill out the Statement of Purpose form available in the Department office or website when registering for the course.

By the end of sophomore year, the BFA student is encouraged to complete at least 24 credits in studio art and at least 6 credits in art history.

B.F.A. students must take 15 credits in art history, including ARH 251, 252, nine (9) credits at the 300 level or above, three credits of which must be selected from the following modern or contemporary art history courses: ARH 331, 361, 362, 364, 374, 375, 376, 377, 380 (with topic approved by chair), 480 (with topic approved by chair). Note: Only 3 credits from ARH 374, 376, or 377 may be used toward the 72 credits required for the major.

Many students choose to do an internship in their junior or senior year. Consult with your advisor before registering for ART 307 Art Internship.

Outstanding students may be permitted by the Department to substitute other studio courses for the 100 and 200 level courses listed above after a portfolio review arranged by their departmental advisor.

A minimum of 120 credits is required for graduation, including the following: major requirements in art (57), and art history (15). Students must meet the requirements of the Basic Liberal Studies program and may not use an ARH or ART course to fulfill the Fine Arts category of this requirement.

## **Chemistry**

The Department of Chemistry offers a Bachelor of Arts (B.A.) degree and a Bachelor of Science (B.S.) degree. The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in chemistry.

Faculty: Professor Euler, chairperson. Professors Dain, Freeman, Kirschenbaum, Lucht, Oxley, Rosen, Smith, and S. Yang; Associate Professor DeBoef; Assistant Professors Dwyer, Kiesewetter, and Levine; Professors Emeriti C. Brown, P. Brown, Cheer, Cruickshank, Goodman, Nelson, Rosie, and Traficante.

### **BACHELOR OF ARTS**

Students in this program must complete a minimum of 31 credits (maximum 45) in chemistry by taking either 10 credits as CHM 191, 192 or 8 credits as CHM 101, 102, 112, 114; and 20 credits as CHM 212, 226, 227, 228, 335, 431, and 432 or 20 credits as CHM 212, 291, 292, 335, 431, and 432. One additional course must be chosen from CHM 401, 412, 427, or 441. CHM 229 and 230 may be substituted for CHM 226.

MTH 141 and 142 and one year of physics (PHY 111, 112, 185, and 186, or PHY 203, 204, 273, and 274) are required. A total of 120 credits is required for the B.A. At least 42 of these must be in courses numbered 300 or above.

### **BACHELOR OF SCIENCE**

Designed to prepare the student for a career in chemistry, this curriculum provides a thorough training in both theory and practice in the fields of analytical, physical, organic, biochemistry, and inorganic chemistry. Those who complete this curriculum are prepared to practice as a chemist, pursue graduate studies in chemistry, or enroll in a professional school in a related area such as medicine, dentistry, or pharmacy. Preprofessional studies can be focused through the use of electives.

The B.S. degree is accredited by the American Chemical Society Committee on Professional Training of Chemists. Graduates receive a certification card issued by the society and are eligible for senior membership after two years of experience in the field of chemistry. It is strongly recommended that WRT 104 or 106 be taken in the freshman year. CHM 425, 427 should be taken in the junior year by students planning research or advanced course work in organic chemistry. Six credits of "curriculum requirements" shall include either CHM 353 or any 500level courses with department approval.

B.S. students desiring the American Chemical Society option in chemistry/biochemistry must take BCH 581, 582. Six additional credits in undergraduate research (CHM 353) are also required to satisfy requirements for advanced laboratory. CHM 353 will be supervised by faculty with expertise in biochemistry. Students electing the chemistry/biochemistry option may wish to take additional courses in molecular biology as electives.

A total of 120 credits is required for the B.S. degree. Accreditation guidelines require chemistry majors to take 55 credits toward the chemistry major.

*Freshman Year First semester: 16–18 credits*

CHM 191 (5) (or CHM 101, 102 [4]); MTH 141 (4), language or free elective (3), Basic Liberal Studies requirements (5-6).

*Second semester: 16–18 credits*

CHM 192 (5) (or CHM 112, 114 [4]); MTH 142 (4), language or free elective (3), Basic Liberal Studies requirements (5-6).

*Sophomore Year First semester: 17 credits*

CHM 212 (4); CHM 227 or 291 (3); MTH 243 (3); PHY 203, 273 (4), language or Basic Liberal Studies requirements (3).

*Second semester: 18 credits*

CHM 292 (5) (or CHM 226, 228 [5]); MTH 244 (3); PHY 204, 274 (4), language or Basic Liberal Studies requirements (6).

*Junior Year First semester: 15 credits*

CHM 335 (2), 431 (3); PHY 205, 275 (4); Basic Liberal Studies requirement (3), free elective (3).

*Second semester: 17 credits*

CHM 412 (3), 414 (2), 432 (3); Basic Liberal Studies requirements (6), free elective (3).

*Senior Year First semester: 14–19 credits*

CHM 401 (3), 425 (2), 427 (3), curriculum requirements (3-6), free electives (3-5).

*Second semester: 15 credits*

CHM 492 [capstone] (1), 402 (2), 441 (3), free electives (9).

## Chemistry and Chemical Oceanography

The Department of Chemistry and the Graduate School of Oceanography offer a Bachelor of Science (B.S.) degree in

chemistry and chemical oceanography. The faculty consists of the members of the department and the GSO's chemical oceanography faculty. As of June 2009, new admissions to this program have been suspended. For program details, please refer to the 2009-2010 URI Catalog.

## Chemistry and Forensic Chemistry

The Department of Chemistry offers a Bachelor of Science degree in chemistry and forensic chemistry.

*Coordinator: Professor Euler*

Students who earn a degree in chemistry and forensic chemistry have a number of potential career opportunities. Most forensic chemists work in government laboratories, typically affiliated with a medical examiner's office. Students wishing to earn an American Chemical Society accredited degree need to take only CHM 402 and 492 and PHY 205 and 275.

The course sequence given below is the typical curriculum for majors in chemistry and forensic chemistry, but modifications in the timing of upper level courses are acceptable. The degree emphasizes a strong preparation in chemistry supplemented by an introduction to the field of forensic science. In addition to the required courses, students are encouraged to take SOC 230, Crime and Delinquency, to meet one of their social science general education requirements.

A total of 120 credits is required for graduation.

Freshman and sophomore years follow the same program as the B.S. in chemistry (see above).

*Junior Year: First semester: 15 credits*

CHM 335 (2), 354 (3), 391 (1), 431 (3), Basic Liberal Studies requirement (3), free elective (3).

*Second semester: 17 credits*

CHM 392 (3), 412 (3), 414 (2), 432 (3), Basic Liberal Studies requirement (6).

*Senior Year: First semester: 15 credits*

CHM 391 (1), 401 (3), 425 (2), 427 (3), free electives (6).

*Second semester: 16 credits*

CHM 354 (3), 391 (1), 441 (3), free electives (9). For more information see [chm.uri.edu](http://chm.uri.edu).

## Chinese

The Department of Modern and Classical Languages and Literatures offers the Bachelor of Arts (B.A.) degree with a major in Chinese.

Faculty: Associate Professor He, section head. Assistant Professor Xiong.

Students selecting the Chinese major are required to complete at least 30 credits (maximum 45) in Chinese, not including CHN 101, 102, 111 or equivalent. Students must complete six credits in Chinese literature and civilization, at least three of which must be taken at the 400 level. Students must also

complete one additional 400-level Chinese course.

In addition, students must take six credits in Chinese/Asian culture such as Chinese/Asian politics, history, philosophy, arts, etc. offered in English through other departments. Students must choose these six credits from the courses listed below, which can be counted towards the General Education requirement, or from other courses on Chinese culture and civilization as approved by the section head: HIS 171, 374; PHL 331; PSC 116, 377; RLS 131; THE 382.

Students completing the B.A. with a major in Chinese simultaneously with the International Engineering Program, the International Business Program, or the Chinese Language Flagship Program may use three credits of Chinese literature towards the Fine Arts and Literature Basic Liberal Studies requirement. In addition, students in these programs are exempt from the one-course-per-discipline rule in Letters, Social Sciences, and Natural Sciences. A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Classical Studies

The Department of Modern and Classical Languages and Literatures offers the Bachelor of Arts (B.A.) degree with a major in classical studies.

Faculty: Professor Carpenter, section head.

Classical Studies Track. Students selecting classical studies as a major must complete a minimum of 30 credits. Twenty-four of the 30 credits must be in Latin and Greek (only six credits of either LAT 101, 102, or GRK 101, 102 may count toward the required 24 credits) as follows: a) a minimum of six credits in each language (12); b) the balance of 12 credits in either or both language(s) (12). The remaining six credits must be from the following: ARH 354; CLA 391, 395, 396, 397; HIS 300, 303; PHL 321 (6). Other courses may be substituted with permission of the section head.

Certification in secondary education in Latin is available through the Department of Education.

Classical Civilization and Culture Track. Students selecting classical civilization and culture as a major must complete a minimum of 30 credits. Students must complete a Latin sequence through LAT 302 or a Greek sequence through GRK 302 (12 credits). Students must take five courses (15 credits) from the following list of courses: APG 417; ARH 354, 475; CLA 391, 395, 396, 397; ENG 366, 368; GRK 497; HIS 110, 111, 300, 303, 490; PHL 321; LAT 497. Other courses may be substituted with permission of the section head. The final requirement (3 credits) is CLA 497, which is the capstone course for the major.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

Only two 100-level courses may count for the major (usually LAT 101, 102 or GRK 101, 102). Courses that may be taken multiple times are CLA 497; GRK 302, 497; LAT 302, 497.

## Communication Studies

Part of the Harrington School of Communication and Media ([uri.edu/harrington](http://uri.edu/harrington)), the Department of Communication Studies offers the Bachelor of Arts (B.A.) degree in communi-

cation studies.

Faculty: Professor McClure, chairperson. Professors Brownell, Chen, Ketrow, Logan, N. Mundorf, Salazar, Swift, Torrens, and Wood; Associate Professors Derbyshire, DiCioccio, Healey Jamiel, Leatham, Reyes, Roth, Quainoo, and Ye; Assistant Professor Petronio; Lecturers Alfano, August, Bell, Cabral, Fonseca, Greenwood, Monksgaard, Morrison, J. Mundorf, Poulakos, Proulx, R. Smith, Stifano, Waitkun, and Wales; Professors Emeriti Anderson, Devlin, and Doody.

URI's program in communication studies provides maximum flexibility in planning for a variety of academic and occupational goals. The curriculum is personalized for each student. Although the student will play an important role in curriculum planning, his or her program is closely supervised by the advisor. Departmentally approved courses provide diversity or a more focused approach, depending on the student's needs and goals. Courses outside the department that relate to the student's needs and goals are also encouraged.

Students selecting this major may pursue studies in business and professional communication, communication theory, oral interpretation, rhetoric and public address, public relations, radio and TV advertising, and similar career goals.

Students must achieve a minimum grade of B in COM 100 or COM 110 in order to transfer to the College of Arts and Sciences with a major in Communication Studies. The program requires a minimum of 36 credits (maximum 51) in the major, including COM 202, 221, 381, 382, and 383. The remaining credits will be distributed as follows: at least two courses (6 credits) of COM 200 level; at least two courses (6 credits) of COM 300 level; and at least three courses (9 credits) of COM 400 level. A student must maintain a 2.00 grade point average in her or his major to meet graduation requirements. Courses of independent study (COM 471, 472, 491, 492) and internships do not fulfill the requirements for the major or minor.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Comparative Literature Studies

As of June 2010, admission to the Bachelor of Arts (B.A.) program is suspended. For program details, please refer to the 2010-2011 URI Catalog. The minor is still available (see Interdepartmental Minors). Coordinator: Professor Walton (English).

## Computer Science

The Department of Computer Science and Statistics offers the Bachelor of Arts (B.A.) and the Bachelor of Science (B.S.) degree in computer science. The department also cosponsors the B.S. in computer engineering (described in the College of Engineering section). At the graduate level, the department offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in computer science. The department also offers a Graduate Certificate in Digital Forensics and a Graduate Certificate in Cyber Security.

The department also offers a 24-credit minor in computer science, a minor in cyber security, and a minor in digital forensics.

Faculty: Professor Peckham, chairperson. Professors DiPippo, FayWolfe and Lamagna; Associate Professors Baudet, Hamel, and Hervé; Adjunct Assistant Professors Dickerman, Epstein, Henry, MelloStark, and Ravenscroft; Professors Emeriti Carrano and Kowalski; Joint Appointments Assistant Research Professor Alashwal (Pharmacy), Assistant Professor Zhang (CMB/CELS).

Students majoring in computer science who leave URI and are subsequently readmitted must follow the computer science curriculum requirements in effect at the time of their readmission unless an exception is granted by the department chairperson and approved by the dean.

### BACHELOR OF ARTS

The B.A. curriculum is designed to provide a solid foundation in the fundamentals of computer science.

In order to transfer from University College for Academic Success to the College of Arts and Sciences as a B.A. computer science major (or to be coded as such in the College of Arts and Sciences), a student must have completed CSC 211, CSC 212, and MTH 141, and must have at least a 2.00 cumulative GPA in all CSC and MTH courses required in the B.A. program that have been completed at the time of the application for transfer.

Students in the B.A. curriculum must complete a minimum of 36 credits (maximum 51) as follows: CSC 106 (4), 110 (4), 211 (4), 212 (4), 301 (4), 305 (4); one of 411 or 412 (4); one programming course from the following: CSC 402, 406, 415, 450, 481; one additional CSC or CSF course at the 300level or above, except that CSC 392, 491, and 492 may be used only with prior departmental approval. CSC 499 may not be used. Also required are MTH 141 (4) and one more course from the following list: MTH 142, 215, CSC 340, STA 409 (3 or 4); one course from among WRT 104, 106, HPR 112 and one course from WRT 201, 333 (6).

A total of 121 credits is required for graduation; at least 42 of these credits must be at the 300 level or above. A possible course of studies follows.

#### *Freshman Year First semester: 14 credits*

CSC 106 (4); WRT 104 (3); URI 101 (1); Basic Liberal Studies (3); Elective (3)

#### *Second semester: 17 credits*

CSC 110 (4); MTH 141 (4); Basic Liberal Studies (9)

#### *Sophomore Year First semester: 16 credits*

CSC 211 (4); MTH (3); Basic Liberal Studies (3); Electives (6)

#### *Second semester: 16 credits*

CSC 212 (4); WRT 333 (3); Basic Liberal Studies (6); Elective (3)

#### *Junior Year First semester: 17 credits*

CSC 301 (4), 305 (4); Basic Liberal Studies (3); Electives (6)

#### *Second semester: 14 credits*

CSC 412 (4); CSC elective (4); Basic Liberal Studies (3); Elective (3)

#### *Senior Year First semester: 16 credits*

CSC/CSF elective (4); Basic Liberal Studies (6); Electives (6)

#### *Second semester: 12 credits*

Basic Liberal Studies (3); Electives (9)

### BACHELOR OF SCIENCE

The B.S. curriculum is designed to provide a broad introduction to the fundamentals of computer science including software and systems, programming languages, machine architecture, and theoretical foundations of computing. The required mathematics preparation provides a basis for advanced work. Students will be well prepared for careers or graduate study in computer science.

In order to transfer from University College to Arts and Sciences as a B.S. computer science major (or to be coded as such in the College of Arts and Sciences), a student must have completed CSC 211, CSC 212, MTH 141, and MTH 142 and must have at least a 2.00 cumulative GPA in all CSC and MTH courses required in the B.S. program that have been completed at the time of the application for transfer.

Students in the B.S. curriculum must complete a minimum of 56 credits as follows: CSC 106 (4), 110 (4), 211 (4), 212 (4), 301 (4), 305 (4), 340 (4), 411 (4), 412 (4), 440 (4), 499 (4); one course from CSC 402, 406, 415, 450, 481 (4); and 445 (4); any two additional CSC or CSF courses at the 300level or above, only one of the two courses may be a CSF course, CSC 392, 491, 492 may be used only with prior departmental approval. CSC 499 may not be used.

Students must also complete MTH 141 (4), 142 (4), and two courses from MTH 215, 243, 244, 322, 362, 382, ISE 432, STA 409, 411, 412 (3 or 4); two courses from PHY 203/273, 204/274, CHM 101/102, 112/114, BIO 101, 102, GEO 103, OCG 123 (8); and one course from WRT 104, 106, HPR 112, and one course from WRT 201, 333 (6).

A total of 124 credits is required for graduation. A possible course of studies follows.

#### *Freshman Year First semester: 14 credits*

CSC 106 (4); URI 101 (1); WRT 104 (3); Electives (6).

#### *Second semester: 17 credits*

CSC 110 (4); MTH 141 (4), Basic Liberal Studies requirements (9).

#### *Sophomore Year First semester: 17 credits*

CSC 211 (4); MTH 142 (3); Natural Science (4), Basic Liberal Studies (3), Elective (3).

#### *Second semester: 17 credits*

CSC 212 (4); MTH (3); Natural Science (4); WRT 333 (3), Basic Liberal Studies (3).

#### *Junior Year First semester: 15 credits*

CSC 301 (4), 305 (4), CSC/CSF elective (4), MTH (3).

*Second semester: 15 credits*

CSC 340 (4), 412 (4), CSC elective (4), Basic Liberal Studies (3).

*Senior Year First semester: 14 credits*

CSC 411 (4), 440 (4), Basic Liberal Studies (3), Electives (3).

*Second semester: 16 credits*

CSC 499 (4), CSC elective (4), Electives (8).

#### *Minor in Computer Science*

Students declaring a minor in computer science must earn 24 credits including CSC 211 (4), 212 (4), 301 (4), and two other CSC courses at the 300 level or above (8). In addition, students are expected to complete MTH 141 (4).

#### *Minor in Digital Forensics*

Students declaring a minor in digital forensics must take the following courses: CSF 410 (4), 412 (4), 414 (4), and six credits from HPR 108 (3), CHM 392 (3), PSC 274/SOC 274 (3), PSC 388 (3), CSC 491 (1-3), CSC 499 (1-3).

Minor in Cyber Security Students declaring a minor in cyber security must take the following courses: CSF 430 (4), CSF 432 (4), CSF (434), and two courses from CSF 410 (4), 524 (4), 536 (4), 538 (4), CSC 417 (4), CSC 418 (4), 541 (4), HPR 108 (3), other faculty approved courses.

#### *International Computer Science Program*

The Computer Science Department, under the auspices of the International Engineering Program (IEP) and the Department of Languages, also provides students the opportunity to participate in the International Computer Science Program (ICSP).

Students who complete the five-year program will earn two degrees: a B.S. or B.A. degree in computer science and a B.A. degree in German, French, or Spanish. In addition to computer science courses, students study the language, business, and culture of one or more countries in which the language predominates. Additionally, students will spend six months abroad in a professional internship in a European, Latin American, or Caribbean country, and can extend the stay by completing a semester of course work at a participating university. Upon graduation, students will be well prepared to participate at an international level in computer technology and to compete in the international technological marketplace.

## Economics

The Department of Economics offers a Bachelor of Arts (B.A.) and a Bachelor of Science (B.S.) degree in economics.

Faculty: Professor Bodah, chairperson. Professors Burkett, Lardaro, McIntyre, Mead, Miller, and Ramsay; Assistant Professors Anderson, Molloy, Van Horn, and Yang.

### **BACHELOR OF ARTS**

Students selecting this field must complete a minimum of 30 credits (maximum 48) in economics, including ECN 201 and 202 (6), 305 and 306 (6), 324 or 327 (3), 323 or 328 (3), and 445.

At least 9 credits must be completed from economics courses

numbered 300 or above in addition to the core requirements. Students may substitute up to six credits from related courses taught by other departments. These substitutions must be approved by the economics department chairperson and filed with the Office of the Dean. Three of these credits can be from statistics BUS 210, 212, STA 308, 409, or 412 and do not require departmental approval. Students planning to do graduate work in economics are encouraged to take ECN 375, 376 and at least one semester of statistics.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

### **BACHELOR OF SCIENCE**

Students in this curriculum may elect one of two options, applied economics or economic theory and methods, and must inform the dean's office of the option.

Applied Economics. A minimum of 31 credits in economics including ECN 201, 202, 305, 327, 328, 375, 376, and 445. In addition, students must complete BUS 212 or MTH 451 or STA 308.

Economic Theory and Methods. A minimum of 31 credits in economics including ECN 201, 202, 305, 327, 328, 376, and 445. In addition, students must complete MTH 141, 142, 215, 243, 307, and 244 or 442 or 435. This option is recommended for students preparing for graduate study in economics.

A total of 120 credits is required for graduation.

## English

The Department of English offers a Bachelor of Arts (B.A.) degree. The department also offers the Master of Arts (M.A.) and Doctor of Philosophy (Ph.D.) in English.

Faculty: Associate Professor Trimm, chairperson. Professors Cappello, Davis, Gititi, Mandel, Stein, and Walton; Associate Professors Barber, Betensky, Covino, Karno, Rojas, and Williams; Assistant Professors Eron, Faflik, Jones, Sigler, and Valentino; Professors Emeriti Arakelian, Burke, Campbell, Cane, Cuddy, Donnelly, Leo, Neuse, and Swan.

The Major. Students majoring in this field must complete a minimum of 36 credits (maximum 52), 20 of which must be at the 300 level or above. All students must complete ENG 201 (4). The remaining 32 credits must include one course from each of the following five periods (15): pre-1500 (ENG 251, 367, 368, 381, 478); 1500-1660 (ENG 251, 280, 345, 382, 472, 479); 1660-1800 (ENG 241, 251, 345, 374, 377, 480, 482); 19th century (ENG 241, 242, 252, 347, 348, 376, 377, 448, 486); 20th century (ENG 242; ENG/AAF 248; ENG 252, 348; ENG/AAF 362, 363, 364; ENG 317, 378, 379, 383, 387, 485).

Note: Freshmen are not admitted to 300 or 400 level courses without permission of the instructor. Sophomores are discouraged from taking 100 level courses.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

The Minor. Students minoring in English are required to take 20 total English credits, which can be accomplished by taking five 4-credit classes, four of which must be at the 200 level or above.

## Film Media

Part of the Harrington School of Communication and Media ([uri.edu/harrington](http://uri.edu/harrington)), the Film Media Program offers a Bachelor of Arts (B.A.) degree and a minor.

Faculty: Professor Wills, director. Professors Ma, Manteiga, Sama, Swift, Walton, and Wood; Associate Professors De Bruin, Echevarría, Healey Jamiel, Mandel, Meagher, Moore, and Trimm; Assistant Professors Chadha and KealhoferKemp; Adjunct Professor DeSchepper; Adjunct Assistant Professors Bergstrom, Neugent, Tierney and Zorabedian; Lecturers Brown and Romanow.

The Major. Film media is an interdisciplinary program offering hands-on experience in documentary, experimental, narrative, and new media production, balanced with an emphasis on international cinemas, film/media history, criticism, and theory. Our curriculum reflects the dynamic and diverse nature of this field, approached from a perspective of film history and media theory. Students learn to work with the evolving and overlapping technologies involved in the production of moving images (including film, digital video, 3D animation, game design, and new media), with an understanding of the broadening and globalization of their cultural and aesthetic contexts. A wide range of courses is available to the film media student—courses that examine the historical, theoretical, and global approaches to the analysis and creation of moving images. The film media program prepares students for careers in such areas as independent filmmaking; animation and media design; film and television industries; advertising, marketing, and public relations; and media criticism. Graduates of this program are also prepared to continue with graduate studies, either in film and media production for an M.F.A., or in a master's or doctoral program in film and media studies.

Students majoring in film media must complete a minimum of 30 credits (maximum 45) in approved courses toward the major. All students must complete the core courses: FLM 101 or 101H, FLM 203 (or ENG 302), FLM 204 (or FLM 205), including the senior-level seminar FLM 495; a minimum of 6 credits from the production and technique category and 6 credits from the critical studies category; a minimum of 6 elective credits in courses that count toward the film major (following). This wide range of choices in film media courses permits students to design a major that will meet both personal and professional goals. Students must have a plan of study approved by an academic advisor in the film media program before beginning their coursework in the major.

Production & Technique: These courses focus on the different approaches to and practices of film/video production—how moving images are created, designed, and used to serve a variety of functions: ART 204, 215, 304, 306, 316; COM 341, 342, 445; FLM 110, 351, 401, 445, 491A; JOR 230, 331.

Critical Studies: These courses emphasize the important traditions of genre and the literary and aesthetic approaches toward understanding and valuing film media, and integrates them into their broad historical, cultural, and ideological contexts: AAF 352; ARH 374, 376, 377; CLS 451; COM 346, 414; ENG 205 D, 245, 300A, 300B, 302, 303, 304, 305D, 352, 451; FLM 203, 204, 205, 352, 444, 451, 491B, 495; FRN 320; GWS 350; HIS 358; HPR 324, 411; ITL 315; JOR 311; PHL 256; SPA 320; THE 182. FRN 320, ITL 315, and SPA 320 are taught in English. Other courses may be used for this category with prior

approval of the program director. The following topics courses have been preapproved: HPR 324 Images of Masculinity in Films, HPR 324 Rebel Images in Films, HPR 411 Film and Video Practicum, and GWS 350 Women and Film. Other film based courses may count toward the major or the minor with the permission of the film media program director. A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

The Minor. Students who declare a minor in film media must complete 18 credit hours (at least 12 at the 200 level or higher) from those courses currently eligible to count toward the major. Courses in general education may count toward the minor. All courses must be taken for a grade except for the internship (Field Experience). It is strongly suggested that at least one course in the minor be from each of the following two approaches to film and media study:

Production. These courses focus on the practices of film/video/media production, the design and creation of moving images.

Criticism. These courses address critical and theoretical approaches to film media and the broader contexts of international film history, genre, and ideology in which they are situated.

## French

The Department of Modern and Classical Languages and Literatures offers the Bachelor of Arts (B.A.) degree with a major in French.

Faculty: Associate Professor De Bruin, section head. Professors Erickson and Hammadou; Assistant Professor Kemp. Students selecting this field are required to complete at least 30 credits (maximum 45) in French, not including FRN 101, 102, 391, 392, 393. They must take three credits from FRN 412, 473, or 474. Students must also complete a minimum of three additional FRN credits at the 400 level.

Additionally, students with proven competence in French language and literature, with permission of the advisor, section head, department chairperson, and dean of the college, may take courses toward their concentration in related fields such as history, linguistics, art, or philosophy. Approval must be filed with the Office of the Dean.

Students completing the International Engineering Program or the International Business Program and the B.A. with a major in French simultaneously may use three credits of French literature toward the Fine Arts and Literature Basic Liberal Studies requirement. In addition, students in these programs are exempt from the one-course-per-discipline rule in Letters, Social Sciences, and Natural Sciences.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Gender and Women's Studies

This interdepartmental program provides an option for students interested in the interdisciplinary study of the culture and experiences of women and the ways gender affects social, cultural, political, and economic policies and structures locally, nationally, and globally.

Faculty: Associate Professor Lisberger, director. Professors Beauvais, Brownell, Cappello, Danis, Hughes, Ketrow, Luebke, Mederer, Quina, Reynolds, RolloKoster, Roworth, M. Schwartz, K. Stein, and Walton; Associate Professors Derbyshire, de los Heros, Ferguson, Karno, Kirchner, Kusz, Lisberger, K. Owens, Pegueros, Rusnock, Sama, and Torrens; Assistant Professor Xu; Parttime Professors Akanji, Brennan, Caronia, Evans, Hagen, Herron, Kosmider, Labelle, Lee, Longa, Macfarlan, Marshall, Murphy, Nichols, Petronio, Pisa, Riley, Rose, Russell, Rutherford, Ryder, Saunders, and Vaccaro; Lecturer Ryder.

The Major. This program leads to a Bachelor of Arts (B.A.) degree in gender and women's studies.

The program requires 30 credits for a major. Five required courses are GWS 150, 300 or 320 or ITR 301/302, 310 or 325, 315, and 400. Five courses needed to complete the concentration, of which one must be a GWS listing, may be selected from: AAF 290, 355; APG 310, 328; ARH 385; BUS 346; COM 221, 322, 326, 441; CPL 202; ECN 386; ENG 260, 317, 385; GEG 202; GWS 220, 301, 305, 306, 317, 325, 350, 351, 360, 365, 370, 386, 387, 401, 402, 490, 500, 501, 502; HDF 205, 230, 291, 298, 430, 432, 433, 434, 437, 505, 559; HIS 118, 145, 146, 308, 350, 351, 352, 355, 376, 387, 391; KIN 475, 555; NUR 150, 343, 459; NVP 200; PHL 210; PSC 441; PSY 430, 466, 480; SOC 212, 242, 350, 413, 420, 430, 437; TMD 224; and WRT 645. In addition to this list, there are special courses offered by various departments each year that may be selected with prior approval of the Gender and Women's Studies Advisory Committee, and some additional preapproved topics courses not offered on a regular basis. Students must file a program of study with the dean's office. The Gender and Women's Studies Advisory Committee also strongly recommends that majors take an additional 18 credits in a specialized area as a minor.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above. A GPA of at least 2.00 in the major and overall is required to graduate.

The Minor. Students who declare a minor in gender and women's studies are required to complete 18 credits including GWS 150 and GWS 315, and three credits from any other GWS course. The remaining nine credits may be selected from any GWS course or from the following: AAF 290, 300C; APG 328; ARH 285; BUS 346; COM 322; ECN 386; ENG 260, 317, 385; HDF 230, 298, 430, 432, 433, 437, 505, 559; HIS 118, 146, 308, 352, 391; KIN 475; NUR 150, 459; PHL 210; PSY 430, 466, 480; SOC 212, 242, 413, 420, 430; TMD 224. There may be additional courses offered by various departments each year that may be selected with prior approval of the Gender and Women's Studies Advisory Committee. A GPA of at least 2.00 is required.

PostBaccalaureate Certificate. Please see Gender and Women's Studies in Graduate Programs.

## German

The Department of Modern and Classical Languages and Literatures offers the Bachelor of Arts (B.A.) degree with a major in German.

Faculty: Associate Professor Rarick, section head. Professor Hedderich; Associate Professor von Reinhart; DAAD Visiting Professor Geithner, Professor Emeritus Grandin, Kirchner.

Students selecting this major complete at least 30 credits (maximum 45) in German, not including GER 101, 102, 111,

and 112. Students must complete six credits in literature, at least three of which must be taken at the 400 level, and must complete one additional 400level German course. Students in the International Engineering Program must complete GER 411.

Students completing the International Engineering Program or the International Business Program and the B.A. with a major in German simultaneously may use three credits of German literature toward the Fine Arts and Literature Basic Liberal Studies requirement. In addition, students in these programs are exempt from the onecourseperdiscipline rule in Letters, Social Sciences, and Natural Sciences.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Hebrew

The Department of Modern and Classical Languages and Literatures offers a number of undergraduate courses in Hebrew.

## History

The Department of History offers a Bachelor of Arts (B.A.) degree. The department also offers the Master of Arts (M.A.) degree in history.

Faculty: Professor George, chairperson. Professors Honhart, Mather, RolloKoster, and Rusnock; Associate Professors Buxton, Ferguson, Pegueros, Sterne, and Widell; Assistant Professors Loomis and Verskin; Lecturers Reumann and Ward; Associate Research Professor Jensen; Professors Emeriti Cohen, Findlay, Gutchen, Kim, Klein, Schwartz, Strom, Thurston, and Weisbord.

Students selecting this field must complete a minimum of 30 credits (maximum 45) in history, including a minimum of six and a maximum of 12 credits in courses numbered 100 to 299. The balance of required credits is in courses numbered 300 or above, including (1) HIS 401 or 441 or 481 and (2) HIS 495. The two 400level courses should be taken in consecutive semesters with the same instructor. Under unusual circumstances, with permission of the department chairperson, a student may substitute, in place of the seminar, HIS 391 leading to a substantial research paper. Capstone courses in this major are HIS 401, 441, 481, and 495.

Undergraduates wishing to take courses on the 500 level must secure the permission of the chairperson.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Italian

The Department of Modern and Classical Languages and Literatures offers the Bachelor of Arts (B.A.) degree with a major in Italian.

Faculty: Professor Sama, section head. Professor La Luna.

Students selecting this major must complete at least 30 credits (maximum 45), including at least two 400level courses. ITL 100, 101, and 102 may not be used toward the 30 credits required for the major. Students may use up to three credits

from ITL 390 or 395 toward the 30 credits required for the major.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Japanese

The Department of Modern and Classical Languages and Literatures offers a number of undergraduate courses in Japanese.

## Journalism

Part of the Harrington School of Communication and Media ([uri.edu/harrington](http://uri.edu/harrington)), the Department of Journalism offers the Bachelor of Arts (B.A.) degree.

Faculty: Assistant Professor Pantalone, chairperson. Associate Professors Martin, Meagher, and Moore; Instructors Abbott, Corey, Cotter, Cyr, Phipps, Plunkett, and Stewart.

The study and practice of journalism require the acquisition and application of a broad base of knowledge, so journalism majors at URI pursue a course of study that is strongly grounded in the liberal arts. Along with general education and elective courses from other disciplines, the major requires students to explore the concepts and professional practices of contemporary journalism in a diverse society. While studying the social, historical, legal, and ethical contexts of journalism, students also learn how to gather, synthesize, and critically assess factual information and communicate it clearly to a variety of audiences in all forms of media. Journalism “skills courses” through individual and collaborative assignments focus on reporting, writing, editing, and producing news for all forms of news media: print, broadcast, and multimedia. “Conceptual” courses provide students the intellectual foundation and framework to be responsible journalists. And through its general education course offerings, the Department of Journalism provides nonmajors a forum for studying the importance of journalism and the role of the mass media in society.

Students majoring in journalism must complete a minimum of 31 credits (maximum 45) in journalism. All journalism majors must complete JOR 115, 220, 221, 310, 410, and 411. In addition, students must select nine credits from skills courses: JOR 320, 321, 330, 331, 340, 341, 420, 430, 441, 442; and three credits from conceptual courses: JOR 210, 211, 215, 311, 313, 415. Any journalism courses may be chosen for the remaining three credits. Students are encouraged to consult with their advisors about the mix of journalism courses that best meets their goals.

The only journalism courses open to freshmen are JOR 110 (for nonmajors), 115 (for majors), and 220. Journalism majors are urged to concentrate on their Basic Liberal Studies (BLS) requirements during their freshman and sophomore years. In addition to these required courses, other BLS courses are recommended as useful for journalism majors. Students should consult with their advisors about complete Basic Liberal Studies requirements and about other courses that meet their individual goals.

Students must earn a grade of C or better in JOR 220 to enroll in the next level course. Only three credits of JOR 220 may be

used to satisfy graduation requirements.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above. Journalism majors are transferred from University College for Academic Success to the College of Arts and Science upon completion of JOR 115. They must also complete JOR 220 with a grade of C or better to be transferred.

## Latin American Studies

The Departments of Sociology and Anthropology, History, and Modern and Classical Languages and Literatures offer a Bachelor of Arts (B.A.) degree in Latin American Studies (LAS). As of June 2009, new admissions to this program have been suspended. For program details, please refer to the 2009–2010 URI Catalog.

## Linguistics

The Department of Modern and Classical Languages and Literatures offers a number of undergraduate courses in linguistics. A minor in linguistics is also available.

Faculty: Contact Professor Hedderich, department head.

## Mathematics

The Department of Mathematics offers a Bachelor of Arts (B.A.) degree and a Bachelor of Science (B.S.) degree. The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees.

For information on URI's minor in mathematics, see the end of this section.

Faculty: Professor Baglama, chairperson. Professors Beauregard, Eaton, Finizio, Kaskosz, Kulenovic, Merino, and Wu; Associate Professors Bella, Comerford, MedinaBonifant, and Thoma; Assistant Professors Barrus and Kinnerseley; Professors Emeriti Clark, Datta, Driver, Fraleigh, Grove, Ladas, Lewis, Roxin, Schwartzman, and Verma.

### BACHELOR OF ARTS

Students in the B.A. curriculum may tailor a program to suit their individual needs and interests. They should meet with their advisor no later than the end of the first semester of the sophomore year to plan a complete program. This program, and any subsequent changes in it, must be approved by the advisor and the department chairperson. It must contain at least 32 credits (maximum 45) in mathematics, and include MTH 141, 142, 215, 243, 307 and 316, plus 12 or more additional credits in mathematics, at least three credits of which must be at the 400 level.

Credits earned in MTH 101, 105, 106, 107, 108, 109, 110, 111, 208, or 362 cannot be applied toward this degree.

A total of 120 credits is required in the B.A. curriculum. At least 42 of these must be in courses numbered 300 or above.

### BACHELOR OF SCIENCE

Students in the B.S. curriculum may elect either the general program or the applied mathematics option. The Office of the Dean must be informed of any substitutions.



General Program. This program stresses basic theories and techniques, and includes an introduction to the principal areas of mathematics. It is recommended for students considering graduate study in mathematics. Students in this program must complete MTH 141, 142, 215, and 243. These courses should normally be taken in the freshman and sophomore years. Students must complete an additional 29 credits in mathematics, including MTH 307, 316, 435/436, and 462.

Applied Mathematics Option. This program is intended for the student who anticipates a career as an applied mathematician or mathematical consultant with an organization such as an industrial or engineering firm or with a research laboratory. The student learns the mathematical ideas and techniques most often encountered in such work. Although a theoretical foundation is developed, the applications are emphasized. The student must take MTH 141, 142, 215, and 243, preferably by the end of the sophomore year. The student must complete an additional 18 credits in mathematics including one of the sequences MTH 435/436 or 437/438, and of the 12 remaining credits in mathematics, at least three credits should be at the 400level. Also, the student must complete an additional four courses, one of which must be chosen from CSC 200, 201, 211, 212, PHY 410, or CHE 272, and three other courses chosen from Group I (Applications).

Group I: BME 207; BUS 320, 321, 335, 337; CHE 272, 313, 314; CHM 431, 432; CSC 340, 350, 406, 418, 440, 445; ECN 323, 324, 375; ELE 313, 314, 322, 438, 457; ISE 411, 412, 432, 433; MCE 341, 354, 366, 372, 411, 466; OCE 301; PHY 306, 322, 331, 410, 420, 451, 452, 455; STA 409, 412. Other courses may be used for this group with prior permission of the chairperson.

Credits earned in MTH 101, 105, 106, 107, 108, 109, 110, 111, 208, 362, or 420 cannot be applied toward this degree (general program and applied mathematics option). Both B.S. programs require 120 credits for graduation. Minor in Mathematics Students declaring a math minor must earn credit for MTH 141, 142, 215, and 243, and two threecredit math courses chosen from MTH 307, 316, 322, or any 400level course. At least one of these two courses must be at the 400 level. Substitutions may be made with permission of the chairperson.

## Military Science and Leadership (Army ROTC)

The Department of Military Science and Leadership (Army ROTC) is recognized as one of the best leadership programs in the country and is part of the University of Rhode Island curriculum. During classes and field training, students learn firsthand what it takes to lead others and motivate groups, as well as how to organize information to create executable tasks for others to follow. The experience is similar to being a vital manager in a corporation. Students learn to achieve success as team members or leaders in various situations.

Students may participate in the basic program (MSL 101, 102, 201, and 202) without obligation to the United States Army. Students desiring a minor in Military Science and Leadership may request approval from the dean of the College of Arts and Sciences upon beginning the program. Completion of 18 credits of MSL course work is required to complete the minor.

Contracted cadets receive a monthly allowance ranging from \$300 for freshmen to \$500 for seniors.

Faculty: Professor Whittemore (Lt. Col., U.S. Army), chairper-

son. Assistant Professors CPT Richards, MSG Eichner, SFC Rubang, and Mr. Chris Corbett.

## Modern and Classical Languages and Literatures

The Department of Modern and Classical Languages and Literatures offers the Bachelor of Arts (B.A.) degree in Chinese, Classical Studies, French, German, Italian, and Spanish (described in alphabetical order), as well as course work in Arabic, Modern Greek, Hebrew, Japanese, Portuguese, and Russian.

Faculty: Professor Hedderich, chairperson.

## Modern Greek

The Department of Modern and Classical Languages and Literatures offers a number of undergraduate courses in Modern Greek.

## Music

The Department of Music offers a Bachelor of Arts (B.A.) degree with options in music, music history and literature, and jazz studies, and Bachelor of Music (B.M.) degrees with options in composition, music education, and performance. The department also offers Master of Music (M.M.) degrees in music education or performance (including conducting and composition).

For information on the music minors, see the end of this listing.

Faculty: Professor Parillo, chairperson. Professors Conley, Danis, Kent, Pollart, and Takasawa; Associate Professors Aberdam; Assistant Professor A. Cardany; Lecturers de la Garza, Frazier, and Thomas; Director of Athletic Bands and Lecturer B. Cardany; Guest Artists/Teachers Berney, Buttery, Ceo, Dennewitz, Hofbauer, Holt, Langfur, Langone, Maxon Carpenter, McEwan, Mitak, Monllos, Mook, Murray, O'Connor, Phillips, Porter, Raimondi, Sims, Thorne, Volness, Uricco, Wood, and Zinno; Professors Emeriti Abusamra, Ceo, Dempsey, Fuchs, Gibbs, Ladewig, Lee, Livingston, and Rankin; Music Resources and Facilities Coordinator Heroux; Concert Manager Rizzuto, Community Music Coordinator Murray; Accompanists Maxwell and Carroll; Piano Technician Van Dine; Fiscal Clerk Andrews; Senior Word Processing Typist Botello.

### BACHELOR OF ARTS

Students selecting music as a major have three options: jazz studies, music, or music history and literature.

Students can be admitted to the B.A. degree program and should contact the Department of Music for specific requirements. Transfer credits in music theory, music history, and performance must be validated by placement examination.

Jazz Studies. Students selecting this option must complete 43 credits in musicianship and music performance as follows: Musicianship: MUS 119 (1) (fulfills URI 101 requirement), 120 (2), 121 (2), 122 (2), 225 (2), 226 (2), 424 (3), 106 (3), 221 (World Music Unit) (1), 222 (3), 322 (Jazz and Popular Music Units) (2), 280 (0), 480 (1). Music Performance: A: Six semesters of applied music study in the student's principal area of jazz instrumental performance, (MUS 110W, 210W, and 310W) at

2 credits per semester (12). A successful audition is required prior to study in the principal applied area of jazz instrumental performance. Applied study for the B.A. in music with a jazz option is limited to the following instruments: saxophone, trumpet, trombone, piano, string bass, guitar, and drum set. B: For saxophone, trumpet, and trombone, two semesters of major ensembles MUS 291, 292, 293, 394, 395, and 397. For piano, string bass, guitar, and drum set, two semesters of MUS 396 and 398J in addition to the requirements in section C below (2). C: Two semesters of MUS 391 (2) and three semesters of MUS 396 or 398J (3). At least two of these semesters should be in MUS 396. A successful audition is required prior to participation in jazz ensembles. D: MUS 350 with emphasis on jazz styles (0). E: Seven semesters of MUS 300 (0). Electives: 38 credits, of which a minimum of 30 must be in nonmusic courses. The department recommends that eight credits of electives be taken in music. At least six of these should be in upperdivision music courses. Students who are deficient in keyboard skills must take MUS 171 (1) and 172 (1). MUS 171 and 172 may count as two of the recommended music electives.

A minimum of 120 credits is required for graduation. At least 42 of these credits must be in courses at the 300 level or above.

**Music.** Students selecting this option must complete 36 credits in musicianship and performance as follows: Musicianship:

MUS 119 (1); 120, 121, 122, 225, 226, 227, 228 (14); 221, 222 (6); 322 or upperdivision music history course (3); 280 (0) and 480 [capstone] (1). Students who are deficient in keyboard skills must take MUS 171 (1). Performance: four semesters of the principal applied music area, at two credits per semester (8); three semesters of ensembles appropriate to the principal applied music area, MUS 291, 292, 293, 394, 395, 396, 397, or 398G (3); seven semesters of MUS 300 (0). A successful audition is required prior to study in the principal applied music area. Electives: 45 credits, of which a minimum of 30 credits must be in nonmusic courses. The department strongly recommends that 15 credits of electives be taken in music. At least six of these credits should be in upperdivision music courses.

A minimum of 120 credits is required for graduation. At least 42 of these must be at the 300 level or above.

**Music History and Literature.** Students choosing this option must complete 43 credits in musicianship and performance, as follows: Musicianship: MUS 119 (1); 120, 121, 122, 225, 226, 227, 228 (14); 221, 222, 322 (9); three upperdivision music history courses (9); 280 (0) and 480 [capstone] (1). Students who are deficient in keyboard skills must take MUS 171 (1). Performance: four semesters of the principal applied music area, at two credits for two semesters and one credit for two semesters (6); three semesters of major ensembles appropriate to the principal applied music area MUS 291, 292, 293, 394, 395, 396, 397, or 398G (3); seven semesters of MUS 300 (0). A successful audition is required prior to study in the principal applied music area. Electives: 38 credits, of which a minimum of 30 must be in nonmusic courses. The department strongly recommends that eight credits of electives be taken in music. At least six of these credits should be in upperdivision music courses. Other: nine credits of foreign language and proficiency through 103.

A minimum of 120 credits is required for graduation. At least

42 of these must be in courses numbered 300 or above.

## BACHELOR OF MUSIC

Students selecting the Bachelor of Music degree program have three options: music composition, music education, or music performance.

Students can be admitted to the B.M. degree program only after a successful audition in the principal applied music area and should contact the Department of Music for specific requirements. Transfer credits in music theory, music history, and performance must be validated by placement examination.

All Bachelor of Music students must successfully complete Option I or Option II of the piano proficiency requirement. In Option I, students must pass all seven piano proficiencies by the end of their junior year. Piano proficiency examinations before the faculty examination committee are scheduled on a regular basis during the fall and spring semesters. In Option II students take MUS 171, 172, 271, and 272 and successfully pass each course with a grade no lower than a C. Failure to pass either option will require reexamination in succeeding semesters. The B.M. degree will not be granted until this requirement is fulfilled.

Students selecting Option I will need to demonstrate the following seven piano proficiencies by the end of their junior year: 1)

Fivefinger patterns, playing a vocal warmup sequence, hands together; 2) scales, playing twooctave major scales up to three sharps and flats, and oneoctave minor scales in all three forms up to three sharps and flats, hands together, by memory at a tempo of M.M.=144 per note; 3) transposition, transposing at sight two melodies selected by the examination committee, students will be asked to transpose the melodies up or down by either a half step or whole step; 4) harmonization, reading two melodies taken from any major or minor key chosen by the examination committee, improvising suitable accompaniments for the melodies by using diatonic triads and secondary dominants, and reading from chord symbols; 5) patriotic songs, playing America and The StarSpangled Banner in a manner suitable for accompanying community or school singing; these accompaniments are to be prepared in advance; 6) sightreading, playing at sight selections chosen from a simple accompaniment part and/or beginninglevel solo scores; and 7) repertoire, playing two prepared piano pieces by contrasting composers; each piece must be approved in advance by a member of the piano faculty or an instructor of class piano.

No student should participate in more than three major ensembles in a single semester. In addition, students select one of the following options:

**Music Composition.** Students selecting the music composition option must complete seven semesters of applied composition (MUS 110V, 210V, 310V, 410V), one or two credits per semester (10); seven semesters of the principal applied music area, two credits per semester (14); seven semesters of MUS 300 (0); and four semesters of secondary applied music areas, one credit per semester (4); MUS 171 and 172 are required as secondary applied music areas if students select piano proficiency option II. Students who have not passed the piano proficiency examination by the end of MUS 172 will be expected to take MUS 271 and 272, which can count as sec-

ondary applied music areas. Other secondary applied credits as needed must come from MUS 110–410 (in an applied area other than the principal applied music area) or MUS 169, 170, 173, 175, 177, or 179. Also required are six semesters of major ensembles MUS 292, 293, 394, 395, or 397 appropriate to the principal applied music area (6). For the studio composition specialization, credits in MUS 396 may be included. Also required are MUS 119 (1); MUS 120, 121, 122, 225, 226, 227, 228, 416 (17); 221, 222, 322 (9); 235 (2) and 311 (2); 417, 420, and 421 (9) (for students wishing to specialize in studio composition, three credits of MUS 424 may be substituted for MUS 420); an upperdivision music history course (3); MUS 450 Senior Composition Recital [capstone] (0); MUS 280 (0) and 480 [capstone] (2); and six credits of electives, at least three of which should be in upperdivision music courses.

A minimum of 124 credits is required for graduation.

**Music Education.** See “Teacher Education Programs” in Pre-professional Preparation and “Admission Requirements” in Education for admission requirements for teacher education programs. Completing all requirements in the music education option leads to an initial teaching certificate for music in grades K12. Students selecting this option must complete 89 credits in Studies in Music and Professional Education, as follows:

**Studies in Music (64 credits):** seven semesters of the principal applied music area (instrument or voice must be selected from MUS 110–410 AU only; applied study in jazz as the principal applied music area is not acceptable for the music education option), two credits per semester (14). Seven semesters of MUS 300 (0); senior recital MUS 450 [capstone] (0). Four semesters of secondary applied music areas, one credit per semester (4); MUS 171 and 172 are required as secondary applied music areas if students select piano proficiency option II. Students who have not passed the piano proficiency exam by the end of MUS 172 will be expected to take MUS 271 and 272, which can count as secondary applied music areas. Other secondary applied credits as needed must come from MUS 110–410 (in an applied area other than the principal applied music area). Seven semesters of major ensembles appropriate to the principal applied music area, at 01 credit per semester (6). Major ensembles include MUS 292, 293, 394, 395, and 397; no more than two semesters of MUS 291 and/or 396 can count toward the major ensemble requirement. MUS 119 (1); 120, 121, 122, 225, 226, 227, 228 (14); 416 or 417 (3); 221, 222, 322 (9). MUS 169, 170, 173, 175, 177, 179 at a minimum of one credit each (6); 235 (2); 311, 312 (5).

**Professional Education (25 credits):** Students pursuing the music education option must apply for admission to the Office of Teacher Education in the School of Education; see Teacher Education Programs and “Admission Requirements”

in Education for admission requirements. MUS 280 (0), 480 [capstone] (2); MUS 238, 339, 340, 341 (10); EDC 250 (1), 484 (12). PSY 113 (3) is required as a Professional Education course but also counts toward the Social Science requirement in the Basic Liberal Studies program. The piano proficiency examination Options I or II, the Praxis II: Principles of Learning and Praxis II: Music Content Knowledge, and all courses required for the music education option, with the exception of MUS 480 [capstone], must be successfully completed before supervised student teaching (EDC 484). Students may wish to enroll in EDC 312 (3) in order to prepare for the Praxis II: Principles of Learning.

A minimum of 128 credits is required for graduation.

**Music Performance.** All students in the music performance option must take the following music courses: eight semesters of MUS 300 (0); MUS 350 (0) and 450 [capstone] (0); MUS 119 (1); 120, 121, 122, 225, 226, 227, 228, 416 (17); 221, 222, 322 (9). MUS 235 (2) and 442 (2); 311 (2); 280 (0); 480 [capstone] (2). Students in the jazz option must take MUS 424 in place of MUS 416. Jazz option students must also take MUS 106 (3).

A minimum of 124 credits is required for graduation. In addition, students must select one of the following five sub-options:

**Classical Guitar:** eight semesters of the principal applied music area. Two semesters of MUS 110T at two credits in the first semester and three credits in the second (5); two semesters of MUS 210T at three credits each (6); two semesters of 310T and 410T at four credits each (16). MUS 171 and 172 (2). Students who have not passed the piano proficiency examination by the end of MUS 172 will be expected to take MUS 271 and 272. Four semesters of major ensembles MUS 292, 293, 394, 395, 396, or 397 (4). Four semesters of guitar ensemble (MUS 398G) and three semesters of playing guitar in chamber music ensembles (MUS 398) (7). An upperdivision music history course (3); an upperdivision music theory course (3). Four credits of electives, at least three of which should be in upperdivision music courses.

**Jazz (limited to saxophone, trumpet, trombone, piano, guitar, string bass, and drum set):** eight semesters of the principal jazz applied music area. Two semesters of MUS 110W at two credits in the first semester and three credits in the second (5); two semesters of MUS 210W at 3 credits each (6); two semesters of 310W and 410W at four credits each (16). MUS 171 and 172 (2). Students who have not passed the piano proficiency examination by the end of MUS 172 will be expected to take MUS 271 and 272. Two semesters of major ensembles MUS 291, 292, 293, 394, 395, or 397 (4). Two semesters of jazz studio ensemble (MUS 396), two semesters of jazz studio lab (MUS 391), and four semesters of chamber music ensembles/jazz (MUS 398J) (8). An upperdivision music history course or an upperdivision music theory course (3). Three credits of electives which should be in upperdivision music courses.

**Orchestral Instrument:** eight semesters of the principal applied music area. Two semesters of MUS 110 at two credits in the first semester and three credits in the second (5); two semesters of MUS 210 at three credits each (6); two semesters of 310 and 410 at four credits each (16). MUS 171 and 172 (2). Students who have not passed the piano proficiency examination by the end of MUS 172 will be expected to take MUS 271 and 272. Eight semesters of major ensembles MUS 292, 394, or 397 (8). Three semesters of secondary or chamber music ensembles (3). An upperdivision music history course (3); an upper division music theory course (3). Four credits of electives, at least three of which should be in upperdivision music courses.

**Piano or Organ:** eight semesters of the principal applied music area. Two semesters of MUS 110B or C and 210B or C at three credits each (12); two semesters of 310B or C and 410B or C at four credits each (16). All students pursuing this sub option must pass the piano proficiency examination by the end of the second semester of the junior year. Keyboard majors can waive MUS 171, 172, 271, and 272, courses normally taken to develop the skills necessary to pass the piano proficiency

examination. Four semesters of major ensembles MUS 292, 293, 394, 395, or 397 (4). Six semesters of piano accompanying (MUS 371) or playing piano in chamber music ensembles (MUS 398) (6). MUS 420 (3). An upperdivision music history course (3). Six credits of electives, at least three of which should be in upperdivision music courses.

Voice: eight semesters of the principal applied music area. Two semesters of MUS 110A at two credits in the first semester and three credits in the second (5); two semesters of MUS 210A at three credits each (6); two semesters of 310A and 410A at four credits each (16). MUS 171, 172, 271, and 272 (4). Eight semesters of major ensembles MUS 293 or 395 at zero or one credit per semester (7). Two semesters of chamber or other music ensembles (2). MUS 283 (3). Four credits of electives, at least three of which should be in upperdivision music courses.

Students selecting voice must also take nine credits of foreign language in two or more languages. This requirement may be modified or satisfied by advanced placement.

#### *Minors in Music*

**Jazz Studies.** Students who wish to declare a minor in music using the jazz studies option must complete 19 credits in musicianship, performance, and electives as follows: Musicianship: MUS 106 (3), 120 (2), 121 (2), 122 (2), 171 (1), 221 (World Music Unit) (1), 322 (Jazz and Popular Music Units) (2), and MUS 300 for a minimum of two semesters (0). Music Performance: a minimum of four credits in the principal applied music area (MUS 110W, 210W, at one or two credits per semester) (4), and two semesters of MUS 391, 396, or 398J (2). Applied study in MUS 110W and 210W for the minor in jazz option is limited to the following instruments: saxophone, trumpet, trombone, piano, bass, guitar, and drum set. Electives: The department strongly suggests that 3 credits be taken in MUS 101. Participation in other major ensembles is also encouraged. Major ensembles include MUS 291, 292, 293, 394, 395, 397, and 398G, pending audition. A successful audition is required prior to study in the principal applied music area and prior to participation in ensembles.

**Music.** This option gives students a broadbased background in music. Course work in this option is similar to that taken by students starting work toward a B.A. or B.M. degree in music. Students who wish to declare a minor in music using the music minor option must earn credit for MUS 111 (3) or 120 (2); 171 (1), 121 and 122 (4), 300 for a minimum of two semesters (0), and two 3-credit music history and literature courses selected from MUS 221, 322, 408, 430, 431, 433, 434 (or 222, if the student has the additional prerequisites) (6). Additionally, students must earn a minimum of four credits in their principal applied music area (MUS 110410, at one or two credits per semester) and four credits in major ensembles\* appropriate to the principal applied music area (8). The minimum number of credits required for this option is 2122. Students must pass an audition in their principal applied music area prior to registration for applied study in voice or on an instrument.

**Music Performance.** This option gives students the opportunity for a more concentrated study in voice or on an instrument. Students who wish to declare a minor in music using the music performance minor option must earn credit for MUS 111 (3) or 120 (2); MUS 121 and 122 or a music history course selected from MUS 101, 106, 221, 322, 408, 430, 431,

433, 434 (34); MUS 300 for a minimum of two semesters (0). Additionally, students must earn a minimum of eight credits in their principal applied music area (MUS 110–410 at one or two credits per semester) and six credits in major ensembles\* appropriate to the principal applied music area (14). The minimum number of credits required for this option is 1921. Students must pass an audition in their principal applied music area prior to registration for applied study in voice or on an instrument.

**Music Voice Performance for Theatre Majors.** The purpose of this option is to give students who are theatre majors the opportunity for more concentrated and focused study in voice and other areas of music. Theatre students who wish to declare this minor must earn credit for MUS 111 (3) or 120 (2) and 121 (2); a music history course selected from MUS 101, 106, 221, 322, 408, 430, 431, 433, 434 (3); MUS 300 for one semester (1). Additionally, students must earn a minimum of eight credits in voice over four semesters (MUS 110A (2), 110A (2), 210A (2), 210A (2)), and three semesters in MUS 395 (audition required), MUS 293 (1), or MUS 485 (1), with MUS 485 being limited to one semester. Students must pass an audition in voice prior to registration for applied study in voice. The minimum number of credits required for this option is 18.

**Individual Music.** This option gives students more flexibility. These students design and develop their music minor program under the advisement and sponsorship of a fulltime music faculty member. Petitions outlining and justifying the desired music minor program must be presented by the faculty sponsor to the music faculty for approval. A minimum of 18 credits is required. Petitions should be submitted as early as possible in a student's undergraduate program.

\*Music ensembles include MUS 291, 292, 293, 394, 395, 396, and 397. Up to one semester of MUS 291 can count toward the major ensemble requirement in the music minor option; up to two semesters of MUS 291 can count toward the major ensemble requirement in the music performance option. Those with a major applied area in guitar can count MUS 398G for guitar ensemble as a major ensemble. Those with a major applied area in piano can count additional applied music credits (MUS 110410) and/or accompanying (MUS 371) in lieu of the major ensemble requirements.

## Philosophy

The Department of Philosophy offers a Bachelor of Arts (B.A.) degree.

**Faculty:** Professor Johnson, chairperson. Professors Foster, J. Peterson, and Wenisch; Associate Professors Meghani and Mollgaard; Assistant Professors Krieger and Jomaa (joint appointment with PSC); Professors Emeriti Y. Kim, Schwarz, and Zeyl.

Students selecting this major must complete no fewer than 33 credits (maximum 48) in philosophy. Students are required to take PHL 205; at least one from PHL 101, 451 (logic); at least one from PHL 212, 314 (ethics); at least one from PHL 341, 342, 452; both PHL 321 and 323; at least one from PHL 204, 318, 324, 346; and PHL 490 [capstone]. The remaining nine credits may be chosen freely from the list of PHL courses offered by the department. At least 18 credits in course work must be at the 300 level or above.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Physics

The Department of Physics offers a Bachelor of Arts (B.A.) degree for students already registered and a Bachelor of Science (B.S.) degree. The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees.

Faculty: Associate Professor Andreev, chairperson. Professors Heskett, Kahn, Kaufman, Malik, Meyerovich, Muller, Nightingale, and Steyerl; Associate Professors Andreev and Reshetnyak; Adjunct Professor McCorkle; Adjunct Associate Professors Bozyan, Karbach, and Ruffa; Professors Emeriti Desjardins, Hartt, Letcher, Nunes, Penhallow, Pickart, and Willis.

### BACHELOR OF ARTS

As of June 2009, new admissions to this program have been suspended. For program details, please refer to the 2009–2010 URI Catalog.

### BACHELOR OF SCIENCE

This curriculum provides a general background in both theoretical and experimental physics. It forms a foundation for further study at the graduate level toward an advanced degree, and also prepares the student for a career as a professional physicist in industry, education, or government. Initiative, independent solution of laboratory problems, and research are encouraged in the advanced laboratory courses.

The following courses are required for the B.S., but exceptions and/or substitutions are possible and can be arranged by consulting the department chairperson.

A total of 120 credits is required for graduation. PHY 483 and 484 are the capstone courses in this program.

*Freshman Year First semester: 14 credits*

MTH 141 (4); PHY 203/273 (4), Basic Liberal Studies requirements and electives (6).

*Second semester: 16 credits*

MTH 142 (4); PHY 204/274 (4), Basic Liberal Studies requirements and electives (8).

*Sophomore Year First semester: 17 credits*

CSC 211 (4); MTH 243 (3); PHY 205/275 (4), Basic Liberal Studies requirements and electives (6).

*Second semester: 14 credits*

MTH 244 (3); PHY 306 (3), 410 (3), Basic Liberal Studies requirements and electives (5).

*Junior Year First semester: 14 credits*

PHY 322 (3), 381 (3); MTH 215 (3), Basic Liberal Studies requirements and electives (5).

*Second semester: 17 credits*

Mathematics elective at the 300 or 400 level (3), PHY 331 (3),

382 (3), Basic Liberal Studies requirements and electives (8).

*Senior Year First semester: 13 credits*

PHY 401 (1), 420 (3), 451 (3), 483 (3), Basic Liberal Studies requirements and electives (3).

*Second semester: 15 credits*

PHY 452 (3), 455 (3), 484 (3), 510 (3), Basic Liberal Studies requirements and electives (3).

**Medical Physics Track:** Five-Year Program leading to a B.S. in Physics and an M.S. in Medical Physics.

The field of medicine is facing a significant shortage of well-trained and qualified clinical medical physicists, due to the increasing use of complex technology in the field of radiation oncology and medical imaging. Consequently there is a growing demand for the training of professionals in medical physics. Only specially created programs can accomplish this mission, since among other things medical physics requires a multidisciplinary effort.

This degree program provides students with rigorous training in essential undergraduate and graduate physics courses, as well as in medical physics courses. Students are introduced to both research and clinical aspects of modern medical physics through the Rhode Island Hospital stateofheart medical imaging and therapy facilities. The program is based on the B.S. and M.S. programs in physics with the introduction of additional courses in photo medicine, nanotechnology, radiation physics and dosimetry, radiation oncology, radiobiology, and a clinical practicum. These courses are taught by the URI Physics Department, the Rhode Island HospitalBrown University Medical School Faculty, and the staff at the RI Nuclear Science Center at the Bay Campus.

Matriculation in this program requires that the student apply and be accepted; it is not automatic. It is possible that a student will enter the program having taken some of the courses but not all. It is mandatory that the student take all of the courses (or show credit in them) in order to graduate. The schedule outlined below demonstrates that it is possible to get both degrees in five years. Where we have written two courses separated by an "or" (e.g., PHY 322 or 420) the student is to take whichever course is offered that semester. The student must have credit in both courses, however, at the end of the curriculum.)

*Freshman Year First semester:*

BIO 121 + lab; MTH 141; PHY 203H, 273H; URI 101; one 3credit Basic Liberal Studies course.

*Second semester:*

BIO 242, 244; CHM 101, 102; MTH 142; PHY 204H, 274H; one 3credit Basic Liberal Studies course.

*Sophomore Year First semester:*

CSC 211; MTH 243; PHY 205H, 275H, 210; 6 credits of Basic Liberal Studies courses.

*Second semester:*

MTH 244; PHY 306, 410; 9 credits of Basic Liberal Studies courses.

*Junior Year First semester:*

MTH 215; PHY 381, 451, 322 or 420; 6 credits of Basic Liberal Studies courses.

(In the beginning of the sixth semester, the student can begin the application process to be admitted to graduate school. This is necessary only if the student is planning on getting both the master's and bachelor's degrees after five years. The application will be evaluated by a committee of faculty formed for that purpose, and it will be the sole determiner of who goes on in that year. At that time it will still be possible to get a simple B.S. in physics in the standard four years.)

*Second semester:*

PHY 331, 382, 455, 540 or 545; 6 credits of Basic Liberal Studies courses.

*Senior Year First semester:*

PHY 322 or 420, 550 or 552, 560 or 565, 510 or 610; ELE 564, 565.

*Second semester:*

PHY 402, 452 or 570, 540 or 545; ELE 562, 563; STA 307.

*Fifth Year First semester:*

PHY 483, 550 or 552, 560 or 565, 510 or 610.

*Fifth Year Second semester:*

PHY 484, 555, 691; SOC 224.

Near the end of the final semester, students also take a final exam which is similar to the ABR Part 1 exam they are expected to take to get into a CAMPEP accredited residency program.

## Physics and Physical Oceanography

The Department of Physics and the Graduate School of Oceanography offer a Bachelor of Science (B.S.) degree in physics and physical oceanography.

Coordinators: Professors Heskett and Muller (Physics). The faculty consists of the members of the Department of Physics and the GSO's physical oceanography faculty.

This program includes a comprehensive background in physics and a solid introduction to physical oceanography. The curriculum includes a full set of physics and mathematics courses required for a B.S. in physics, with extra emphasis on classical physics, plus additional upperdivision or graduate-level courses in fluid dynamics and physical oceanography.

The senior physics research project (PHY 483 and 484) will be undertaken in the Graduate School of Oceanography under the supervision of a GSO faculty member. In addition, students may find summer employment or participate in

oceanographic research cruises after their junior year.

Students graduating in this course of study are well prepared to pursue careers in conventional physics or physical oceanography. Technical positions in private or government oceanographic research laboratories are available for physical oceanographers at the B.S. level. Students who continue on to graduate studies should expect to find high demand for physical oceanographers with advanced degrees. It is recommended that students planning to attend an oceanography graduate school take PHY 520 (Classical Dynamics); students wishing to keep open the option of physics at the graduate level should take PHY 452 (Quantum Mechanics). Students entering the URI Graduate School of Oceanography from this program will have a significant head start compared to those entering from most other undergraduate institutions.

A total of 129 credits is required for graduation.

*Freshman Year First semester: 17 credits*

MTH 141 (4); OCG 110 (3); PHY 203, 273 (4), Basic Liberal Studies requirements and electives (6).

*Second semester: 16 credits*

CHM 101, 102 (4); MTH 142 (4); OCG 123 (4); PHY 204, 274 (4).

*Sophomore Year First semester: 17 credits*

CSC 211 (4); MTH 243 (3); PHY 205, 275 (4), Basic Liberal Studies requirements and electives (6).

*Second semester: 17 credits*

MTH 244 (3); PHY 306 (3); 410 (3), Basic Liberal Studies requirements and electives (8).

*Junior Year First semester: 17 credits*

PHY 322 (3), 381 (3); MTH 215 (3), Basic Liberal Studies requirements and electives (8).

*Second semester: 17 credits*

MCE 354 (3); PHY 331 (3), 382 (3), Basic Liberal Studies requirements and electives (8).

*Senior Year First semester: 16 credits*

OCG 501 (3); PHY 401 (1), 420 (3), 451 (3), 483 (3), Basic Liberal Studies requirements and electives (3).

*Second semester: 12 credits*

OCG 510 (3); PHY 425 (3), 484 (3), and 510 (3).

## Political Science

The Department of Political Science offers the Bachelor of Arts (B.A.) degree. The department also offers the Master of Arts (M.A.) in political science and the Master of Public Administration (M.P.A.).

Faculty: Professor Krueger, chairperson. Professors Hennessey, Moakley, Petro, and Rothstein; Associate Professor; Assistant Professors Hutchison, Johnson, PearsonMerkowitz, and Xu;

Professors Emeriti Hamilton, Killilea, Leduc, Stein, Tyler, Wood, and Zucker.

**The Major.** Students selecting this field must complete a minimum of 32 credits (maximum 48) in political science, including PSC 113 (4), 116 (4), 212 or 310 (4), and either 210 or 211 (4). Student must select one 300level experiential course (4) and two 400level research seminars (4 each).

Students completing both the B.A. degree in political science and the B.S. degree in engineering at the same time may use courses in the political science major to satisfy Basic Liberal Studies requirements for the Bachelor of Arts. The College of Engineering and the Department of Political Science have established a curriculum that allows for the completion of the two degrees and a publicsector internship in five years.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

**The Minor.** Students declaring a minor in political science must earn 20 credits including PSC 113 (4), 116 (4), either 210 or 211 (4), and any two other political science courses at the 300 level or above.

Minor in International Relations. See Interdepartmental Minors.

John Hazen White Sr. Center for Ethics and Public Service. An important part of URI's Political Science Department, this center was established in 1994 through a grant from John Hazen White Sr., a local businessman and philanthropist. The center offers ethics and public service programs for undergraduate and graduate students, elected and appointed officials, public managers, and citizen groups. In addition to research opportunities, workshops, and special programs, the center also sponsors the Mentor/Tutor Internship (MTI), which provides URI students internships, for credit, in local public schools to encourage and mentor students at risk of dropping out. Contact the department office for more information.

## Portuguese

The Department of Modern and Classical Languages and Literatures offers a number of undergraduate courses in Portuguese.

## Psychology

The Department of Psychology offers a Bachelor of Arts (B.A.) degree and a Bachelor of Science (B.S.) degree. The department also offers the Master of Science Degree in School Psychology (M.S.) and provides three doctoral programs in Behavioral Science, Clinical Psychology, and School Psychology (Ph.D. degrees).

Faculty: Professor Collyer, chairperson. Professors Boatright-Horowitz, Brady, Bueno de Mesquita, J.L. Cohen, Faust, Florin, Gorman, Harlow, Laforge, Morokoff, Prochaska, Quina, Rogers, Rossi, L. Stein, Stoner, Velicer, Weyandt, Willis, and Wood; Associate Professors FlannerySchroeder, S. Harris, Robbins, and Walls; Assistant Professor Loftus; J. Mena; Professors Emeriti Biller, Grebstein, Gross, A. Lott, B. Lott, Merenda, Silverstein, N. Smith, Stevenson, Valentino, and Vosburgh.

## The Major

### BACHELOR OF ARTS

The B.A. degree in Psychology provides students with a solid academic preparation through an overview of the current areas in the field of Psychology. Student gain a better understanding of human behavior and an enhanced awareness of themselves and society, as well as skills for analyzing and evaluating information and data. Students in this program must complete a minimum of 32 credits (maximum 47) in Psychology.

In order to transfer from University College for Academic Success to Arts and Sciences as a psychology major (or to be coded as such in the College of Arts and Sciences), a student must have a C or better in PSY 113; a C average in two of the following courses: PSY 232, 235, and 254; and a C in PSY 200 (300).

Psychology majors are required to complete a minimum of 32 (maximum 47) credits in psychology courses to be distributed as follows: PSY 113 (with a grade of C or better); a minimum of two courses from PSY 232, 235, and 254 (with a C average); both PSY 200 (300) and PSY 301 (with a grade of C or better in each); a minimum of three topics courses (9 credits) from PSY 255, 310, 335, 361, 381, 384, 385, 399, 425, 432, 434, 436, 442, 460, 464, 479, and 480 (the average in the three courses must be C or better); a minimum of one course (3 credits) in the applied knowledge area to be selected from PSY 103, 261, 275, 334, 399, 465, 466, 471, and 478 (with a C or better); a minimum of one course (at least three credits) from the experiential practice and/or internships area selected from PSY 305, 473, 488, 489, 499; EDC 484; ITR 301, 302; CSV 302, with a C or better in graded courses or a satisfactory in S/U courses. A minimum of 32 graded psychology (PSY) credits (not S/U) are required for the psychology major. Once 47 credits in psychology courses are taken, additional psychology credits will not count toward the 120 total credits required for graduation. Students pursuing the B.A. degree must complete 42 of the 120 credits required for graduation at the 300level or higher.

### BACHELOR OF SCIENCE

The B.S. degree in Psychology requires additional credits in natural science and mathematics, more of a focus on research and statistics, and an area of specialization to more adequately prepare students for advanced work in graduate school. Students in this degree program must complete a minimum of 37 credits in Psychology (maximum of 52). In order to transfer from University College for Academic Success, a student must have completed PSY 113, PSY 232, and PSY 200 with grades of C or better.

The general education requirements are the same as those for the B.A. degree with three modifications: students must take two math classes instead of one (choosing from the following: MTH 107 or STA 220 (not both), MTH 111, 131, 132, 141, 142, or 215); students must take a research writing class (WRT 106 or 333), and must take BIO 101 or 105 for one of the Natural Science courses. For the foreign language, letters, fine arts, and literature general education courses, students should follow the requirements for the College of Arts and Sciences B.A. degree.

In the area of research methods, students must take PSY 200, PSY 301, PSY 434, and a special section of STA 412 offered

for Psychology majors. They must also take PSY 489 to gain research experience. A minimum grade of C is required for the research methods and research experience courses. In addition, students must choose at least three courses from a selected focus area. Child Psychology/School Psychology Focus: PSY 432, 442, 466, 471, 479 (Introduction to School Psychology); PSY/SOC 430. Cognitive/Neuroscience Focus: PSY 384, 361, 385, 432 (cognitive topic), 479 (cognitive topic).

Health/Clinical Psychology Focus: (note that two of the three courses must be at the 300+ level) PSY 254, 255, 275, 334, 335, 436, 460, 479 (Health Promotion Topic). Social/Multicultural Psychology Focus: PSY 335, 399, 425, 470, 480. For the courses in the focus area, a minimum of a C average is required. Students also must take Physiological Psychology (PSY 381) and one course from a focus area other than the main focus area selected by the student. A minimum of a C average is required for these two courses as well. Overall, a grade point average of 2.5 is required for all Psychology courses.

For either degree option, students who must repeat a course to meet the minimum grade requirements may use only three credits of that particular course toward graduation.

Students majoring in psychology typically go on either to pursue a career at the B.A. level or study for an advanced degree. In both cases, students should consult the department's Web site ([uri.edu/artsci/psy](http://uri.edu/artsci/psy)) and their academic advisor to select the appropriate degree option and the appropriate courses for their interests and goals.

For either the B.A. or the B.S., a total of 120 credits is required for graduation.

The Minor. The minor in psychology requires completion of 18 or more credits in psychology courses. These credits must include PSY 113. Only three credits in experiential courses for letter grades (i.e. PSY 305, 473, 488, or 489) may count towards the minor. The quality point average in psychology courses must be at least 2.00 or above. At least 12 of the 18 credits (three courses) must be taken at URI. General Education credits may be used for the minor, but no course may be used for both the major and minor field of study. Courses for the minor cannot be taken pass/fail or S/U.

## Public Relations

Part of the Harrington School of Communication and Media ([uri.edu/harrington](http://uri.edu/harrington)), the Departments of Communication Studies offers the Bachelor of Arts (B.A.) degree in public relations.

Contact: Regina A. Bell, MA, Public Relations, (401) 8742587.

This interdepartmental major combines a liberal arts education with the skills important to a career in public relations. Working with the public relations advisor, students will develop a specific program of studies.

Students must complete the following courses before being accepted into the major: PRS 100: Intro to Public Relations and COM 202: Public Speaking. Students apply to the public relations program in February of each year. The major requires an overall GPA of 2.50 and a 2.50 GPA in the premajor courses. Exception: discretion of the chairperson of Communication Studies.

The major requires 39 credits: two premajor courses (PRS

100, COM 202); students enroll in the following courses once accepted to the major PRS 320, 340, 441, 491; COM 381; WRT 331 (prerequisite of a 200level WRT course), and JOR 341 (21). Students must complete four courses (12 credits) from the following including at least one course from each category

- Category A: JOR 321, WRT 201, 235, 302, 303, 304, 333; Category B: BUS 365, 465, 468; Category C: COM 302, 351, 415, 450; Category D: COM 415; JOR 410, 442; PRS 200, 300, 442; PSY 335. A student must maintain a 2.00 grade point average in her or his major to meet graduation requirements.

A total of 120 credits is required for graduation. At least 42 of these must be at the 300 level or above. A minor is also available (see Interdepartmental Minors).

## Russian

The Department of Modern and Classical Languages and Literatures offers a number of undergraduate courses in Russian.

## Sociology

The Department of Sociology and Anthropology offers the Bachelor of Arts (B.A.) degree and the Bachelor of Science (B.S.) degree in sociology.

Faculty: Professor Carroll, chairperson. Professors Cunnigen and Mederer; Associate Professors Costello, Doerner and Van Wyk; Assistant Professor Zozula; Lecturers Bibeau and Pisa; Professor Emerita Reilly.

### BACHELOR OF ARTS

Students selecting this curriculum must complete a minimum of 30 credits (maximum 45) in sociology, including SOC 100, 301, 401, 495 [capstone], and two courses selected from SOC 240, 242, 336, 413, 428, and 452. At least 18 of the 30 credits must be at the 300 level or above. No more than six credits in independent study and/or field experience courses may be used toward the 30 credits required for the major. SOC 495 is to be taken during the senior year. (See the description of the anthropology major.)

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

In order to transfer into the sociology B.A. program from University College for Academic Success, a student must have completed at least 24 credits and have earned a minimum of a 2.00 GPA.

### BACHELOR OF SCIENCE

Students in this curriculum elect either the Criminology and Criminal Justice option or the Organizational Analysis option and must notify the dean's office of the chosen option.

SOC 476 is the capstone course for the Criminology and Criminal Justice option. SOC 495 is the capstone course for the Organizational Analysis option.

Criminology and Criminal Justice Option. A minimum of 30 credits in sociology is required including SOC 100, 230, 274, 301, 370, and 476 (18); two courses selected from SOC 240, 242, 336, 375, 403, 413, 428, and 452 (6); and two courses selected from SOC 300, 330, 331, 332, 403, 410, 420, 497, 498, and 499 (6). SOC 300, 497, 498, and 499 may be used



only when the subject matter is central to criminology and/or criminal justice; students should consult with the program coordinator before enrolling in one to ensure the course can be used for the major. No more than three credits in independent study and/or field experience may be used toward the 30 credits required for the major. Students in this major must fulfill the foreign language/crosscultural competence requirement by demonstrating competence in a foreign language, taking six credits in a foreign language, or by study abroad in an approved academic program for at least one semester. They may not use cross cultural competence courses to fulfill this requirement. In addition to the required courses, students selecting this option are strongly encouraged to take PSC 388 and PSC 472.

A total of 120 credits is required for graduation.

**Organizational Analysis Option.** A minimum of 30 credits in sociology is required including SOC 100, 301, 320, 350, 401, 495 (12); and six credits in sociology at the 300 level or above. No more than six credits in independent study and/or field experience courses may be used toward the 30 credits required for the major. In addition, students selecting this option must complete ECN 201 and 202 (6); MTH 111 (3); STA 308 and 412\* (6); CSC 201\* (4); WRT 333 (3); BUS 340, 341, 343, 345, 442, and either BUS 315 or BUS 443 or BUS 448 (18).

\*Note: BUS 210 and 212 may be substituted for STA 308 and 412; and BUS 110 may be substituted for CSC 201 if these courses are already completed when the student transfers into the B.S. program.

Admission to this option is open to only 15 students per graduating class. Applications for admission will be reviewed only once each year, usually on or about March 1. Students must apply by the end of February by submitting their names to the University College for Academic Success advisor for sociology or to the chairperson of the Department of Sociology and Anthropology. To be considered for the organizational analysis option, students must have earned a minimum of 45 credits by the application deadline and must have at least a 2.00 grade point average. Preference for admission will be given to those individuals with the highest grade point averages.

A total of 120 credits is required for graduation.

## Spanish

The Department of Modern and Classical Languages and Literatures offers the Bachelor of Arts (B.A.) degree with a major in Spanish. The department also offers the Master of Arts (M.A.) program in Spanish.

Faculty: Professors de los Heros, Morin (section coordinator), Trubiano, and White; Associate Professor Echevarria; Professor Emeritus Gitlitz.

For the Spanish major, students will complete a minimum of 30 credits (maximum 45), including SPA 325 and three 400level courses (excluding SPA 421). SPA 421 may be used as part of the remaining 18 required credits. Note: SPA 101, 102, 321, 391, 392, and 393 cannot be counted toward the Spanish major. Students may also include LIN 202 and 220, and—with permission of the advisor, section head, department chairperson, and dean—up to two courses in allied fields such as history, art, and anthropology. These requirements are the same for the secondary education major.

A summer field workshop (SPA 310) in Spain or Spanish America is occasionally offered for three to six credits. For information, see the section head.

Students in the International Engineering Program (IEP) or the International Business Program (IBP) must take SPA 312, 316, 317, 321, 325, and a 400level engineering or business course taught in Spanish, designated SPA 412 for engineering students and SPA 421 for business students. IEP or IBP students beginning their study of Spanish at the 200 level or higher may opt to take up to six credits of Portuguese toward the completion of the major in Spanish. IEP or IBP students do not have to take three 400level courses in Spanish, but must take at least one 400level literature course in Spanish. Note: SPA 101, 102, 391, 392, and 393 cannot be counted toward the major for IEP or IBP students. The 6credit Portuguese option is available to IEP and IBP students only. Students simultaneously completing the International Engineering Program or the International Business Program and the B.A. with a major in Spanish may also use three credits of Spanish literature toward the Fine Arts and Literature Basic Liberal Studies requirement. In addition, students in these programs are exempt from the onecourseperdiscipline rule in Letters, Social Sciences, and Natural Sciences.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

## Statistical Science

**Minor in Statistics.** Students who wish to declare a minor in statistics must earn credit for STA 409 (3), 412 (3), MTH 451 (3), and three threecredit statistics courses chosen with prior approval of the chairperson of the Department of Computer Science and Statistics.

## Theatre

The Department of Theatre offers a Bachelor of Fine Arts (B.F.A.) degree.

Faculty: Professor McGlasson, chairperson. Professor Swift; Associate Professors Howard, Wittwer, and Wortman; Lecturer Hawkrigde.

Productions at URI cover the range of theatre forms, ancient to modern, with an emphasis on contemporary and experimental work. All members of the University community may participate in productions.

The criteria used to transfer students out of University College for Academic Success into the Department of Theatre are 24 credits and a 2.00 GPA.

### BACHELOR OF ARTS

Enrollment in this program is currently suspended with the exception of students enrolled in the elementary education program. Elementary education students who do not complete the elementary education program must switch to the B.F.A. program in order to earn a degree in theatre.

Students must fulfill the elementary education requirements as well as a total of 33 credits (maximum 48) as follows: THE 111 (3), 161 (3), 181 (3), 221 (3), 250 (3), 261 (3), 307 (3), 321 (3), 381 and 382 (6), 383 or 384 or 481 (3). Potential B.A. candi-

dates are urged to complete THE 111, 112, 161, and 181 by the end of their freshman year. B.A. candidates may elect up to 15 more credits in theatre with the approval of their department advisor.

A total of 120 credits is required for graduation. At least 42 of these must be in courses numbered 300 or above.

### BACHELOR OF FINE ARTS

The B.F.A. program is intended for highly motivated students who wish their education to emphasize a major theatrical field of interest. The program offers concentrated study in acting, design and theatre technology, directing, and stage management. Specific requirements of these areas are flexible to suit students' individual needs.

All B.F.A. students are required to complete 37 credits in core courses distributed as follows: THE 111 (3), 161 (3), 181 (3), 221 (3), 250 (3), 261 (3), 291 (2), 321 (3), 351 or 352 (3); three courses from 381 (3), 382 (3), 383 or 384 or 481 (3) to total nine credits; and 391 (2). All B.F.A. candidates are urged to select a course from ENG 362, 366, 446, or 472, and to complete THE 111, 161, and 181 by the end of their freshman year.

In addition to the core requirements, each student selects one of the following specializations. Students must notify the office of the dean of the area of specialization they have selected. B.F.A. students selected for an internship program may substitute up to 12 credits for theatre courses in their area of specialization, subject to departmental approval. Transfer students, late entries into the theatre major, and others wishing to modify this schedule of B.F.A. requirements may do so in consultation with their faculty advisor and with permission of the department chairperson.

**Acting.** These students must complete an additional 40 credits: THE 112 (3), 211 and 212 (6), 213 and 214 (2), 300 or 301 (3), 311 and 312 (6), 313 and 314 (2), 350 (1), 400 or 401 (3), 411 and 412 (6), 417 and 418 (2). Select six credits from THE 217, 227, 237, and 413. Recommended electives include courses in related fields such as anthropology, art, communication studies, history, literature, music, psychology, and sociology.

A total of 120 credits is required for this specialization.

**Design and Theatre Technology.** Students selecting design and theatre technology must complete an additional 31 credits: THE 300 (3), 301 (3), 351 or 352 (3) to complete the sequence begun in the core curriculum; 350 (1), 355 (3), 365 (3), 371 (3); and 12 credits selected from 362 (3), 400 (3), 401 (3), 415 (12), 451 (3), 455 (3), 463 (3), 465 (3), 475 (3). Recommended electives include ARH 251, 252, ART 207, and courses in related fields.

A total of 120 credits is required for this specialization.

**Directing.** Students selecting directing must complete an additional 35 credits: THE 300 or 301 or 307 (3), 322 (3), 331 (3), 341 (3), 355 or 365 or 371 (3), 400 or 401 (3), 420 (3), and 484 (3). They must also complete a threesemester sequence in acting: 112 (3), 211 (3), 213 (1), 212 (3), and 214 (1), to total eleven (11).

Recommended electives include courses in anthropology, art history, history, literature, music, psychology, and sociology. A total of 120 credits is required for this specialization.

**Stage Management.** Students selecting stage management

must complete an additional 30 credits: COM 351 (3);

management course (to be approved by chair) (3); THE 300 (3), 301 (3), 341 (3), 355 or 365 (3), 371 (3), 400 (3), 401 (3), 441 (3).

A total of 120 credits is required for this specialization.

**Minor in Music Voice Performance.** See Music earlier in this section.

### Writing and Rhetoric

Part of the Harrington School of Communication and Media, the Writing and Rhetoric Program offers the Bachelor of Arts (B.A.) degree.

**Faculty:** Professors Reynolds and Schwegler; Associate Professors Dyehouse, Hensley Owens, and Miles; Assistant Professors GottschalkDruschke, Omizo, and Ledbetter; Professor Emerita Shamoon.

**The Major.** This major is designed for undergraduate students who seek to expand their repertoire of writing for various public and private audiences. Graduates will have a strong foundation in rhetorical theory balanced with a wide range of situational practices common to professional writers. Coursework is balanced between inclass learning and experiential fieldwork in real world settings. All graduates design their own digital electronic portfolios prior to graduation, demonstrating their ability to work with a range of technologies in producing and distributing their polished writing.

Writing and rhetoric majors must complete 30 credits (maximum 51) including the core courses of WRT 201, 235, 360, 490, and 495. Acceptable substitutions for WRT 490 are WRT 435, 484, or 512 (with curriculum modification form). At least 15 credits for the major must be completed from writing courses numbered 300 or above. Writing and rhetoric majors are strongly encouraged to complete a practicum experience, such as an internship (WRT 484) or a field experience course (WRT 383 or 385). A maximum of three credits for each of these experiential courses can count towards the major, unless the project substantially changes. Undergraduates wishing to take a 500 or 600level course must secure the instructor's permission.

A total of 120 credits is required for graduation. At least 42 of these credits must be in courses numbered 300 or above.

**The Minor.** Students who declare a minor in writing and rhetoric must complete 18 credits from WRT courses at or above the 200 level. Students must take at least one 200level course. Students can apply toward the minor a maximum of three creditsearned through WRT 383 and WRT 484 each. 100 level courses and WRT 391 and 392 will not be counted as part of the minor.

# Business Administration

## Introduction

Mark Higgins, Dean

Shaw K. Chen, Associate Dean  
Deborah Rosen, Associate Dean  
Peg Ferguson Boyd, Assistant Dean

Faculty: Professors Beauvais, Beckman, Budnick, S. Chen, Comerford, Cooper, Creed, Dash, Della Bitta, N. Dholakia, R. Dholakia, Hazera, Hickox, Higgins, Jarrett, Lin, S. Martin, Matoney, Mazze, D. Rosen, Scholl, Schwarzbach, Sheinin, Westin, Wheeler and Yu; Associate Professors Blanthorne, Boyle, Y. Chen, Dorado, Dugal, Dunn, Hales, Jelinek, Jervis, Y. Lee, Leonard, Lloyd, Oppenheimer and Shin; and Assistant Professors Atlas, DaDalt, Djurdjevic, Gill, Ni, Ozpolat and Schniederjans.

The seven majors in the College of Business Administration allow students to develop competence in special fields of interest and prepare them to meet the changing complexities of life and leadership in the business community. Majors are offered in accounting, entrepreneurial management, finance, general business administration, global business management, marketing, and supply chain management.

Basic courses required of all undergraduates at the University introduce the student to the humanities, social sciences, physical and biological sciences, letters, foreign language, and the arts. The business curriculums develop the student's professional capabilities through a broad group of business courses with specialization in one area of study. Business programs provide a strong foundation in accounting, finance, marketing, organization and management theory, supply chain management, and statistics. The college emphasizes behavioral studies and computer technology to meet the needs of the business community and society as a whole. Emphasis is placed on the total business environment, as a part of the national and world economic structure. Theory, analysis, and decisionmaking are stressed in all areas of learning.

The College of Business Administration is a professional school with courses in lower and upper divisions. The lower-division courses constitute those taught in the freshman and sophomore years; the upper-division courses constitute those taught in the junior and senior years. Courses taken by transfer students at the lower-division level may be applied to satisfying upper-division requirements only after successful completion of a validating examination. All 500 and 600-level courses in the college are open to matriculated graduate students only.

A student enrolled in this college must complete the curriculum in one of the majors and must obtain an overall cumulative grade point average of 2.00 and a 2.00 or better average for all required courses in the major. Students wishing permission to substitute required courses or waive other requirements may petition the college's Scholastic Standing Committee. Petition forms are available in the Office of the Dean.

The College of Business Administration, the first accredited business school in Rhode Island, has been continuously accredited by the Association to Advance Collegiate Schools of Business International (AACSB) since 1972.

**For more information, visit [CBA.uri.edu](http://CBA.uri.edu) or call**

## 401.874.2337

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

## Admission Requirements

All students are initially enrolled in University College for Academic Success (UCAS), where they complete general education and lower-business core courses. Core requirements include accounting, economics, business computing and decision making, mathematics, and statistics. First-semester sophomores who complete a minimum of 42 credits with an overall grade point average of 2.50 or higher and who have a 3.00 or higher average in BUS 111, 201, 210, and ECN 201 will be transferred to the College of Business Administration. Students not qualifying after the first semester of their sophomore year must still meet the requirements of an overall grade point average of 2.50 and a 2.70 or higher average in BUS 111, 201, 202, 210, and ECN 201 and 202.

Students who have not satisfied entrance requirements may petition the Scholastic Standing Committee of the college for a waiver of those requirements during their fourth or succeeding semesters. Students in the UCAS business programs who have not met entrance requirements to the College of Business Administration are permitted to enroll only in 100 and 200 level business courses and in nonbusiness courses.

To ensure that business majors have access to required courses, a strict registration policy will be followed with regard to business courses. Highest priority will be given to business students for whom a course is a program requirement, as stated in this catalog, followed by any other student in the College of Business Administration, and then students outside the College of Business Administration who specifically need the course as a requirement for their degree.

## Curriculum Requirements

The first two years are common to all majors in the college.

**Freshman Year:** 16 credits in the first semester and 15 credits in the second semester. All students take URI 101 fall semester. All students must complete a behavioral science course from the following list: APG 203; PSY 103, 113; SOC 100, 204. BUS 110 and 111 are taken in alternate semesters, with the balance of credits in general education. Students majoring in global business management are required to complete PSC 116. Students majoring in accounting are required to complete PHL 212.

**Sophomore Year:** 15 credits in each semester. The BUS 201, 202, ECN 201, 202, and BUS 210, 211 (entrepreneurial management, finance, marketing, or supply chain management majors only) sequences are begun in the first semester and completed in the second. WRT 227 may be taken in either semester. The balance of credits is made up of general education requirements and liberal electives.

**General Education.** Students are required to select and pass 39 credits of course work from the general education

requirements (see General Education Requirements). Specific requirements of the College of Business Administration in each group follow:

Group A (6 credits). A minimum of three credits must be in literature: AAF 247 [D], 248 [D]; CLA 391 [D], 395 [D], 396 [D], 397 [D]; CLS 160 [D]; ENG 110 [D], 160 [D], 241 [D], 242 [D], 243 [D], 247 [D], 248 [D], 251 [D], 252 [D], 260 [D], 262, 263 [D], 264, 265, 280 [D], 300 [D], 302 [D], 303 [D], 304 [D], 355 [D], 357 [D], 358 [D]; FRN 309 [D], 310 [D], 320 [D], 391 [D], 392 [D], 393 [D]; HPR 125; RUS 391 [D], 392 [D]; SPA 305 [D], 306 [D], 307 [D], 308 [D], 320 [D].

The remainder may be in Fine Arts: ARH 120 [D], 251 [D], 252 [D]; ART 101, 207; FLM 101 [D], 203 [D], 204 [D], 205 [D]; HPR 105, 124; LAR 201; MUS 101 [D], 106 [D], 111, 292, 293 [D]; PLS 233; THE 100, 181, 351 [D], 352 [D], 381, 382, 383.

Groups L (6 credits) and N (6 credits). Any course for which prerequisites have been met.

Group MQ (3 credits). BUS 111 in the freshman year.

Group S (6 credits). ECN 201, 202 in the sophomore year.

Group EC (6 credits). COM 100; WRT 104, 106, 201, or 333 in the freshman year and WRT 227 in the sophomore year.

Group FC. This requirement shall be fulfilled in one of the following ways: Option 1. Demonstration of competence through the intermediate level by a proficiency examination or by successfully completing the 104 level in a living language or the 302 level in a classical language or by completing ARB 100 (6 credits) (students who fulfill this requirement through an examination cannot earn course credit for graduation; students who earn less than six credits in fulfilling the requirement should apply credits to the elective or major areas); Option 2. A twocourse sequence in a language previously studied for two or more years in high school through at least the 103 level in a living language or 301 in a classical language appropriate to a student's level of competence (e.g., 102 and 103, 102 and 301; 131 and 103; 103 and 104; 301 and 302); Option 3. A two course sequence in a language not previously studied (or studied for less than two years in high school) through the beginning level (e.g. 101 and 102). NOTE: Study abroad does not waive the foreign language requirement. As the above indicates, a minimum of 102 in a foreign language must be completed.

Electives. Liberal electives are courses offered by departments outside the College of Business Administration.

Business Track in the Honors Program. In cooperation with the University Honors Program, academically talented business students are able to enhance their intellectual development and strengthen their preparation by participating in the Business Track in the Honors Program.

Minors. College of Business Administration majors are encouraged to develop a nonbusiness minor. See Minor Fields of Study for requirements and options relating to minors, along with a list of approved interdepartmental minors. Students in the College of Business Administration choosing the third option—"related studies from more than one department under the sponsorship of a qualified faculty member"—need the approval of the Scholastic Standing Committee.

Nonbusiness students wishing to obtain a departmental minor in the College of Business Administration should expect to take the required six courses over a period of two years.

Admission is on a spaceavailable basis only, and therefore not guaranteed. Interested students should complete an application form, available from the Office of the Dean of the College of Business Administration.

International Business Program. In cooperation with URI's Department of Modern and Classical Languages and Literatures, the College of Business Administration offers an opportunity for students to earn two degrees and receive a B.S. in Business Administration and a B.A. in foreign language. The business requirements include a major in accounting, entrepreneurial management, finance, general business administration, global business management, marketing, or supply chain management. The student also develops a language component, choosing to major in Chinese, French, German, or Spanish. In addition, studies in international politics, European history, and courses in history and literature of the target country are included. Following the junior or senior year, students must complete a study abroad experience and a professional internship experience.

Green Business. The College of Business Administration and the Department of Environmental and Natural Resource Economics offer a double degree in general business and environmental economics. This program is designed for those interested in corporate sustainability, energy efficiency, nonprofit management, green marketing, renewable energy, global environmental challenges, environmental policy, and energy finance. Students earn a B.S. in Business Administration from the College of Business Administration and a B.S. in Environmental and Natural Resource Economics from the College of the Environment and Life Sciences. More details on this program can be found at [uri.edu/business/green-business/](http://uri.edu/business/green-business/).

## Business Administration Programs

### Accounting

The College of Business Administration offers a curriculum leading to the Bachelor of Science (B.S.) degree with a major in accounting. This curriculum provides the education requirements recommended by the American Institute of Certified Public Accountants for certification as a public accountant (CPA). The college also offers a Master of Science (M.S.) degree in accounting.

The increased scope of governmental and business activities has greatly extended the field of accounting and has created an unprecedented demand for accountants in both government and industry. This curriculum has been designed to meet that demand.

In addition to providing a general liberal arts and business background, the curriculum offers specialized training in the fields of general accounting, cost accounting, and public accounting. It offers specific, basic training to students who wish to become industrial accountants, cost analysts, auditors, credit analysts, controllers, income tax consultants, teachers of specialized business subjects, certified public accountants, government cost inspectors, or government auditors.

The broad scope of the courses offers fundamental training in the accounting field of the student's choice, whether this training is to be used as an aid to living or as a basis for graduate study.

*Junior Year First Semester: 16 credits*

BUS 301 (3), 320 (3), 341 (3), 390 (1), 401 (3), and one liberal elective (3).

*Second semester: 15 credits*

BUS 302 (3), 303 (3), 355 (3), 365 (3), and PSC 113, 116 or GEG 104 (3).

*Senior Year First Semester: 15 credits*

BUS 315 (3), 345 (3), 403 (3), and 404 (3), and one liberal elective (3).

*Second semester: 15 credits*

BUS 402 (3), 428 (3), 445 [capstone] (3), and two liberal electives (6).

Note: All accounting majors are required to complete a minimum of three credit hours in each of the following areas. Ethical Foundations: fulfilled by taking PHL 212 as a Letters general education requirement or as a liberal elective. Political Foundations: fulfilled by taking PSC 113, 116, or GEG 104 as a liberal elective.

### Entrepreneurial Management

The College of Business Administration offers a curriculum leading to the Bachelor of Science (B.S.) degree with a major in entrepreneurial management. The curriculum is intended to provide the student with a background to tackle all aspects of a small business or entrepreneurial endeavor. The entrepreneur

faces unique situations and needs a variety of skills to meet the challenges these situations present. Our program builds the skills necessary to the successful development of a business enterprise and includes courses in human resource management, marketing research, customer relationship marketing, leadership, and motivation.

With a degree in entrepreneurial management, students are prepared to start and manage their own business or work for companies in an entrepreneurial role.

*Junior Year First Semester: 16 credits*

BUS 315 (3), 341 (3), 345 (3), 365 (3), 390 (1), and one liberal elective (3).

*Second semester: 15 credits*

BUS 320 (3), 342 (3), 355 (3), 367 (3), and one liberal elective (3).

*Senior Year First Semester: 15 credits*

BUS 441 (3), 443 (3), 449 (3), 467 (3), and one liberal elective (3).

*Second semester: 15 credits*

BUS 445 [capstone] (3), 448 (3), 450 (3), and two liberal electives (6).

### Finance

The College of Business Administration offers a curriculum leading to the Bachelor of Science (B.S.) degree with a major in finance. The college also offers the Master of Business Administration (M.B.A.) degree with an opportunity for specialization in finance and the Doctor of Philosophy (Ph.D.) degree.

A finance curriculum is designed to prepare the student to be eligible to pass the Chartered Financial Analyst (CFA) Level 1 exam. This background prepares the student for managerial positions in the private, public, and nonprofit sectors. The curriculum emphasizes both financial decisionmaking and implementation.

Careers in finance are found in financial institutions; security analysis, portfolio, and related investment management; corporate financial management leading to positions as treasurer, controller, and other financial administrative positions; and financial administration tasks in federal and state agencies as well as in the nonprofit sector in hospitals, nursing homes, and educational institutions.

*Junior Year First Semester: 16 credits*

BUS 301 (3), 320 (3), 365 (3), 341 (3), 390 (1), and one liberal elective (3).

*Second semester: 15 credits*

BUS 302 (3), 315 (3), 321 (3), 322 (3), and one liberal elective (3).

*Senior Year First Semester: 15 credits*

BUS 345 (3), 421 (3), 424 (3), 428 (3), and one liberal elective (3).

*Second semester: 15 credits*

BUS 355 (3), 420 (3), 445 [capstone] (3), and two liberal electives (6).

## General Business Administration

The College of Business Administration offers a curriculum leading to the Bachelor of Science (B.S.) degree with a major in general business administration. The college also offers the Master of Business Administration (M.B.A.) degree with an opportunity for specialization in general business and the Doctor of Philosophy (Ph.D.) degree.

This curriculum offers the student an opportunity to study all phases of business operation. It is particularly suitable for: 1) those students who are planning to operate their own businesses and are seeking a broad business background; 2) those who are preparing for positions in large organizations with training programs in which specialization is taught after employment; and 3) those who desire a general business background at the undergraduate level prior to taking more specialized graduate work.

A general business administration student takes a broad spectrum of courses and does not concentrate in one special field of study. The student cannot enroll in more than six (6) credits of professional electives in any area of business. All general business administration majors are strongly encouraged to include in their program of study an internship, or a study abroad experience, or a minor in a field outside of the College of Business Administration.

*Junior Year First Semester: 16 credits*

BUS 320 (3), 341 (3), 335 (3), 365 (3), 390 (1), and one liberal elective (3).

*Second semester: 15 credits*

BUS 315 (3), BUS 355 (3), 342 (3), 345 (3), and one liberal elective (3).

*Senior Year First Semester: 15 credits*

BUS 448 (3), two professional electives (6), and two liberal electives (6).

*Second semester: 15 credits*

BUS 445 [capstone] (3), 460 (3), two professional electives (6), and one liberal elective (3).

## Global Business Management

The College of Business Administration offers a curriculum leading to the Bachelor of Science (B.S.) degree with a major in global business management. The curriculum is designed to prepare students to meet the challenges of an international career by achieving a high degree of proficiency in the language of another country as well as a background in

its history, economy, politics, culture, and arts. In addition to the common body of knowledge required of all business students, global business management majors will study business principles taught from a global perspective. A required internship abroad and/or study abroad experience is an essential part of the program.

*Junior Year First Semester: 16 credits*

BUS 320 (3), 341 (3), 355 (3), 365 (3), 390 (1), and one foreign language (3).

*Second semester: 15 credits*

BUS 345 (3), 342 (3), 460 (3), one foreign language (3), and one liberal elective (3).

*Senior Year First Semester: 15 credits*

Study Abroad: Businessrelated courses (12) and one liberal elective (3).

*Second semester: 15 credits*

BUS 315 (3), 428 (3), 468 (3), 445 [capstone] (3), and one Letters course (3).

## Management Information Systems

As of fall 2007, admission to this program has been suspended.

## Marketing

The College of Business Administration offers a curriculum leading to the Bachelor of Science (B.S.) degree with a major in marketing. Elective courses in the department expose students to career opportunities in a variety of fields in marketing. The college also offers the Master of Business Administration (M.B.A.) degree with an opportunity for specialization in marketing and the Doctor of Philosophy (Ph.D.) degree.

A major focus of marketing is determining product and service needs of consumers and industries as well as understanding how an organization deals with these marketing issues. The courses required of a marketing major give the student a well rounded view of consumer and organizational needs.

*Junior Year First Semester: 16 credits*

BUS 315 (3), 355 (3), 365 (3), 366 (3), 390 (1), and one liberal elective (3).

*Second semester: 15 credits*

BUS 320 (3), 341 (3), 345 (3), 367 (3), and one liberal elective (3).

*Senior Year First Semester: 15 credits*

BUS 441 (3), 460 (3), 465 (3), 468 (3), and one liberal elective (3).

*Second semester: 15 credits*

BUS 445 [capstone] (3), 467 (3), 470 (3), and two liberal electives (6).

## Supply Chain Management

The College of Business Administration offers a curriculum leading to the Bachelor of Science (B.S.) degree with a major in supply chain management. The college also offers the Master of Business Administration (M.B.A.) degree with an opportunity for specialization in supply chain management and the Doctor of Philosophy (Ph.D.) degree.

The supply chain management major is a comprehensive program covering the basic and advanced topics necessary for designing, implementing, operating, and improving global supply chains.

Careers in supply chain management span every industry. Career options also include a diverse list of positions including inventory management, customer relationship management, scheduling, purchasing, and facilities management.

### *Junior Year First Semester: 16 credits*

BUS 315 (3), 341 (3), 355 (3), 360 (3), 390 (1), and one liberal elective (3).

### *Second semester: 15 credits*

BUS 320 (3), 362 (3), 365 (3), 460 (3), and one liberal elective (3).

### *Senior Year First Semester: 15 credits*

BUS 345 (3), 361 (3), 463 (3), and two liberal electives (6).

### *Second semester: 15 credits*

BUS 445 [capstone] (3), 462 (3), 464 (3), 467 (3), and one liberal elective (3).

## Engineering

Raymond M. Wright, Dean

George E. Veyera, Associate Dean

### URI Engineering's Mission

The College of Engineering (COE) is a diverse community of scholars, learners, and professional staff dedicated to the development and application of advanced technologies, and working together to enhance the quality of life for all. We are creative problem solvers, innovators, inventors, and entrepreneurs, applying our skills for the advancement of knowledge, service to our community, and the economic development of the state of Rhode Island and beyond. We prepare our graduates to be global leaders in a wide range of engineering disciplines and to create new knowledge, products, and services.

For more information, visit [egr.uri.edu](http://egr.uri.edu) or call +1.401.874.5985.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

### Expected Student Outcomes

The College of Engineering offers undergraduate majors in biomedical, chemical, civil, computer, electrical, industrial and systems, mechanical, and ocean engineering. Because the same fundamental concepts underlie all branches of engineering, freshman-year courses are similar for all curricula, and the choice of a specific engineering major may be delayed until the beginning of either the second term or the second year of study. All of the engineering curricula are based on an intense study of mathematics and the basic sciences supporting the fundamentals of each engineering discipline. These principles are applied to the understanding and solution of problems of current interest and importance in the field. Each curriculum is designed to provide the knowledge and ability necessary for practice as a professional engineer, or for successful graduate study, which may include law, business administration, or medicine, as well as engineering and science disciplines.

Engineers from all fields are heavily involved in the solution of technological and sociotechnological problems; industry's needs are for balanced teams of both men and women from different engineering areas. Therefore, the college's goal is to stimulate our students to become creative, responsible engineers, aware of the social implications of their work, and flexible enough to adjust to the rapid changes taking place in the world and, consequently, in all branches of engineering.

Expected Student Outcomes for the chemical engineering, civil engineering, industrial and systems engineering, mechanical engineering and ocean engineering programs

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet

desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in, life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Outcomes I-p are specific to the Ocean Engineering program.

- knowledge and the skills to apply the principles of fluid and solid mechanics, dynamics, hydrostatics, probability and applied statistics to engineering problems,
- knowledge and the skills to apply the principles of oceanography, water waves, and underwater acoustics to engineering problems,
- the ability to work in groups to perform engineering design at the system level, integrating multiple technical areas and addressing design optimization.
- an appreciation of diversity in the engineering workplace
- participation of 20% of the Ocean Engineering BS students in the International Engineering Program (IEP) (Chinese, German, French, Italian, and Spanish)

### EXPECTED STUDENT OUTCOMES FOR THE BIOMEDICAL ENGINEERING PROGRAM

To Understand – to understand the mathematical and physical foundations of biomedical engineering and how these are applied to the design of biomedical instruments, the analysis of biological systems, and the technological advancement for health care. An understanding that engineering knowledge should be applied in an ethically responsible manner for the good of society.

To Question – to critically evaluate alternate assumptions, approaches, procedures, tradeoffs, and results related to engineering and biological problems.

To Design – to design a variety of electronic and/or computer-based devices and software for applications including biomedical instrumentation, medical imaging, physiological measurement, biomedical signal processing, rehabilitation engineering and medical informatics.

To Lead – to lead a small team of student engineers performing a laboratory exercise or design project; to participate in the various roles in a team and understand how they contribute to accomplishing the task at hand.

To Communicate – to use written and oral communications to document work and present project results.

### EXPECTED STUDENT OUTCOMES FOR THE COMPUTER ENGINEERING PROGRAM

To Understand – to understand fundamentals of computer hardware and software, electronics, electronic design automa-



tion, and mathematics, and how these are used in computers and computerbased systems. An understanding that engineering knowledge should be applied in an ethically responsible manner for the good of society.

To Question – to critically evaluate alternate assumptions, approaches, procedures, tradeoffs, and results related to engineering problems.

To Design – to design and implement a computer system including processor, memory and I/O system, compiler, operating system, and local area network interface.

To Lead – to lead a small team of student engineers performing a laboratory exercise or design project; to participate in the various roles in a team and understand how they contribute to accomplishing the task at hand.

To Communicate – to use written and oral communications to document work and present project results.

### EXPECTED STUDENT OUTCOMES FOR THE ELECTRICAL ENGINEERING PROGRAM

To Understand – to understand the mathematical and physical foundations of electrical engineering and how these are used in electronic devices and systems. An understanding that engineering knowledge should be applied in an ethically responsible manner for the good of society.

To Question – to critically evaluate alternate assumptions, approaches, procedures, tradeoffs, and results related to engineering problems.

To Design – to design a variety of electronic and/or computer-based components and systems for applications including signal processing, communications, computer networks, and control systems.

To Lead – to lead a small team of student engineers performing a laboratory exercise or design project; to participate in the various roles in a team and understand how they contribute to accomplishing the task at hand.

To Communicate – to use written and oral communications to document work and present project results.

## Curriculum Requirements

Entering engineering students who have chosen a specific major should follow the particular program listed in this section. It is recommended that those students who have decided to major in engineering, but have not selected a specific major take the following courses: CHM 101/102; EGR 105; MTH 141; PHY 203/273; and a general education requirement during their first semester. Students who are still undecided about their choice of major after completing the first semester should review their second semester courses with their engineering advisor to be certain that they meet the prerequisites for the sophomore year.

Students who are undecided about engineering as a major, but wish to keep it open as an option, should note that CHM 101/102; EGR 105, 106; MTH 141, 142; and PHY 203/273, 204/274 are required for graduation by the College of Engineering (COE), and are prerequisites for many engineering courses. These individuals need to meet with the Wanting Engineering (WEGR) advisor, and review relevant information regarding WEGR below.

Admission to the College of Engineering. To be admitted to the COE, students must complete at least 24 credits (including transfer credits) with a grade point average of 2.00 or better, and must also complete the following required courses with a grade point average of 2.00 or better and a grade of C– or better in each course: CHM 101/102; EGR 105, 106; MTH 141, 142; PHY 203/273; and either PHY 204/274 or CHM 112/114.

Enrollment in Engineering Courses. Enrollment in 200-level College of Engineering courses is restricted to engineering majors. Exceptions can be made by permission of the department chair. Enrollment in 300-level and above College of Engineering courses is restricted to students who have been admitted to a degree granting college.

Graduation Requirements. To meet graduation requirements, students enrolled in the COE must satisfactorily complete all courses of the degree program in which they are enrolled and obtain a grade point average of 2.00 or better in all required science, mathematics, and engineering courses (including professional electives). Students are also required to complete a degree audit and an exit interview with the associate dean at least one semester prior to their anticipated graduation date. At the discretion of the dean, students who do not demonstrate satisfactory progress may be required to leave the COE.

Student Advisement. Engineering students are advised by engineering faculty members in their degree program. While the student is in University College for Academic Success (UCAS), advising takes place at UCAS; once the student is transferred to the COE, advising takes place at the departmental level. The office of the Associate Dean of Engineering only provides nonroutine advising.

General Education Requirements. All COE undergraduates must meet the breadth, depth, and flexibility requirements for general education courses as specified below. Students must refer to their specific engineering major for additional requirements, which vary by program. For a list of general education courses, see General Education Requirements.

**(a) General Education Breadth Requirement. All engineering students must take at least three credits in each of the seven general education categories specified by the University (minimum of 21 credits), as noted below:**

English Communications [EC/ECw]—one WRT course is required; only one of the following courses is allowed for general education credit: WRT 104, or 106; Mathematics and Quantitative Reasoning [MQ]—satisfied by MTH 141; Fine Arts and Literature [A]; Foreign Language and CrossCultural Competence [FC]; Letters [L]; Natural Science [N]—satisfied by CHM 101; Social Science [S]—satisfied by ECN 201.

**(b) General Education Depth Requirement. All engineering students must take at least three additional credits in each of three different general education categories specified by the University (at least nine credits).**

English Communications [EC/ECw]—only one of the following writing courses is allowed for general education credit: WRT 104, or 106; Mathematics and Quantitative Reasoning [MQ]—satisfied by MTH 142; Fine Arts and Literature [A]; Foreign Language and CrossCultural Competence [FC]; Letters [L]; Natural Science [N]—satisfied by additional required courses; Social Science [S].

**(c) General Education Flexibility Requirement.**  
**Students must refer to their engineering major for any additional specific courses needed to satisfy the remaining General Education requirement(s).**

Wanting Engineering. Based on background and interests, students are provided with the opportunity to explore engineering as a potential major by taking required fundamental core courses in engineering, mathematics, and science. These students are designated as “Wanting Engineering (WEGR)”, which is not an engineering major, during this exploratory period. To become an engineering major, WEGR students must have an overall grade point average of 2.00 or better, and complete (including transfer credits) the following required courses with a grade point average of 2.00 or better and a grade of C– or better in each course: MTH 141, CHM 101, 102, PHY 203, 273, and EGR 105, within 3 (three) semesters, under the guidance of the WEGR advisor. Note: Some WEGR students are typically not ready to begin in the first required calculus course, MTH 141. As such, these WEGR students should expect a five year plan for graduation based on the various engineering curricula requirements. The WEGR advisor will review this and the options with each WEGR student.

International Engineering Program (IEP). IEP students must consult with their IEP language advisor regarding additional specific general education requirements.

## Computational Facilities

The Engineering Computer Center (ECC), located in the Chester H. Kirk Center for Advanced Technology, supports the teaching and research activities of the College of Engineering. The ECC has one dual eightcore and two dual quadcore processor Dell PowerEdge servers providing centralized services for PC file and print sharing, license serving, email, and web applications. Both wireless and cabled network access are available. Students are assigned COE computer accounts and use these accounts until they graduate. Student accounts are accessible from all of the ECC and COE department computer classrooms. Email accounts are provided for COE faculty and staff.

There are 132 networked PCs available at the ECC for student use. These are incorporated into three classrooms with projection systems, a main student work area, and two side project/study rooms. Also provided are three scanners, four black and white laser printers, a color laser printer, and three large format inkjet plotters, one specifically for CAD drawings and one for final presentation quality posters. Areas are available for students to set up their own laptops for access to software, printers, and the network. Available installed software includes Abaqus, Aspen, AutoCAD, Bentley, Comsol, EES, LabView, Mathematica, MatLab, Microsoft Visual Studio, Minitab, Multisim, SolidWorks, and Working Model. The ECBE Linux distribution is also available as a dual boot option on all machines.

In addition to providing the computer technologies that engineering students rely on for their course work, the ECC provides faculty members with the resources necessary for their teaching and research commitments, through the use of network services, interactive multimedia classrooms, and the expertise of the ECC staff in identifying and procuring hardware and software.

The Discovery Center is a stateoftheart multimedia computer classroom with dualmonitor PCs for 30 students; an instructor podium with tablet monitors and the ability to interact with any of the student PCs; eight widescreen, flatpanel TV monitors; and two large screen projectors. The Discovery Center is heavily used for our introductory freshman engineering classes, where students are introduced to the College of Engineering, engineering career paths, engineering problem solving, teamwork, handson projects, and software with applications used in other engineering classes. The Discovery Center is also used by other engineering classes and is available to all engineering students for general use during the evenings and in between classes.

A second 32seat classroom located near the main ECC facility contains stateoftheart equipment to handle the increased demand for engineering multimedia instructional capabilities. Managed by the ECC staff, this classroom is available for classes, seminars, lectures, and lab sessions.

In the Department of Chemical Engineering computing room ten PCs with specialized software packages such as Aspen, a Chemical Engineering Design Process Simulator, FACTORY FLOOR, a process control program, MatLab, and Polymath are available for undergraduate teaching and research.

The Department of Civil and Environmental Engineering has two computational facilities. The CADD Laboratory contains 30 stateoftheart PCs, one network printer; and a direct projection multimedia system. Available software includes AutoCAD Civil3D, the Bentley Suite with over 50 engineering software packages (including Inroads, Leap, Microstation, RAM, SewerCAD, STAAD, WaterCAD, etc.); ANSYS, HCS, Maple, MatLab, Mathematica, MicroPAVER, MS Office, and others. Modern geomatics and surveying equipment (funded by the Champlin Foundations) including electronic Total Station and GPS for field data acquisition are linked to the CADD lab PCs, printers, and plotters for GIS representation and analysis. The senior Capstone Design Project Studio has six PCs, a reference library, and a direct projection multimedia system, used by the design teams during the integrated capstone design project.

The Department of Electrical, Computer, and Biomedical Engineering has numerous multiprocessor Linux servers. The primary servers feature hardware RAID and fiberoptic gigabit network connections. The main computing lab hosts 14 general use, dualmonitor Linux workstations, which are available 24 hours a day to all students in the department. In addition, there are approximately 50 Linux workstations and 40 Windows systems dispersed throughout laboratories and offices. Available software includes MatLab for signal processing, HSPICE for analog circuit simulation, Quartus for FPGA simulation and design, as well as thousands of opensource applications. Numerous laser printers are available, including duplex (twosided) and color variants. Wireless network access is available throughout the department.

The Department of Mechanical, Industrial, and Systems Engineering has two computer classrooms. The Wales Hall computer classroom includes 25 workstations and two highspeed laser printers. The Gilbreth Hall computer classroom includes 13 workstations and two laser printers. Both classrooms are equipped with projection systems for classroom and seminar presentations. Application software includes SolidWorks, Working Model, MatLab, Abaqus, Algor, Excel, Comsol, Gams,

Lingo, Maple, Mathematica, Mintab, Engineering Equation Solver, Compact 2D (CFD), and others. In addition, department laboratories are equipped with a variety of computers for computational modeling studies, highspeed data acquisition, and control of mechanical devices.

The Department of Ocean Engineering has a newly designed Ocean Project Center at the Narragansett Bay Campus to support both their education and research programs. The Ocean Project Center is open to all undergraduate and graduate students in Ocean Engineering and is equipped with dual screens and two laser printers. Available software includes: MatLab, Word, Excel, PowerPoint, LaTeX, Scientific Word, Netscape/Explorer, LabView, and SolidWorks. The Ocean Project Center also has computer and conference tables, and whiteboards for collaborative efforts, student group learning, and individual assignments. WiFi is also available.

## Minors, Double Majors, and Graduate Degrees

**Minors and Double Majors.** Students wanting to obtain strengths in other areas of academic specialization while in engineering are encouraged to do so by completing either a minor (see "Minor Fields of Study") or double major. Some of the COE degree programs also offer minors. For details, see degree programs described in the following sections.

**Nuclear Engineering Minor.** The COE offers a minor in nuclear engineering to qualified students who are matriculated in the COE. Students declaring this minor must complete a minimum of 18 credits consisting of four required courses (12 credits) and two supporting courses (6 credits). Additional information can be found at [egr.uri.edu/nuclearengineering-minor/](http://egr.uri.edu/nuclearengineering-minor/).

**International Engineering Program (IEP).** In conjunction with the College of Arts and Sciences, the COE offers a fiveyear program in which students earn two degrees: a Bachelor of Science (B.S.) in engineering and a Bachelor of Arts (B.A.) in a foreign language. The foreign languages currently offered by the IEP are Chinese, German, French, Italian, and Spanish. Students also spend six months abroad in a paid professional internship working at an international engineering company in Europe, Latin America, the Caribbean, or Asia. Upon graduation, students are well prepared to compete in the global marketplace and are highly sought after by employers both in the U.S. and abroad. Interested students should contact the IEP director at the IEP House on Upper College Road, or the associate dean of the COE, Dean's Office, 102 Bliss Hall. The IEP has been recognized for excellence in international engineering education and received the Award for Educational Innovation from ABET, Inc.

**Accelerated FiveYear B.S./M.S. Degree Programs.** The COE offers accelerated fiveyear B.S./M.S. degree programs in all engineering majors. These programs allow qualified students to complete both the B.S. and M.S. degrees within five years. Specific requirements vary by major. Please refer to program details in this catalog, including department requirements listed by individual major and links to department websites for further information.

**Engineering and Political Science Program.** Students completing both the B.A. degree in political science and the B.S. degree in engineering at the same time may use courses in the political science major to satisfy Basic Liberal Studies require-

ments for the Bachelor of Arts. The College of Engineering and the Department of Political Science have established a curriculum that allows for the completion of the two degrees and a publicsector internship in five years.

**Engineering and M.B.A. Program.** This fiveyear program offers students the opportunity to earn a B.S. degree in engineering and a Master of Business Administration (M.B.A.). Students with a cumulative GPA of 3.00 or better may enroll during their senior year with successful completion of the Graduate Management Admissions Test (GMAT).

**Engineering and M.O. Program.** The fifthyear Master of Oceanography (M.O.) program is designed for URI students who want to enter GSO's M.O. program while still an undergraduate and complete the degree in the year following completion of the B.S. The program is open to qualified URI undergraduates in the natural sciences or engineering. Eligibility and program requirements can be found in the "Graduate Programs" section of this catalog.

**Graduate Degrees.** Graduate study is available in the COE at the Master of Science (M.S.) and Doctorate (Ph.D.) level. For a listing of advanced degrees, see the "Graduate Programs" section of this catalog.

## Accreditation, Engineering

**Accreditation.** The College of Engineering's eight undergraduate B.S. degree programs in biomedical engineering, chemical engineering, civil engineering, computer engineering, electrical engineering, industrial and systems engineering, mechanical engineering, and ocean engineering are all accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., the recognized leader in international engineering program accreditation.

We encourage you to visit ABET, Inc., to learn more about the importance of engineering program accreditation, and the valuable benefits for graduates of accredited engineering degree programs.

URI's College of Engineering is a member of the American Society for Engineering Education (ASEE).

## Engineering Programs

### Biomedical Engineering

The Bachelor of Science (B.S.) degree in biomedical engineering is offered by the Department of Electrical, Computer, and Biomedical Engineering (ECBE), and is open to qualified students under the New England Regional Student Program. The Biomedical Engineering Program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ([www.abet.org](http://www.abet.org)). Specialization in biomedical engineering is also available within the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) programs in electrical engineering.

Faculty: Professor Fischer, chairperson; Professor Ying Sun, program coordinator. Professor Ohley; Associate Professors Besio, and Vetter; Assistant Professors Kennedy, and Mankodiya. Supporting Faculty: Professors BoudreauxBartels, Fischer, Swaszek, and Vaccaro. Adjunct Professor Chiamarida; Adjunct Assistant Professors DiCecco, Liu, and Salisbury.

Program Educational Objectives.

Three to five years after graduation from the B.S. in Biomedical Engineering, graduates will:

1. Successfully practice biomedical engineering to serve state and regional industries, hospitals, government agencies, or national and international industries.
2. Work professionally in one or more of the following areas: biomedical electronics, medical instrumentation, medical imaging, biomedical signal processing, rehabilitation engineering, and neuroengineering.
3. Achieve personal and professional success with awareness and commitment to their ethical and social responsibilities, both as individuals and in team environments.
4. Maintain and improve their technical competence through lifelong learning, including entering and succeeding in an advanced degree program in a field such as engineering, science, business, or medicine.

Student Outcomes. Biomedical engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

Program Description. Biomedical engineering is an interdisciplinary area in which engineering techniques are applied to problem solving in the life sciences and medicine. Biomedical engineers design medical instruments for diagnosis and the treatment of various diseases as well as for research in biology. Examples of instruments for diagnosis include electrocardiographs, electroencephalographs, automatic blood analyzers, and medical imaging systems such as Xray imaging, radionuclide imaging, ultrasound imaging, computerassisted tomography, and magnetic resonance imaging. Examples of instruments for treatment include radiotherapy machines, pacemakers, cardiacassist devices, intelligent drug delivery systems, and lasers for surgery. Biomedical engineers develop artificial organs for prosthesis and computer software and hardware systems to help provide highquality, costeffective health care.

Biomedical engineers are employed in the medical instrument industry, where they invent, design, manufacture, sell, and service medical equipment; hospitals, where they evaluate, select, maintain, and provide training for the use of complex

medical equipment; and medical and biological research institutes, where they use unique analytical ability and instrumentation skills to conduct advanced research.

URI's biomedical engineering program combines study in the biological sciences with the areas of engineering that are particularly important for the application of modern technology to medicine. This curriculum is designed to provide students with not only a general background in biomedical engineering but also a special focus on the skills in electrical engineering necessary for developing medical devices. With a few minor elective changes, the program also satisfies the entrance requirements of most medical schools, but students who plan to go on to medical school should consult the premedical advisor and the coordinator of the biomedical engineering program.

The biomedical engineering major requires 122–123 credits.

*Freshman Year First semester: 15 credits*

CHM 101 (3), 102 (1); ECN 201 (3); EGR 105 (1); MTH 141 (4); and general education requirement<sup>1</sup> (3).

*Second semester: 17 credits*

BME 181 (1); CHM 124 (3); EGR 106 (2); MTH 142 (4); PHY 203 (3), 273 (1); and general education requirement<sup>1</sup> (3).

*Sophomore Year First semester: 16 credits*

BIO 121 (4); BME 281 (1); ELE 201 (3), 202 (1); MTH 362 (3); and PHY 204 (3), 274 (1).

*Second semester: 15 credits*

BIO 242 (3), 244 (1); BME 207 (3); ELE 212 (3), 215 (2); and MTH 243 (3).

*Junior Year First semester: 16 credits*

BIO 341 (3); BME 307 (3); ELE 313 (3), 338 (3), 339 (1); and general education requirement<sup>1</sup> (3).

*Second semester: 16 credits*

BME 360 (3), 361 (1); ELE 314 (3); ISE 411 (3) or STA 409 (3); general education requirement<sup>1</sup> (3); and free elective (3).

*Senior Year First semester: 13–14 credits*

BME 461 (3), 464 (3), 465 (1), 484 (2) [capstone]; ELE 400 (1); and approved professional elective<sup>2</sup> (34).

*Second semester: 14 credits*

BME 462 (3), 468 (3), 485 (2) [capstone]; and general education requirement<sup>1</sup> (6).

<sup>1</sup> General Education Requirement (EC/ECw): Must take at least six credits of EC/ECw general education courses, with at least one course in writing, ECw.

<sup>2</sup> Professional Elective Requirements: One (1) course from the following: CHE 333, 347, 574; CSC 522; ELE 322, 343/344, 435/436, 437, 438, 444/445, 447/448, 458/459, 470, 501, 506; ISE 404, 412; MCE 341, 354, 372; MTH 442, 451, 462, 471; with prior approval of the Electrical, Computer, and Biomedical

Engineering department chairperson, any other 300, 400, or 500 level College of Engineering course not required by the BME major.

Accelerated Five Year B.S./M.S. Degree Program. To qualify for this program, students must earn a cumulative GPA of 3.30 or higher while pursuing their B.S. degree. To ease the course load at the graduate level, candidates are encouraged to earn some graduate credits (e.g. one or two courses not required for their B.S. degree) during their senior year. Additional information about this program can be obtained by contacting the department chairperson.

## Chemical Engineering

The Department of Chemical Engineering (CHE) offers a curriculum leading to the Bachelor of Science (B.S.) degree in chemical engineering. The Chemical Engineering Program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ([www.abet.org](http://www.abet.org)). In addition to the major there are two available tracks: biology and pharmaceutical. The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees.

Faculty: Professor Brown, chairperson. Professors Bose, Gregory, and Lucia; Associate Professors Bothun, Greenfield, and RiveroHudec; Assistant Professors Meenach, Kennedy, and Worthen; Associate Research Professor Crisman; Professors Emeriti Barnett, Gray, Knickle, Rockett, and Rose.

The chemical engineer is concerned with the application and control of processes leading to changes in chemical composition. These processes are most frequently associated with the production of useful products (chemicals, fuels, metals, foods, pharmaceuticals, paper, plastics, and the like), but also include processes such as removal of toxic components from the blood by an artificial kidney, environmental cleanup, and semiconductor processing. The chemical engineer's domain includes more efficient production and use of energy, processing of wastes, and protection of the environment.

Chemical engineers have a strong foundation in chemistry, physics, mathematics, and basic engineering. Chemical engineering courses include thermodynamics, transport phenomena, mass transfer operations, materials engineering, process dynamics and control, kinetics, and plant design. The student has the opportunity to operate smallscale equipment and to visit local industry. Intensive work is undertaken in the solution of complex problems in which economics and optimization of engineering design are emphasized.

Department Mission Statement. We are a community in a common quest to create and distribute chemical engineering knowledge in order to prepare our graduates to be successful leaders and practitioners.

Program Educational Objectives.

Three to five years after graduation from the B.S. in Chemical Engineering, graduates will :

1. Successfully practice or apply the principles of Chemical Engineering in a variety of employment areas.
2. Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.
3. Pursue continued lifelong learning through profes-

sional practice, further graduate education or other training programs in engineering science or other professional fields.

Student Outcomes. Chemical engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

Program Description. URI's chemical engineering program is more than just a collection of courses and credit hours whose content reflects the required criteria. The program has also been carefully designed to prepare students for the profession of chemical engineering through study, experience, and practice. Through eight specific program goals, the Department of Chemical Engineering at URI seeks to:

- 1) provide the necessary background in science, particularly chemistry, physics, and advanced mathematics through the study of differential equations, so that students will be able to continue their education in the engineering sciences, with depth of understanding, and learn to apply these subjects to the formulation and solution of engineering problems;
- 2) provide a broad cross section of fundamental engineering science courses, including some from other engineering disciplines so that our students will acquire an understanding of the way in which chemistry, physics, and mathematics have been and continue to be used to solve important engineering problems relevant to the general chemical engineering and engineering design;
- 3) provide students with experience in conducting and planning experiments in the modern engineering laboratory, including interfacing experiments with computers as well as interpreting the significance of resulting data and properly reporting results in wellwritten technical reports;
- 4) provide experience in the process of original chemical engineering design in the areas of equipment design, process design, and plant design through the process of formulating a design solution to a perceived need and then executing the design and evaluating its performance, including economic considerations and societal impacts if any, along with other related constraints, culminating in both written and oral presentations of results;
- 5) provide experience with the multifaceted aspects of using computers to solve problems and present results with word processing, spreadsheet, presentation, and professional-level applications software used for design and analysis; and provide for obtaining and using information on the World Wide Web;
- 6) provide a familiarity with professional issues in chemical engineering, including ethics, issues related to the global economy and to emerging technologies, and fostering of important jobrelated skills such as improved oral and written communications and experience in working in teams at a number of levels;
- 7) encourage students to become actively engaged in the student chapter of the American Institute of Chemical Engineers and other student organizations, and to continue these associations after graduation with an emphasis on the importance of lifelong professional development including the desirability of attending graduate school or otherwise obtaining continuing or advanced education; and
- 8) make available continuous individual advising

throughout the entire undergraduate educational experience to insure that each student makes the most of the educational opportunities provided by URI, particularly those related to general education electives that might enhance an engineering education, and special programs such as internships, cooperative experience and especially the International Engineering Programs in Chinese, German, French, and Spanish which are a unique opportunity available to globally motivated URI engineering students.

Traditional Chemical Engineering Major.

The chemical engineering major requires 120 credits.

*Freshman Year First semester: 13 credits*

CHM 101 (3), 102 (1); EGR 105 (1); MTH 141 (4); and PHY 203 (3), 273 (1).

*Second semester: 17 credits*

CHM 112 (3), 114 (1); ECN 201 (3); EGR 106 (2); MTH 142 (4); and PHY 204 (3), 274 (1).

*Sophomore Year First semester: 12 credits*

CHE 212 (3); CHM 227 (3); MTH 243 (3); and general education requirement (3).

*Second semester: 15 credits*

CHE 232 (3), 272 (3), 313 (3); CHM 228 or BCH 311 (3); and MTH 244 (3).

*Junior Year First semester: 17 credits*

CHE 314 (3), 347 (3); CHM 335 (2), 431 (3); approved mathematics elective<sup>1</sup> (3); and general education requirement (3).

*Second semester: 15 credits*

CHE 348 (3), 364 (3); CHM 432 or approved professional elective<sup>1</sup> (3); and general education requirements (6).

*Senior Year First semester: 17 credits*

CHE 345 (2) [capstone], 349 (2), 351 (3) [capstone], 425 (3), 428 (1); approved professional elective<sup>2</sup> (3); and general education requirement (3).

*Second semester: 14 credits*

CHE 346 (2) [capstone], 352 (3) [capstone]; and approved professional electives<sup>2</sup> (9).

<sup>1</sup> Mathematics Elective Requirement: MTH 215 or any 300, 400, or 500level MTH course except MTH 381.

<sup>2</sup> Professional Elective Requirements: Half of the professional electives are to be 400level or higher CHE courses taken at URI. The remaining courses are to be 300level or higher in natural science, or 400level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400level or higher in MTH. All professional electives require prior approval by CHE advisor.

Biology Track in Chemical Engineering. The primary motivation is to respond to advances in our understanding of biological processes at the molecular and macroscopic levels, and

the unique opportunity for chemical engineers to translate that understanding to useful processes. The application of the chemical engineering paradigm to biology enables graduates to develop new molecular biology tools; drug delivery systems; artificial skin, organs and tissues; sensors and alternative fuels; and to integrate new bioproducts into existing materials. The curriculum is founded on the core principles of transport phenomena, unit operations, thermodynamics, and reaction kinetics. Students take a series of five courses in biochemistry and cell and molecular biology. Besides preparing students for the biotechnology industry, this combination of biology, chemical engineering, and chemistry courses is relevant to those considering medical school.

This track follows a program similar to the traditional chemical engineering curriculum, but with biology and biochemistry courses replacing some of the other technical and science courses.

The chemical engineering major with biology track requires 124 credits.

*Freshman Year First semester: 13 credits*

CHM 101 (3), 102 (1); EGR 105 (1); MTH 141 (4); and PHY 203 (3), 273 (1).

*Second semester: 17 credits*

BIO 101 (3), BIO 103 (1); CHM 112 (3), 114 (1); ECN 201 (3); EGR 106 (2); and MTH 142 (4).

*Sophomore Year First semester: 15 credits*

CHE 212 (3), CHM 227 (3); MTH 243 (3); and general education requirements (6).

*Second semester: 15 credits*

BCH 311 (3) or BIO 341 (3); CHE 232 (3), 272 (3), 313 (3); and MTH 244 (3).

*Junior Year First semester: 16 credits*

BIO 341 (3) or BCH 311 (3); CHE 314 (3), 347 (3); PHY 204 (3), 274 (1); and general education requirement (3).

*Second semester: 17 credits*

BIO 352 (4); CHE 348 (3), 364 (3); MIC 211 (4); and general education requirement (3).

*Senior Year First semester: 17 credits*

CHE 345 (2) [capstone], 349 (2), 351 (3) [capstone], 425 (3), 428 (1); approved professional elective<sup>2</sup> (3); and general education requirement (3).

*Second semester: 14 credits*

BIO 437 (3); CHE 346 (2) [capstone], 352 (3) [capstone]; approved mathematics elective<sup>2</sup> (3); and approved professional elective<sup>2</sup> (3).

<sup>1</sup> Mathematics Elective Requirement: MTH 215 or any 300, 400, or 500level MTH course except MTH 381.

<sup>2</sup> Professional Elective Requirements: Half of the professional

electives are to be any 400level or higher CHE courses taken at URI. The remaining courses are to be 300level or higher in natural science, or 400level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400level or higher in MTH. All professional electives require prior approval by CHE advisor.

**Pharmaceutical Track in Chemical Engineering.** Biopharmaceuticals is one of the fastest growing industrial sectors both in the United States and worldwide, with a projected growth rate of ten percent per year for the foreseeable future. Driving this rapid growth are the worldwide increase in average life span, major developments in our understanding of key factors behind the development of disease, and important innovations in drug formulations and delivery. This growth has created a need for graduates who are wellversed in the basic sciences as well as all technological aspects related to the development process for therapeutic agents—production, scale-up and processing, formulation and delivery, and regulatory constraints. The chemical engineering pharmaceutical track serves to meet this need, combining the wellknown strengths of the College of Pharmacy with those of the Department of Chemical Engineering, for a curriculum that will produce leaders in the pharmaceutical industry.

This track follows the traditional chemical engineering curriculum, but with biology, biochemistry, and biomedical and pharmaceutical science courses replacing some of the other technical and science courses. The chemical engineering major with pharmaceutical track requires 126 credits.

*Freshman Year First Semester: 13 credits*

CHM 101 (3), 102 (1); EGR 105 (1); MTH 141 (4); and PHY 203 (3), 273 (1).

*Second Semester: 17 credits*

BIO 101 (3), BIO 103 (1); CHM 112 (3), 114 (1); ECN 201 (3); EGR 106 (2); and MTH 142 (4).

*Sophomore Year First Semester: 15 credits*

CHE 212 (3); CHM 227 (3); MTH 243 (3); and general education requirements (6).

*Second Semester: 15 credits*

BCH 311 (3) or BIO 341 (3); CHE 232 (3), 272 (3), 313 (3); and MTH 244 (3).

*Junior Year First Semester: 15 credits*

BCH 311 (3) or BIO 341 (3); BPS 301 (2), 303 (2), 305 (2); and CHE 314 (3), 347 (3).

*Junior Year Second Semester: 17 credits*

BPS 425 (3); CHE 348 (3), 364 (3); MIC 211 (4); and PHY 204 (3), 274 (1).

*Senior Year First Semester: 17 credits*

CHE 345 (2) [capstone], 349 (2), 351 (3) [capstone], 425 (3), 428 (1); approved professional elective<sup>1</sup> (3); and general education requirement (3).

*Senior Year Second Semester: 17 credits*

CHE 346 (2) [capstone], 352 (3) [capstone], 548 (3) or approved professional elective<sup>1</sup> (3), 574 (3); and general education requirement (6).

<sup>1</sup> Professional Elective Requirements: Half of the professional electives are to be 400level or higher CHE courses taken at URI. The remaining courses are to be 300level or higher in natural science, or 400level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400level or higher in MTH. All professional electives require prior approval by CHE advisor.

**Minor in Nuclear Engineering.** Qualified chemical engineering students may pursue a minor in nuclear engineering. Students declaring this minor must complete a minimum of 18 credits consisting of four required courses (12 credits) and two supporting courses (6 credits). Additional information can be found at [egr.uri.edu/nuclearengineeringminor/](http://egr.uri.edu/nuclearengineeringminor/)

**Accelerated FiveYear B.S./M.S. Degree Program.** To qualify for this program, students must earn a cumulative GPA of 3.00 or higher while pursuing their B.S. degree. To ease the course load at the graduate level, candidates are encouraged to earn some graduate credits (e.g. one or two courses not required for their B.S. degree) during their senior year. Additional information can be obtained by contacting the department chairperson.

## Civil Engineering

The Department of Civil and Environmental Engineering (CVE) offers a curriculum leading to the Bachelor of Science (B.S.) degree in civil engineering. The Civil Engineering Program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ([www.abet.org](http://www.abet.org)). The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in civil and environmental engineering.

**Faculty:** Professor Tsiatas, chairperson. Professors Baxter, Lee, Veyera, and R.Wright; Associate Professors Craver, Gindy, Hunter, Thiem, and Thomas; Assistant Professors Akanda, Bradshaw; Adjunct Professor Harr; Adjunct Associate Professor O'Neill; Adjunct Assistant Professors Badorek, George, Morgan, and Scalora; Professors Emeriti Kovacs, Marcus, McEwen, Poon, and Urish.

**Department Mission Statement.** Consistent with the missions of the University of Rhode Island and the College of Engineering (COE), the Department of Civil and Environmental Engineering seeks to prepare students to practice professionally in the national and international marketplace in the field of Civil and Environmental Engineering through the provision of high quality undergraduate and graduate educational programs and research opportunities; provides an environment that encourages and supports faculty career development and professional/community service; actively promotes diversity; and maintains a nationally recognized research program.

**Program Mission Statement.** Consistent with the mission of the Department of Civil and Environmental Engineering, the B.S. in Civil Engineering (BSCE) program will prepare graduates for successful careers, advanced studies at the graduate level, and lifelong learning based upon a solid foundation of technical ability, high standards of professional ethics, and strong communication skills.

**Program Educational Objectives.**

Three to five years after graduation from the BS in Civil Engineering, graduates will :

1. Successfully practice Civil Engineering to serve local, state, regional, national, and international industries and government agencies;
2. Have the necessary background and technical skills to work professionally in one or more of the following areas: environmental engineering, geotechnical engineering, structural engineering, transportation engineering, water resources engineering;
3. Be prepared for personal and professional success with awareness and commitment to their ethical and social responsibilities, and diversity, both as individuals and in team environments;
4. Be interested in, motivated for, and capable of pursuing continued lifelong learning through further graduate education, or other training programs in engineering or related fields.

**Student Outcomes.** Civil engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

**Program Description.** Civil engineers are responsible for researching, developing, planning, designing, constructing, and managing many of the complex systems and facilities essential to modern civilization. These include environmental engineering systems; water supply and pollution control systems; all types of transportation systems, from pipelines to city streets; structural systems from residential buildings to city skyscrapers, power plants, and offshore platforms; and all types of geotechnical systems from foundations to dams. Civil engineers play important roles in planning and administration with government agencies at all levels, especially those dealing with public works, transportation, environmental control, water supply, and renewable energy.

The curriculum provides students with an excellent background to pursue graduate study or to enter directly into professional practice in industry or government after graduation. The first year is devoted largely to courses in mathematics, chemistry, physics, and engineering science common to all engineering curriculums. During the sophomore year, students take three courses in civil engineering including mechanics of materials and two laboratories. In their last two years, students develop a proficiency in environmental engineering, geotechnical engineering, structural engineering, and transportation engineering. They can also meet their own professional goals through the selection of professional electives in these areas as well as construction management. Professional electives are selected in consultation with the student's advisor.

The civil engineering major requires 124 credits.

*Freshman Year First semester: 15 credits*

CHM 101 (3), 102 (1); ECN 201 (3); EGR 105 (1); MTH 141 (4); and general education requirement (3).

*Second semester: 16 credits*

EGR 106 (2); MTH 142 (4); PHY 203 (3), 273 (1); and general education requirement (6).

*Sophomore Year First semester: 16 credits*

CVE 205 (2); GEO 103 (4); MCE 262 (3); MTH 243 (3); and PHY 204 (3), 274 (1);.

*Second semester: 16 credits*

CHM 112 (3); CVE 220 (3), 230 (1); MCE 263 (3); MTH 244 (3); and general education requirements (3).

*Junior Year First semester: 17 credits*

CVE 346 (3), 354 (3), 355 (1), 374 (3), 381 (3), 382 (1); and MCE 354 (3).

*Second semester: 14 credits*

CVE 347 (3), 348 (1), 370 (3), 375 (1), ; STA 409 (3); and engineering elective<sup>1</sup> (3)

*Senior Year First semester: 15 credits*

CVE 400 (1), 465 (3), 497 (2) [capstone]; WRT 333 (3); and professional electives<sup>2</sup> (6).

*Second semester: 15 credits*

CVE 483 (3), 498 (3) [capstone]; ISE 404 (3); professional electives<sup>2</sup> (6); and take the Fundamentals of Engineering (FE) Examination<sup>3</sup>.

<sup>1</sup> Engineering Elective Requirement: Select one (1) of the following: CHE 333, ELE 220, or MCE 341.

<sup>2</sup> Professional Elective Requirements: Three (3) of the twelve credits (12) must be selected from the following courses: CVE 470, 471, 475, 477. The remaining nine (9) credits can be any 300level and above CVE courses.

<sup>3</sup> Fundamentals of Engineering (FE) Examination: All CVE majors are required to take the FE Examination offered by NCEES as a part of graduation requirements. Official NCEES proof of having taken the exam is required.

**Accelerated Five Year B.S./M.S. Degree Program (FastTRAC5).** The FastTRAC5 program allows qualified students to complete both the B.S. and M.S. degrees within five years. Students gain professional experience by working at an engineering consulting firm or governmental agency. They also carry out research working closely with a faculty mentor. For admission into the program, students must have junior standing in civil and environmental engineering (minimum of 62 credits) and cumulative GPA of 3.00. Students must also maintain a cumulative GPA of 3.00 while in the program and pass the FE (Fundamentals of Engineering) examination. Additional information about this program can be obtained by contacting the department chairperson.

## Computer Engineering

The Bachelor of Science (B.S.) degree in computer engineering is offered by the Department of Electrical, Computer, and Biomedical Engineering (ECBE). The Computer Engineering Program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ([www.abet.org](http://www.abet.org)). Specialization in computer engineering is also available within the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) programs in electrical engineering.



Faculty: Professor Fischer, chairperson. Professor Lo, program coordinator. Professors OHley and Qing Yang; Associate Professors Sendag and Yan Sun; ProfessorinResidence Uht. Supporting Faculty: Professors BoudreauxBartels, Fischer, Sunak, Swaszek, and Vaccaro.

#### Program Educational Objectives.

Three to five years after graduation from the B.S. in Computer Engineering, graduates will:

1. Successfully practice computer engineering to serve state and regional industries, government agencies, or national and international industries.
2. Work professionally in one or more of the following areas: computer hardware and software design, embedded systems, computer networks and security, system integration, and electronic design automation.
3. Achieve personal and professional success with awareness and commitment to their ethical and social responsibilities, both as individuals and in team environments.
4. Maintain and improve their technical competence through lifelong learning, including entering and succeeding in an advanced degree program in a field such as engineering, science, or business.

**Student Outcomes.** Computer engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

**Program Description.** Digital computer and communication systems have transformed society in a profound way. The examples range from super powerful scientific computers, the internet and the world wide web, to cell phones and smart cards. Traditionally, computer engineering has been a discipline that combines both electrical engineering and computer science. The URI computer engineering program is thus designed so the students will have a strong foundation in the relevant fields of electrical engineering and computer science, while establishing themselves with the latest computer engineering topics, such as advanced computer system architecture, design and programming, computer communication, electronic design automation, and highlevel digital design methodologies.

The computer engineering core courses can be categorized as follows: (1) ELE 208/209, 305, and 408/409 are core courses for computer system architecture and hardware and software organization and interaction. (2) ELE 201/202, 301/302, and 405/406 are the core courses for digital design with electronic design automation and rapid prototyping, and for computer system integration. (3) ELE 313 and 437 are core courses for computer communication and networks. The computer engineering program has three computer engineering electives and one free elective in the senior year so students can further expand into areas such as signals and systems, digital control, electronics, and computer software.

The computer engineering program culminates in the senior year with two major design experiences. First, ELE 408/409 is where all the skills accumulated through the curriculum will be employed in a group senior design project. Second, ELE 480 and 481 provide each student with the opportunity to work in a multidisciplinary team in a senior capstone design project.

Graduates from the program go on to positions in both gov-

ernment agencies and the private sector, or enter graduate school for further study. Many computer engineering undergraduate students work with faculty on research projects before entering graduate school.

The computer engineering major requires 120–123 credits.

**Freshman Year First semester: 15 credits**

CHM 101 (3), 102 (1); EGR 105 (1); MTH 141 (4); and general education requirements<sup>1</sup> (6).

*Second semester: 16 credits*

ECN 201 (3); EGR 106 (2); ELE 208 (2), 209 (1); MTH 142 (4); and PHY 203 (3), 273 (1).

*Sophomore Year First semester: 15 credits*

CSC 211 (4); ELE 201 (3), 202 (1); MTH 362 (3); and PHY 204 (3), 274 (1).

*Second semester: 15 credits*

CSC 212 (4); ELE 212 (3), 215 (2); MTH 243 (3); and general education requirement<sup>1</sup> (3).

*Junior Year First semester: 16 credits*

ELE 305 (3), 313 (3), 338 (3), 339 (1); MTH/CSC 447 (3); and general education requirement<sup>1</sup> (3).

*Second semester: 16–17 credits*

ELE 301 (3), 302 (1); MTH 451 (3); professional elective<sup>2</sup> (3–4); and general education requirements<sup>1</sup> (6).

**Senior Year First semester: (14–15 credits)**

ELE 400 (1), 405 (3), 406 (1), 437 (3), 480 (3) [capstone]; and approved professional elective<sup>2</sup> (34).

*Second semester: 13–14 credits*

ELE 408 (3), 409 (1), 481 (3) [capstone]; approved professional elective<sup>2</sup> (34); and free elective (3).

1 General Education Requirement (EC/ECw): Must take at least six (6) credits of EC/ECw general education courses, with at least one (1) course in writing, ECw.

2 Professional Elective Requirements: Three (3) courses from the following: BME 464/465; BME/ELE 461; CSC 301, 305, 402, 406, 412, 415, 436, 481; CSF 410, 412; any ELE 300, or 400level course not required by the CPE major; with prior approval of the Electrical, Computer, and Biomedical Engineering department chairperson, any ELE 500level course.

**Minor in Computer Engineering.** Minors require the completion of 18 or more credits. A minimum grade point average of 2.00 must be earned in the minor courses, and at least 12 of the 18 credits must be at the 200 level or above. At least half of the credits required for the minor must be earned at the University of Rhode Island. General education requirements may be used for the minor, but no course may be used for both the major and minor field of study. Minor courses may not be taken on a pass/fail basis. Students interested in pursuing a minor in computer engineering should speak

with the department chairperson to discuss specific course requirements.

Accelerated Five Year B.S./M.S. Degree Program. To qualify for this program, students must earn a cumulative GPA of 3.30 or higher while pursuing their B.S. degree. To ease the course load at the graduate level, candidates are encouraged to earn some graduate credits (e.g. one or two courses not required for their B.S. degree) during their senior year. Additional program information can be obtained by contacting the department chairperson.

## Electrical Engineering

The Bachelor of Science (B.S.) degree in electrical engineering is offered by the Department of Electrical, Computer, and Biomedical Engineering (ECBE). The Electrical Engineering Program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ([www.abet.org](http://www.abet.org)). The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees.

Faculty: Professor Fischer, chairperson. Professors Boudreaux-Bartels, Kay, Kumaresan, Mardix, Ohley, Sunak, Swaszek, and Vaccaro; Associate Professor He; Assistant Professor Wei. Supporting Faculty: Professors Lo, Ying Sun, and Q. Yang; Associate Professors Besio, Sendag, Yan Sun, and Vetter; Assistant Professors Kennedy, and Mankodiya; Professorin Residence Uht; Adjunct Professors Banerjee, Cooley, and Hartnett; Adjunct Associate Professor Davis; Adjunct Assistant Professors DiCecco, Sarma, and Sepe; Professors Emeriti Daly, Haas, Jackson, Lengyel, Lindgren, Sadasiv, and Spence.

Program Educational Objectives.

Three to five years after graduation from the B.S. in Electrical Engineering, graduates will:

1. Successfully practice electrical engineering to serve state and regional industries, government agencies, or national and international industries.
2. Work professionally in one or more of the following areas: analog electronics, digital electronics, communication systems, signal processing, control systems, and computer-based systems.
3. Achieve personal and professional success with awareness and commitment to their ethical and social responsibilities, both as individuals and in team environments.
4. Maintain and improve their technical competence through lifelong learning, including entering and succeeding in an advanced degree program in a field such as engineering, science, or business.

Student Outcomes. Electrical engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

Program Description. Since instrumentation is at the heart of modern science and technology, electrical engineers are employed not only in the computer, electronics, communications, and power industries, but also in diverse enterprises such as transportation, the chemical industry, large hospitals, and government laboratories.

The curriculum emphasizes the scientific basis of electrical engineering and the application of mathematical analysis to

engineering problems. Work is required in network and systems theory, atomic physics and solid state, electromagnetic theory, and electronics. Creative use of scientific principles in problems of engineering design is stressed, particularly in the senior year. The development of computer hardware and software is a part of many electrical engineering courses.

Extensive laboratory work serves to bridge the gap between mathematical analysis and the real world of "hardware." Separate undergraduate laboratories are available for electrical measurements, analog electronics, digital electronics, microprocessors, hardware description languages, embedded systems, control systems, optics, communications, and electronic materials.

Capstone Design Courses ELE 480 and 481 provide the opportunity to work on a multidisciplinary team in a senior capstone design project.

Electrical engineering students should note that the four-year electrical engineering curriculum allows for three credits of a completely free elective that does not have to satisfy any of the general education requirements.

The electrical engineering major requires 120–123 credits.

*Freshman Year First semester: 15 credits*

CHM 101 (3), 102 (1); ECN 201 (3); EGR 105 (1); MTH 141 (4); and general education requirement<sup>1</sup> (3).

*Second semester: 15 credits*

CSC 200 (4); EGR 106 (2); ELE 101 (1); MTH 142 (4); and PHY 203 (3), 273 (1).

*Sophomore Year First semester: 17 credits*

ELE 201 (3), 202 (1); MTH 362 (3); PHY 204 (3), 274 (1); and general education requirement<sup>1</sup> (6).

*Second semester: 15 credits*

ELE 205 (2), 206 (1), 212 (3), 215 (2); MTH 243 (3); and PHY 205 (3), 275 (1).

*Junior Year First semester: 14 credits*

ELE 313 (3), 331 (4), 338 (3), 339 (1); MTH 451 (3) or ISE 411 (3); and general education requirement<sup>1</sup> (3).

Second semester: 15 credits

ELE 301 (3), 302 (1), 314 (3), 322 (4), 343 (3), 344 (1).

*Senior Year First semester: 14–16 credits*

ELE 400 (1), 480 (3) [capstone] (see note)

Second semester: 15–16 credits

ELE 481 (3) [capstone] (see note)

*Note:* Senior Year total credits for two (2) semesters: 29–32.

See your advisor for help in preparing a suitable program. Required courses: Professional elective<sup>2</sup> (4); professional electives<sup>2</sup> (913); general education requirements<sup>1</sup> (6), free elective (3).

<sup>1</sup> General Education Requirement (EC/ECw): Must take at least six (6) credits of EC/ECw general education courses, with at

least one (1) course in writing, ECw.

<sup>2</sup> Professional Elective Requirements: Four (4) courses that satisfy both of the following:

(a) Three (3) courses from: ELE 401/402, 423, 425, 432, 435/436, 444/445, 447/448, 457, 458/459, and at least one (1) must be from: 401/402, 423, 432, 444/445, 447/448;

and at least one (1) must include a lab component (401/402, 435/436, 444/445, 447/448, 458/459).

(b) The fourth course must be from: an additional course from (a) above; BME 462, BME/ELE 461; ELE 405/406, 408/409, 437, 438, 470; MTH 215; with prior approval of the Electrical, Computer, and Biomedical Engineering department chairperson, any other 300, or 400-level College of Engineering course not required by the ELE major.

Minor in Electrical Engineering. The minor require the completion of 18 or more credits. A minimum grade point average of 2.00 must be earned in the minor courses, and at least 12 of the 18 credits must be at the 200 level or above. At least half of the credits required for the minor must be earned at the University of Rhode Island. General education requirements may be used for the minor, but no course may be used for both the major and minor field of study. Minor courses may not be taken on a pass/fail basis. Students interested in pursuing a minor in electrical engineering should speak with the department chairperson to discuss specific course requirements.

Accelerated FiveYear B.S./M.S. Degree Program. To qualify for this program, students must earn a cumulative GPA of 3.30 or higher while pursuing their B.S. degree. To ease the course load at the graduate level, candidates are encouraged to earn some graduate credits (e.g. one or two courses not required for their B.S. degree) during their senior year. Additional program information can be obtained by contacting the department chairperson.

## Industrial and Systems Engineering

The Bachelor of Science (B.S.) degree in industrial and systems engineering is offered by the Department of Mechanical, Industrial, and Systems Engineering (MCISE), and is open to qualified students under the New England Regional Student Program. The Industrial and Systems Engineering Program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ([www.abet.org](http://www.abet.org)). The department also offers the Master of Science (M.S.) degree in systems engineering and the Doctor of Philosophy (Ph.D.) in industrial and systems engineering. In collaboration with the College of Business Administration, qualified students could choose to pursue a Master of Business Administration (M.B.A.) degree that will take one extra year following their completion of the B.S. in industrial and systems engineering.

Faculty: Professor Taggart, chairperson; Professors Sodhi, and Wang; Associate Professor MaierSperdelozzi; Adjunct Professors Jones, P. Miller, and Spengler; Adjunct Assistant Professors Gauthier, and McKeon; Professors Emerti Boothroyd, De-whurst, and Knight.

Department Mission Statement. Provide high quality undergraduate and graduate education that will prepare graduates for successful careers in mechanical, industrial and systems

engineering and related fields. Conduct high quality research that supports our educational goals, state and national needs, and advances the state of knowledge in our fields of study. Provide professional expertise, service and outreach to local and national industries and agencies.

Program Educational Objectives.

Three to five years after graduation from the B.S. in Industrial and Systems Engineering program, graduates will:

1. Successfully practice industrial and systems engineering to serve local, state, regional, national, and international industries, and government agencies.
2. Work professionally in the fields of industrial and systems engineering in either manufacturing or service sectors, working in areas such as systems engineering, quality engineering, logistics, supply chain management, advanced manufacturing, human factors, health care or transportation.
3. Achieve personal and professional success with an understanding and appreciation of ethical behavior, social responsibility and diversity, both as individuals and in team environments.
4. Pursue continued lifelong learning through further graduate education, short courses or other training programs in engineering or related fields.

Student Outcomes. Industrial and systems engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

Program Description. The industrial and systems engineering curriculum is designed to provide significant strength in mathematics, basic science, and engineering science, together with a coordinated set of courses important to the professional industrial or systems engineer. Fundamental manufacturing processes, economics, statistics, quality systems, and mathematical and computer modeling of production and service systems are included.

The industrial and systems engineering major requires 122 credits.

*Freshman Year First semester: 15 credits*

CHM 101 (3), 102 (1); EGR 105 (1); MTH 141 (4); and two general education requirements<sup>1</sup> (6).

*Second semester: 16 credits*

ECN 201 (3); EGR 106 (2); MTH 142 (4); PHY 203 (3), 273 (1); and general education requirement<sup>1</sup> (3).

*Sophomore Year First semester: 17 credits*

ISE 240 (3), 241 (1); MCE 201 (3), 262 (3); MTH 243 (3); and PHY 204 (3), 274 (1).

*Second semester: 14 credits*

CVE 220 (3); ISE 220<sup>2</sup> (1); MCE 263 (3); MTH 362 or 244 (3); and PHY 205 (3), 275 (1).

*Junior Year First semester: 15 credits*

CHE 333 (3); EGR 316 or PHL 212 (3); ISE 325 (3), 411 (3), 432 (3).

Second semester: 15 credits

BUS 201 (3); ELE 220 (3); ISE 404 (3), 412 (3), 433 (3)

*Senior Year First semester: 15 credits*

ISE 401 (3) [capstone], 451 (3); professional electives<sup>3</sup> (6); and free elective (3).

*Second semester: 15 credits*

ISE 402 (3) [capstone]; professional electives<sup>3</sup> (9); and general education requirement<sup>1</sup> (3).

<sup>1</sup> Recommend ECN 202 [GES] as one (1) general education choice.

<sup>2</sup> ISE 220 can be taken in either freshman, sophomore, or junior year.

<sup>3</sup> Professional Elective Requirements: Must be satisfied by fifteen (15) credits of professional electives, at least six (6) of which must be 400 or 500 level ISE courses not required by the ISE major. The remaining courses may be any 300, 400, or 500 level courses offered by the College of Engineering not required by the ISE major, CSC, MTH, or PHY (except CHE 328, 351, 352; CSC 320; MTH 381, 420, 451, 452; PHY 322, 381, 382; courses in professional practice; seminars); BUS 315, 316, 320, 341, 344, 365, 420, 444, 450; ECN 323, 324, 327, 328, 344, 363, 368, 376; STA 412 or any 500-level<sup>4</sup> STA courses (except STA 532); MBA 530, 550.

<sup>4</sup> Note: Only ISE 513 or STA 513 will be allowed – not both (these are crosslisted courses).

Minor in Nuclear Engineering. Qualified industrial and system engineering students may pursue a minor in nuclear engineering. Students declaring this minor must complete a minimum of 18 credits consisting of four (4) required courses (12 credits) and two (2) supporting courses (6 credits).

Accelerated Five Year B.S./M.S. Degree Program. Eligibility for this program requires second semester junior status with a minimum overall GPA of 3.00. URI also offers a five year program that includes a B.S. in industrial and systems engineering and an M.B.A. from the College of Business Administration.

## Mechanical Engineering

The Bachelor of Science (B.S.) degree in mechanical engineering is offered by the Department of Mechanical, Industrial, and Systems Engineering (MCISE). The Mechanical Engineering Program is accredited by the Engineering Accreditation Commission of ABET, Inc. ([www.abet.org](http://www.abet.org)). The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in mechanical engineering.

Faculty: Professor Taggart, chairperson. Professors Chelidze, Datseris, Faghri, Ghonem, Jouaneh, Nassersharif, Palm, Shukla, and Zhang; Associate Professors Meyer, and Rousseau; Assistant Professors Yuan, and Zheng; Adjunct Professors Anagnostopoulos, and Kadek; Adjunct Assistant Professors Gomez, Goodwin, and LeBlanc; Professors Emeriti Kim, Lessmann, Sadd, and White.

Department Mission Statement. Provide high quality undergraduate and graduate education that will prepare graduates for successful careers in mechanical, industrial and systems engineering and related fields. Conduct high quality research

that supports our educational goals, state and national needs, and advances the state of knowledge in our fields of study. Provide professional expertise, service and outreach to local and national industries and agencies.

Program Educational Objectives.

Three to five years after graduation from the B.S. in Mechanical Engineering program, graduates will:

1. Successfully practice mechanical engineering to serve state, local, national, and international industries and government agencies.
2. Work professionally in one of the two major stems of mechanical engineering: mechanical and/or thermal systems or related fields.
3. Achieve personal and professional success with an understanding and appreciation of ethical behavior, social responsibility and diversity, both as individuals and in team environments.
4. Pursue continued lifelong learning through further graduate education, short courses or other training programs in engineering or related fields.

Student Outcomes. Mechanical engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

Program Description. The curriculum provides a thorough and wellrounded foundation in basic science, mathematics, engineering science, and general education to prepare the graduate for a professional engineering career. The curriculum is also excellent preparation for graduate school. The program is strong in providing a background in design, solid and fluid mechanics, systems engineering, and the thermal sciences, including energy and energy transfer. Computer applications are stressed throughout the curriculum. All undergraduates are invited and encouraged to join the student section of the American Society of Mechanical Engineers, which sponsors industrial plant visits, special lectures, and other activities. Students may also join chapters of the Society of Automotive Engineers (SAE) and the Society for Experimental Mechanics (SEM).

The work in the first two years consists of basic courses in science (math, physics, chemistry), applied science (mechanics, electricity and magnetism, basic computer literacy and computeraided problem solving), manufacturing processes, and general education requirements (humanities, social sciences, English communication). Two introductory engineering courses are included in the freshman year.

The junior year concentrates on fundamental mechanical engineering courses (thermodynamics, fluid mechanics, systems engineering, engineering analysis, heat transfer), materials sciences, and design of machines. Further general education studies are also covered.

The senior year includes the capstone design sequence, mechanical engineering experimentation, and a wide variety of professional electives such as mechanical control systems, advanced fluid mechanics, advanced mechanics of materials, mechatronics, internal combustion engines, applied energy conversion, tribology, product design for manufacture, air conditioning, heating and ventilation, vibrations, finite element method, and experimental stress analysis. The program also includes two laboratory courses in the junior and senior years.

Computer techniques are integrated throughout the curriculum. Computational facilities including PCs and workstations are available in the College of Engineering's Engineering Computer Center (ECC) and the University's Office of Information Technology Services (ITS). The department's computer classrooms provide state-of-the-art hardware and software for simulation, design, and product development.

The mechanical engineering major requires 122 credits.

*Freshman Year First semester: 15 credits*

CHM 101 (3), 102 (1); EGR 105 (1); MTH 141 (4); and general education requirements (6).

*Second semester: 16 credits*

ECN 201 (3); EGR 106 (2); MTH 142 (4); PHY 203 (3), 273 (1); and general education requirement (3).

*Sophomore Year First semester: 17 credits*

ISE 240 (3), 241 (1); MCE 201 (3), 262 (3); MTH 243 (3); and PHY 204 (3), 274 (1).

*Second semester: 14 credits*

CVE 220 (3); ISE 220 (1); MCE 263 (3); MTH 244 (3); and PHY 205 (3), 275 (1).

*Junior Year First semester: 15 credits*

CHE 333 (3); MCE 301 (3), 341 (3), 354 (3), 372 (3).

*Second semester: 15 credits*

ELE 220 (3); MCE 302 (3), 313 (3), 348 (3), 366 (3).

*Senior Year First semester: 15 credits*

MCE 401 (3) [capstone], 414 (3); professional electives<sup>1</sup> (6); and general education requirement (3).

*Second semester: 15 credits*

MCE 402 (3) [capstone]; professional electives<sup>1</sup> (6); general education requirement (3); and free elective (3).

<sup>1</sup>Professional Elective Requirements: Must be satisfied by twelve (12) credits of professional electives, with a minimum of three (3) three (3) credit MCE courses (no more than two (2) courses from the MCE 47\*/CHE 47\* series), two (2) of which must be taken at URI. The fourth course may be a 300, 400, or 500 level course offered by the College of Engineering, CHM, CSC, PHY, or STA; or a 400 or 500 level MTH course. Professional elective courses taken outside URI are subject to URI transfer credit rules and require prior written approval.

Minor in Nuclear Engineering. Qualified mechanical engineering students may pursue a minor in nuclear engineering. Students declaring this minor must complete a minimum of 18 credits consisting of four (4) required courses (12 credits) and two (2) supporting courses (6 credits).

Accelerated Five Year B.S./M.S. Degree Program. The department offers an accelerated five year B.S./M.S. degree program in mechanical engineering. Eligibility for this program requires second semester junior status with a minimum overall GPA of 3.00. Additional program information can be obtained by contacting the department chairperson.

## Ocean Engineering

The Department of Ocean Engineering offers a curriculum leading to the Bachelor of Science (B.S.) degree in ocean engineering, and is open to qualified students under the New England Regional Student Program. The Ocean Engineering Program is accredited by the Engineering Accreditation Commission of ABET, Inc. ([www.abet.org](http://www.abet.org)). URI's Department of Ocean Engineering is nationally and internationally recognized as one of the leaders in ocean engineering, and also offers Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees.

Faculty: Professor Baxter, chairperson. Professors Ballard, S. Grilli, Hu, Miller, and Tyce; Associate Professor Roman; Assistant Professors Dahl, and Licht; Associate Research Professors A. Grilli and Potty; Adjunct Professors Corriveau, Moran, Muench, Sharpe, and Shonting; Adjunct Assistant Professors Barton, Cousins, Crocker, Dossot, and Newman; Professors Emeriti Kowalski, Silva, and Spaulding, and Stepanishen.

Department Mission Statement. The Department of Ocean Engineering's missions are to provide high quality undergraduate and graduate degree programs that prepare our students for professional careers in ocean engineering in industry, academia, and government; to develop and maintain internationally recognized research programs in selected areas of ocean engineering; to actively serve the profession and community in our areas of expertise; and to provide a challenging work and learning environment where diversity, community, scholarship, professional development, and excellence are valued and rewarded. The program is designed to provide students with a strong base in fundamental sciences, mathematics, and engineering; a broad base in ocean engineering; opportunities for the integration of theory, experimentation, and design; appreciation of ethical, social, and environmental issues in the practice of the profession; and strong oral and written communication skills.

Program Educational Objectives.

Three to five years after graduation, our graduates will be:

1. Gainfully employed with private or government organizations and advancing to positions of increased responsibility, or pursuing an advanced degree in an engineering program.
2. Working in one of the specialty areas within the broad field of ocean engineering including ocean instrumentation, hydrostatics, ocean waves, underwater acoustics, marine structures, marine geomechanics, and ocean engineering design.
3. Behaving ethically, contributing to society, participating in strengthening a diverse engineering professional environment, and succeeding in diverse workplaces, nationally and internationally.

Student Outcomes. Ocean engineering students demonstrate knowledge in all outcomes required by ABET, Inc. which are listed in the college's student outcomes section.

Program Description. URI's curriculum provides a basic ocean engineering program that gives students a firm base in engineering fundamentals and prepares them for direct entry into a professional career or continued study toward a graduate degree. The required ocean engineering courses

begin at the freshman level and include laboratory, analysis, and design courses. A strong emphasis is on the application of scientific principles in the ocean environment gained through laboratory courses. Experiments covering several basic areas are used to provide an integrated approach to investigations into ocean phenomena and processes. Students are involved in the planning and execution of experiments, including data collection and analysis and the reporting of results. This hands-on experience provides graduates with an understanding of ocean engineering activities in scientific and industrial fields.

The broad-based program exposes students to the following topics: offshore renewable energy, ocean instrumentation and data analysis, underwater and subbottom acoustics, marine hydrodynamics, coastal processes, marine geomechanics, coastal and offshore structures.

To ensure that each student gains an in-depth knowledge of one of the ocean engineering disciplines, the curriculum allows course sequences in hydrodynamics, structures, geomechanics, acoustics, instrumentation, and data analysis. A senior year Ocean Systems Design Project course integrates previously obtained knowledge in a comprehensive design project. This experience may be obtained through an on-campus course or through an off-campus internship in an ocean-oriented private company or government laboratory.

The Department of Ocean Engineering is located at URI's Narragansett Bay Campus. Computational facilities include the Ocean Project Center consisting of several personal computers and two laser printers networked and connected to the Engineering Computer Center (ECC). Extensive laboratory facilities are also available. The department often utilizes a 42-foot research vessel equipped with a fully integrated sidescan sonar and subbottom mapping system. This vessel is used for both lab courses and research. A remotely operated vehicle is operated by the department. A 100-foot tow and wave tank and a large acoustics tank are located on the Bay Campus, as well as an electronics shop, machine shop, and the Marine Geomechanics Laboratory. The facilities are available to undergraduates for course work, research, and independent study.

The ocean engineering major requires 126 credits.

*Freshman Year First semester: 16 credits*

CHM 101 (3), 102 (1); EGR 105 (1); MTH 141 (4); PHY 203 (3), 273 (1); and general education requirement (3).

*Second semester: 17 credits*

ECN 201 (3); EGR 106 (2); MTH 142 (4); OCE 101 (1); PHY 204 (3), 274 (1); and general education requirement (3).

*Sophomore Year First semester: 14 credits*

MCE 262 (3); MTH 243 (3); OCE 205 (4); and PHY 205 (3), 275 (1).

*Second semester: 16 credits*

CVE 220 (3); MCE 263 (3); MTH 244 (3); OCE 206 (4); and free elective (3).

*Junior Year First semester: 16 credits*

MCE 354 (3); OCE 301 (4), 310 (3); professional elective<sup>1</sup> (3); and general education requirement (3).

*Second semester: 18 credits*

OCE 311 (4), 408 (4), 471 (4); professional elective<sup>1</sup> (3); and general education requirement (3).

*Senior Year First semester: 14 credits*

OCE 416 (2), 421 (3), 495<sup>2</sup> (3) [capstone]; CHE 333 (3); and professional elective<sup>1</sup> (3).

*Second semester: 15 credits*

OCE 496<sup>1</sup> (3) [capstone]; OCG 451 (3), professional electives<sup>1</sup> (6); and general education requirement (3).

<sup>1</sup> Professional Elective Requirements: Any 300, 400, or 500-level courses in engineering, MTH, OCG, or PHY. A minimum of two (2) professional electives must be in OCE courses.

<sup>2</sup> OCE 495 and OCE 496: An approved off-campus experience, usually between the junior and senior years, can be substituted for OCE 495 and 496.

Professional Practice Degree Program (Accelerated Five-Year B.S./M.S. Degree Program). The Ocean Engineering Professional Practice Degree Program, built on our existing B.S. and M.S. degrees, addresses the need for a five-year degree program that prepares students to practice engineering at the highest possible level. Admission requirements for the program are junior standing in ocean engineering, an overall GPA of 3.00 or higher, and 3.20 or higher in engineering courses.

Program requirements include the following: meet all degree requirements for B.S. and M.S. in ocean engineering plus OCE 491 or 492 (3 credits) focused on a research project led by an engineering faculty member; OCE 500 Ocean Engineering Design Studies (6 credits) (topic areas must be different from M.S. thesis project), ISE 500 (3 credits), OCE/ELE 550 (3 credits); and pass the Fundamentals of Engineering (FE) Examination offered by NCEES. Upon completion of the program, students earn both the B.S. and M.S. degrees in ocean engineering.

Additional program information can be obtained by contacting the department chairperson.

# Environment and Life Sciences

## Introduction

John Kirby, Dean

Richard C. Rhodes III, Associate Dean  
Anne I. Veeger, Associate Dean  
Kimberly M. Anderson, Assistant Dean

In the College of the Environment and Life Sciences (CELS), we strive for excellence in teaching, research, and service. Our mission is to provide our students with the skills, knowledge, and insight needed to meet the challenges of today's world; address contemporary problems through innovative, relevant scholarly research; and, in the tradition of our Land Grant and Sea Grant heritage, extend our research-based knowledge to the local, state, and global community. While the interests and expertise of the faculty, students, and professional staff of the College are diverse, ranging from the most basic aspects of the biological systems that make up life on earth to the complexity of terrestrial and marine ecosystems, the CELS community is united in its concern for and dedication to the enhancement of human health and wellbeing, environmental sustainability, and stewardship of the earth's resources.

Our Center for Biotechnology and Life Sciences and the URI Coastal Research Institute house state-of-the-art teaching facilities, high-tech research labs, a genomics center, and an aquarium facility, all designed to meet the needs of the College's programs in biotechnology and the environmental, life, and health sciences.

The College of the Environment and Life Sciences (CELS) offers undergraduate majors leading to three degrees: the Bachelor of Science (B.S.), the Bachelor of Arts (B.A.), and the Bachelor of Landscape Architecture (B.L.A.). The following majors are offered within the B.S. degree program: animal science and technology, aquaculture and fishery technology, biological sciences, cell and molecular biology, environmental and natural resource economics, environmental science and management, geology and geological oceanography, marine affairs, marine biology, medical laboratory science, nutrition and dietetics, plant sciences, and wildlife and conservation biology. Students may also obtain a B.A. in biology or marine affairs, or a B.L.A. in landscape architecture.

Options have been developed within most majors to help students prepare for graduate study, professional training, or specialized careers. Entering freshmen and transfer students with fewer than 24 credits are admitted to University College for Academic Success and may choose a major in the College of the Environment and Life Sciences at that time.

Undergraduate students from any college may develop a minor from one of the majors offered by the College of the Environment and Life Sciences. See details later in this section, as well as "Interdepartmental Minors". Details can be worked out with an appropriate faculty advisor. In addition, most departments have an internship program for combining hands-on professional experience with academic credit.

CELS encourages students in all majors to pursue opportunities such as undergraduate research fellowships, internships, apprenticeships, and field studies that will complement their formal classroom learning.

CELS and the five-year Master of Oceanography Program. The five-year Master of Oceanography (M.O.) program is designed for URI students who want to enter the Graduate School of Oceanography's M.O. program while still an undergraduate and complete the degree in the year following completion of the B.S. The program is open to qualified URI undergraduates in the natural sciences or engineering. Eligibility and program requirements can be found in the "Graduate Programs" section of this catalog.

For more information, visit [uri.edu/cels](http://uri.edu/cels) or call 401.874.2957.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

## Faculty

**Biological Sciences:** Professor Wilga, chairperson. Professors Bullock, Fastovsky, Kass-Simon, Killingbeck, Kirby, Koske, Roberts, and Webb; Associate Professors Irvine, Katz, Norris, Preisser, Seibel, and Thornber; Assistant Professors Fournier, Kolbe, Lane, and Moseman-Valtierra; Adjunct Professors Carlton, Deacutis, Grogan, Henry, McGarigal, Schneider, and Summers; Adjunct Associate Professors Bailey, Cromarty, Gemma, Orwig, and Thursby; Adjunct Assistant Professors Anderson, Austin, King, Leicht-Young, Raposa and Swanson; Adjunct Research Assistant Professor Blouin; Professors Emeriti Albert, Beckman, Bibb, Caroselli, Cobb, Costantino, Goertemiller, Harlin, Hauke, Heppner, Hyland, and Twombly; Associate Professor Emeritus Krueger; Research Professor Hill.

**Cell and Molecular Biology:** Professor Sun, chairperson. Professors Bradley, Chandlee, P. Cohen, Goldsmith, Hufnagel, Kausch, D. Nelson, and Sperry; Associate Professors Howlett, Jenkins, L. Martin, and Norris; Adjunct Professor Mehta; Research Professors A. DeGroot, L. DeGroot, and Spero; Assistant Research Professor Moise; Professors Emeriti Cabelli, Hartman, Laux, Traxler, and Tremblay; Associate Professor Emeritus Mottinger; Clinical Professor Paquette.

**Environmental and Natural Resource Economics:** Professor Opaluch, chairperson. Professor J.L. Anderson; Assistant Professors Lang, Sproul, E. Uchida, and H. Uchida; Adjunct Professors C. M. Anderson, Asche, Holland, Johnston, Mazzota, Roheim, Shogren, and Swallow; Professors Emeriti Grigalunas, Sutinen, and Tyrrell.

**Fisheries, Animal and Veterinary Science:** Professor Gomez-Chiarri, chairperson. Professors Bengtson, Bradley, Mallilo, Rhodes, and Rice; Associate Professors Petersson and Sartini; Lecturer Launer; Adjunct Professors Hoey, Klein-McPhee, Musik, and Smolowitz; Adjunct Associate Professors Colwill and Hare; Adjunct Assistant Professors Brumbaugh, Castro, Dudzinski, Hancock, Leavitt, Rheault, Schwartz, and Weatherbee; Adjunct Clinical Professor Serra; Professors Emeriti Chang, Costa-Pierce, DeAlteris, McCreight, Nippo, Recksiek, and Wolke.

**Geosciences:** Professor Fastovsky, chairperson. Full Professors Boving; Associate Professors Petersson, Sartini, Savage and Veeger; Assistant Professors Cardace and Engelhart; Adjunct Professors Burks, Fischer, Hapke, Pockalny, and Spiegelman; Professors Emeriti Boothroyd, Cain, Hermes, and Murray.

Landscape Architecture: Professor Green, chairperson. Professors Atash, Sheridan, and Simeoni; Associate Professor Gordon; Adjunct Assistant Professors Bradley, Carter, Desilets, Greenleaf, Kelley, Veri, and Weygand; Professor Emeritus Hanson.

Marine Affairs: Professor Thompson, chairperson. Professors Burroughs, Dalton, Juda, Marti, and D. Nixon; Associate Professor Macinko; Research Professor Pollnac; Joint Appointments: Barry CostaPierce (Sea Grant), Tim George (History), and Tim Hennessey (Political Science); Adjunct Professors Lisa Colburn (NOAA), Kenneth Payne, Jesper Raakjaer (Aalborg University, Denmark); and Professors Emeriti Alexander, Knauss, and West; Associate Professor Emeritus Krausse.

Medical Laboratory Science: Clinical Professor Paquette, director. Clinical Associate Professors Bozzi, Klitz, and Uhnak. Adjunct Clinical Professors Gmuer, Pisharodi, and Sweeney; Adjunct Clinical Associate Professors Cataldo and Mello; Adjunct Clinical Assistant Professors Braga, Ferreira, Hoffman, Martineau, and Smeal.

Natural Resources Science: Professor Gold, chairperson. Professors Amador, August, Forrester, Husband, McWilliams, Paton, Stolt, and Wang; Associate Professor Meyerson; Assistant Professor Karraker; Adjunct Professors Paul and Perez; Adjunct Associate Professors Abedon, Cerrato, Daehler, Gorres, Groffman, Nowicki, O'Connell, Reed, Rockwell and Smith; Adjunct Assistant Professors Augeri, Bergondo, Buffum, Dabek, Detenbeck, Eisenbies, Eldridge, Farnsworth, Gayaldo, Good, Hollister, Jarecki, Kellogg, Lashomb, McKinney, McGreevy, Milstead, Peters, Pierce, Rubinstein, Saltonstall, Steele, Tefft and Vinhateiro; Professors Emeriti Brown, Golet, and Wright.

Nutrition and Food Sciences: Professor English, chairperson. Professor Greene; Associate Professors Gerber and Melanson; Assistant Professors Lofgren and Tovar; Adjunct Professor Sebelia; Adjunct Associate Professor Pivarnik; Professors Emeriti Caldwell, Constantinides, Lee, and Rand; Instructors Arpino and Kness.

Plant Sciences and Entomology: Professor Mitkowski, chairperson. Professors Alm, Casagrande, LeBrun, Mather, Maynard, Ruemmele, and Sullivan; Associate Professors Brown, Englander; ProfessorinResidence Ginsberg; Adjunct Assistant Professor Gettman; Professors Emeriti Beckman, Hull, and Jackson; Associate Professor Emeritus Krul.

## Curriculum Requirements for Majors

All Programs. CELS students need not only a 2.00 GPA to graduate, but also a minimum of a 2.00 GPA in their major concentration area (see specific program requirements) to qualify for graduation.

Bachelor of Arts. Students who pursue the B.A. in marine affairs or biology must fulfill the Basic Liberal Studies requirements of the College of Arts and Sciences (see Basic Liberal Studies Requirements). Also see the listings under biology and marine affairs in this section.

Bachelor of Science. Most of the college's B.S. programs require a minimum of 120 credits for graduation, except when specified otherwise under the program description. Required courses come from three categories: general education requirements (36 credits); program requirements (77–85 credits); and free electives (6–12 credits).

The following outline gives the basic general education requirements for all students in the B.S. curriculum within the college. Individual programs may require that specific courses be selected.

English Communication (6 credits): three credits in written communication from courses in Group Cw, and three credits in oral communication from communication studies.

Mathematics (3 credits) Natural Sciences (6 credits) Social Sciences (6 credits)

In addition, 15 credits must be chosen from:

Letters (3–6 credits)

Fine Arts and Literature (3–6 credits) Foreign Language and Culture (3–6 credits) Total: 36 credits.

Bachelor of Landscape Architecture. For information on the curriculum requirements for URI's B.L.A. degree, see Landscape Architecture later in this section.



## CELS Programs

### Animal Science and Technology

This major, offered by the Department of Fisheries, Animal and Veterinary Science, is designed for students interested in applied animal science careers. Options are available to students interested in veterinary medicine, animal sciences, and animal management.

The major requires AVS 101, 102, 110, 331, and 333 plus optionspecific courses as indicated below. Also required are 19–48 credits in basic science, 25–26 credits of concentration courses, and 8–34 credits of supporting electives approved for the major.

**Animal Science Option.** This option includes animal nutrition, physiology, behavior, and disease. Students will normally emphasize one or more of these areas. A strong preparatory background in the basic sciences is needed. Students in this option seek employment in technical areas and/or continue their studies in specialized graduate programs.

In addition to the requirements of the major, students choosing this option must complete the following basic science requirements: AVS 420 or BIO 352; BIO 101/103, 102/104; CHM 101, 102, 112, 114; CHM 124, 126 or CHM 226, 227, 228; MIC 201 or 211; and MTH 131 and STA 307 or 308. The remaining credit requirements will be selected from the concentration courses and supporting electives approved for this option.

**Animal Management Option.** Research techniques and procedures for animal care are emphasized along with a strong background in the sciences. Students with this training and animal experience would be employed in research and teaching facilities as animal technicians, animal technologists, supervisors of animal technicians, and assistant research project leaders.

In addition to the requirements of the major, students must complete the following basic science requirements: BIO 101/103; CHM 101, 102, 112, 114 or CHM 103, 105, 124, 126; MTH 107 or higher. Twelve credits in animal management are required in the concentration. The remaining credits will be selected from the concentration courses and supporting electives approved for this option.

**Preveterinary Option.** This option requires a demonstrated capability in the basic sciences and prepares students for admission to veterinary schools offering the D.V.M. degree. Because admission requirements among schools are not totally uniform and are subject to change, students should determine specific requirements of the schools in which they are interested. Those who are not accepted for veterinary training will be well prepared to pursue graduate programs in animal physiology and health.

In addition to the requirements of the major, students must complete the following basic science requirements: BCH 311; BIO 101/103, 102/104, 352; CHM 101, 102, 112, 114, 226, 227, 228; MIC 201 or 211; PHY 111, 112, 185, 186; MTH 131 and STA 307 or STA 308 or 409. The remaining credits will be selected from the concentration courses and supporting electives approved for this option.

### Aquaculture and Fishery Technology

This major, offered by the Department of Fisheries, Animal and Veterinary Science (AFS), prepares students for professional or technical careers in aquaculture or fisheriesoriented occupations. It is sufficiently broad to allow for specialization in either fisheries or aquaculture science and technology. Students who demonstrate superior ability in the basic sciences and wish to continue their professional training can select a course curriculum that will both prepare them for graduate school and provide a broad overview in fisheries and aquaculture science and technology.

The major requires a minimum of twelve credits in introductory professional courses including natural resource conservation, fisheries or aquaculture, and resource economics; six to eight credits in animal and plant biology; four credits in general chemistry; four additional credits in general or organic chemistry; and nine to twelve additional credits in basic science selected from an approved course list in the departments of Biological Sciences, Chemistry, Computer Science and Statistics, Mathematics, and Physics. In addition, the major requires 24 credits in concentration courses at the 300 level or above, and 18 credits of the concentration courses must be selected from courses offered by AFS. The additional six credits may be selected from courses offered in Biological Sciences; Fisheries, Animal and Veterinary Science; Nutrition and Food Sciences; Marine Affairs; Environmental and Natural Resource Economics; and by the Graduate School of Oceanography. Finally, the program requires 30–36 credits of supporting electives selected from an approved list of courses in the departments of Biological Sciences; Fisheries, Animal and Veterinary Science; Marine Affairs; Environmental and Natural Resource Economics; Natural Resources Science; and the Graduate School of Oceanography. A total of 130 credits is required for graduation.

### Biology, Biological Sciences, Marine Biology

These programs are administered by the Department of Biological Sciences. A student may earn either the Bachelor of Arts (B.A.) degree in biology or the Bachelor of Science (B.S.) degree in biological sciences or marine biology. The department also offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in biological and environmental sciences.

#### *BACHELOR OF ARTS*

#### **Biology.**

Students selecting a major in biology must complete a minimum of 28 credits (maximum 45 credits) in biological sciences including the following courses: BIO 101/103 and 102/104 (8), and MIC 201 or 211 (4). They must also complete a minimum of three credits from each of the three lists (A, B, and C) below. The remaining nine credits may be selected from courses in biology and/or microbiology. Students in this major must elect a year of chemistry with laboratories. Up to three credits of independent study or special topics in the following disciplines may be applied toward this bachelor's degree: AFS, AVS, BCH, BIO, MIC, NRS, and PLS. BIO 105 is not for major credit.

List A (plant biology): BIO 311, 321, 323, 332, 346, 348, 365, 418. List B (animal biology): BIO 121, 201, 242, 244, 286, 302, 334, 335, 354, 355, 366, 385, 386, 404 (304), 412, 417, 441, 442, 445, 467, 469, 475. List C (integrative biology): BIO 262, 272, 341, 345, 352, 353, 360, 396, 437, 452, 455, 457, 472, 480, 485, 491, 492.

Students in this major must fulfill the Basic Liberal Studies requirements of the College of Arts and Sciences.

Those wishing to prepare for a professional career in the life sciences should enroll in the B.S. program (description follows). Students must maintain a 2.00 grade point average in BIO and MIC courses used to meet graduation requirements. A total of 120 credits is required in the B.A. program. At least 42 credits must be in courses numbered 300 or above. Only three credits of 491, 492 may be used for biology elective.

In order to transfer from University College for Academic Success to the College of the Environment and Life Sciences as a Biology major (or be coded as such in the College of the Environment and Life Sciences), a student must have earned 30 credits including BIO 101, 102, 103, 104 with grades of C or better.

#### BACHELOR OF SCIENCE

The following curricula provide a foundation in the fundamental principles of biology and marine biology, and are concerned with the application of biological science to problems of modern life. They also provide preparation for graduate work in biological fields including aquatic, environmental, and marine studies; molecular, cellular, and developmental biology; biological oceanography; genetics and physiology, and preparation for admission to professional schools of medicine, dentistry, and veterinary medicine.

Students who know their professional goals are encouraged to declare a major as soon as possible to take advantage of help from department advisors. Students must declare their major when leaving University College for Academic Success.

#### Biological Sciences.

The Major. A minimum of 35 credits in biology is required and must include BIO 101/103, 102/104 and 352 (12). The remaining 23 credits must include at least one course from List A (plant biology) and one course from List B (animal biology).

At least three laboratory courses beyond BIO 101/103 and 102/104 must be taken, excluding 491, 492, and 495. The 23 credits must include at least one course from each of three of the following five areas: Cell and Development (BIO 302, 311, 341); Ecology and Evolution (BIO 262, 272); Molecular Biology (BIO 437); Organismal Diversity (BIO 321, 323, 354, 365, 366, 404 (304), 417); Physiology (BIO 201, 242/244, 346). BIO 105, 286 are not for major credit.

In addition, students must take CHM 101, 102, 112, 114, or CHM 191, 192, and CHM 226, 227, 228 or 124, 126, and BCH 311; MIC 201 or 211; two semesters of introductory calculus (MTH 131, 132 or 141, 142) or one semester of calculus and STA 308; PHY 111, 112, 185, 186 or PHY 203, 204, 273, 274; and WRT 104 or 106 and three additional credits of English communication, (oral or written) used to meet CELS general education requirements.

Students are encouraged to participate in research through Special Problems (491, 492). Up to three credits of 491, 492, or Independent Study or Special Topics in the following disciplines may be applied toward the major requirements: AFS, AVS, BCH, BIO, MIC, NRS, and PLS.

List A (plant biology): BIO 311, 321, 323, 332, 346, 348, 365, 418. List B (animal biology): BIO 121, 201, 242, 244, 302, 334, 335, 354, 355, 366, 385, 386, 404 (304), 412, 417, 441, 445, 467, 469, 475.

Students are strongly urged to consult the biological sciences advisors to obtain detailed programs of the various disciplinary paths through the department most suited to their particular career goals.

Students must maintain a 2.00 grade point average in BIO courses used to meet graduation requirements. A total of 120 credits is required for graduation.

In order to transfer from University College for Academic Success to the College of the Environment and Life Sciences as a Biology Sciences major (or be coded as such in the College of the Environment and Life Sciences), a student must have earned 30 credits including BIO 101, 103, 102, 104 with grades of C or better; CHM 112 with a grade of C– or better.

#### Marine Biology.

The Major. A minimum of 36 credits in biological sciences is required for the major and must include BIO 101/103, 102/104, 130, 352 and 360 (17). The remaining 19 credits must include at least one course from each of three of the following five areas: Cell and Developmental Biology (BIO 302, 311, 341); Ecology and Evolution (BIO 262, 272); Molecular Biology (BIO 437); Organismal Diversity (BIO 321, 323, 354, 365, 366; 404 (304), 417; MIC 211); Physiology (BIO 201, 346). The balance of the 36 credits must be selected from the following Marine Biology electives: AFS 486; AVS 440, BIO 345, 354, 355, 365, 412, 418, 441, 455, 457, 469, 475, 485, 491, 492, 495, 563; OCG 420, 576. Students are encouraged to participate in research through Special Problems (491, 492, or 495). Up to three credits of BIO 491, 492, 495, or Independent Study or Special Topics in the following disciplines may be applied toward this requirement: AFS, AVS, BCH, BIO, MIC, NRS, and PLS. Students must take at least two laboratory courses in biological sciences in addition to BIO 101/103, 102/104 and 360 excluding BIO 491, 492, and 495.

In addition, the student must take CHM 101, 102, 112, 114 or CHM 191, 192, and CHM 226, 227, and 228 or CHM 124, 126, and BCH 311; two semesters of introductory calculus (MTH 131, 132 or MTH 141, 142) or one semester of calculus and STA 308; OCG 401 or 451; PHY 111, 112, 185, 186 (or PHY 203, 204, 273, 274); WRT 104, or 106 and three additional credits of English Communication, (oral or written) used to meet the College general education requirements.

Students must maintain a 2.00 grade point average in BIO courses used to meet graduation requirements. A total of 120 credits is required for graduation.

In order to transfer from University College for Academic Success to the College of Environment and Life Sciences as a Marine Biology major (or be coded as such in the College of the Environment and Life Sciences), a student must have earned 30 credits including BIO 101, 102, 103, 104 with grades

of C or better; CHM 101 with a grade of C– or better.

**The Minor.** The minor in marine biology requires at least 20 credits, including 8 credits of General Biology (BIO 101/103 and 102/104, or equivalent, e.g., Advanced Placement), Marine Biology (BIO 360), and at least 8 additional credits at the 200 level or above, chosen from among courses counted as marine biology electives for the B.S. degree in marine biology. A maximum of 3 credits in research (e.g., BIO 491, 492) may be counted towards the minor. At least half of the credits for the minor must be earned at URI. A minimum GPA of 2.00 must be earned in the credits required for the minor. Application for a minor must be filed with the coordinator of the Marine Biology Program prior to the completion of the first semester of the senior year.

## Cell and Molecular Biology

This major is the study of cells and the biological macromolecules—including DNA, RNA, proteins, lipids and carbohydrates—that define the structure and function of cells. The cell and molecular biology major provides excellent preparation for careers in medicine (the major automatically satisfies the prehealth course requirements), biomedical and life science research, and biotechnology. Options in biochemistry, biotechnology, and microbiology are available.

All cell and molecular biology majors are required to take: BIO 101/103, 102/104, and 352; CHM 101, 102, 112, 114, 226, 227, and 228; MIC 211 and 333; BCH 311; PHY 111, 112, 185, and 186; and MTH 131 or 141 plus one of the following: MTH 111, 132, 142; CSC 201; or STA 308. Students planning to attend graduate school are advised to take MTH 131 and 132, or 141 and 142.

**Biochemistry Option.** Students in the cell and molecular biology major may elect the biochemistry option, which meets the guidelines of the American Society for Biochemistry and Molecular Biology, and provides additional training in advanced areas of biochemistry.

The following additional courses are required for this option: BCH 312, 412, 421, 437, 482, 492, and 495; BIO 341 plus one of the following electives: BIO 242 or 445; BCH 435 or 522; BPS 535; MIC 413, 414 or 450.

**Biotechnology Option.** Students in the cell and molecular biology major may elect the biotechnology option, which offers preparation for further work in research and development, biotechnology operations, quality assurance, and regulatory affairs. This option emphasizes a broad and interdisciplinary overview of the biotechnology industry, and provides students with an academic background in microbiology, biochemistry, cell biology, molecular biology, and molecular genetics to prepare them for careers at several levels of industry.

The following additional courses are required for this option: MIC 190, 413, 415, 499; BIO 341, and 437.

The required internship for this option (MIC 499) is conducted with the cooperation of local members of the biotechnology industry and may be pursued on a full or parttime basis. Students should be aware that internships may be limited in number and are awarded on a competitive basis; therefore, those interested in the biotechnology option should consult with their advisors early in their college career.

**Microbiology Option.** Students in the cell and molecular biology major may elect the microbiology option, which meets the guidelines for the American Society for Microbiology. Students who develop a strong interest in the clinical laboratory aspects of microbiology can easily move to URI's medical laboratory sciences program. This option is useful for students planning a career in microbiology or wanting to pursue graduate education in the broad area of microbiology or cell and molecular biology or attend dental, medical, or veterinary school.

The following additional courses are required for this option: the capstone experiences courses 413, 414, 415, 416, and 495; and one course selected from MIC 412, 422, 432, 435, 450 or 576. Students in the microbiology option must take an additional 9 credits of MIC courses. These credits may include any course in microbiology; or BIO 341, or 437.

Note: CHM 229 and 230, which are offered in summer only, may be substituted for CHM 226. A total of 120 credits is required for graduation.

The Department of Cell and Molecular Biology also participates in the interdisciplinary and interdepartmental graduate programs in biological and environmental sciences, offering both M.S. and Ph.D. degrees with a specialization in cell and molecular biology. Additional information may be obtained at [cels.uri.edu/cmb/CMB\\_Grad.aspx](http://cels.uri.edu/cmb/CMB_Grad.aspx).

## Environmental and Natural Resource Economics

How can we create a sustainable society that protects the environment while maintaining a prosperous society? Why have humans caused environmental degradation on local, regional, and global scales, and what can we do about it? Public officials, nonprofit organizations, and private businesses need professionals who can answer these questions in order to design a new sustainable world.

As a major in environmental economics, you will learn tools that can help answer these questions. The environmental economics major integrates the natural sciences with economics to help us understand why many of earth's natural resources are under threat and how we can design policies to address these threats. This major teaches students to weigh options and make important decisions concerning the protection, restoration, development, and use of our natural resources. The major prepares students for graduate school or for careers in the public and private sector that address environmental and natural resource management, business, or public policy. Professionals in these fields play an important role in coordinating interdisciplinary teams to address such complex problems. Graduates gain an understanding of both natural sciences and the economy.

The degree requires a minimum of 120 credits, including 24 credits in concentration credits. In addition to satisfying the general education requirements, students need 9 credits in introductory professional courses, including natural resource conservation (NRS 100), introductory resource economics (EEC 105), and resource management (EEC 205). The major also requires a minimum of three credits in communication skills beyond the general education requirements. It is also possible to get a double major in Environmental Econom-

ics and General Business, which we call the Green Business double major.

The major is comprised of two options: Green Markets and Sustainability (GMS) and Environmental Economics and Management (EEM). The two options are discussed below.

Option 1: Green Markets and Sustainability (GMS). This option is for students who wish to develop a deep understanding of social and economic systems as they relate to a sustainable environment. This option is designed to provide considerable flexibility so students can focus their studies to meet their professional goals. Twentyfour credits in concentration courses are required at the 300 level or above, including 15 credits in environmental and natural resource economics (EEC), three credits in microeconomic theory (ECN 328), and 6 credits in other concentration courses selected by students, selected in consultation with their advisors. Up to 9 concentration credits may be in economics (ECN) or business (BUS). A minimum of 21 credits in basic and supporting sciences are required, including three credits in mathematics, introductory geology (GEO 100 or 103), introductory biology (BIO 101/103 or 105), and introductory chemistry (CHM 100, 101, or 103). Introductory calculus (MTH 131) is strongly recommended, especially for students who are considering going to graduate school. Supporting sciences can be selected from a broad range of subjects including business (BUS 210 and 212 only), mathematics, statistics, computer science, natural resources science, physics, genetics, plant physiology, biology, ecology, chemistry, geology, or oceanography. An additional 25–27 credits in supporting electives allow the student either to develop a closely related focus area (e.g., green business) or to sample from a broad set of relevant courses.

Option 2: Environmental Economics and Management (EEM). This option is for students who seek a balanced focus on environmental sciences and environmental economics. The option requires 36 credits of basic sciences, including at least eight credits in general biology (BIO 101/103, 102/104); four credits in general chemistry (CHM 101/102 or 103/105); introductory soil science (NRS 212); 3 credits in introductory ecology (BIO 262); 4 credits in introductory geology (GEO 103); 3 credits in introductory calculus (MTH 131); and 3 credits in introductory statistics (STA 308). The 24credit concentration includes a minimum of 12 concentration credits in environmental and resource economics (listed under EEC), including economics of natural resource management and policy (EEC 310) and a capstone course in environmental economics and policy (EEC 432), as well as six additional credits selected to meet the student's particular interests. Students are also required to take a minimum of 12 concentration credits selected from ecology, soils and watersheds, and geosciences. Students choose a minimum of 20 credits in supporting electives and 8 credits in free electives.

Green Business. The Department of Environmental and Natural Resource Economics and the College of Business Administration offer a double degree in environmental economics and general business. This program is designed for those interested in corporate sustainability, energy efficiency, nonprofit management, green marketing, renewable energy, global environmental challenges, environmental policy, and energy finance. Students earn a B.S. in Environmental and Natural Resource Economics from the College of the Environment and Life Sciences and a B.S. in Business Administration from the College of Business Administration. More details on this

program can be found at [web.uri.edu/enre/doublemajorinbusinessandenvironmentaleconomics](http://web.uri.edu/enre/doublemajorinbusinessandenvironmentaleconomics).

## Environmental Economics and Management

See Environmental and Natural Resource Economics.

## Environmental Horticulture and Turfgrass Management

See Plant Sciences.

## Environmental Science and Management

The major in environmental science and management, offered by the Department of Natural Resources Science, prepares undergraduate students for professional careers in the public and private sectors of natural resources management. Flexible course requirements allow students to develop individual areas of concentration and prepare for a variety of positions in environmental management after graduation. This major is also suitable for students who wish to become certified as teachers of environmental science and natural resources at the secondary level. In addition, the program provides a solid background for graduate study in several more specialized environmental science disciplines. Environmental science majors may meet the educational requirements for state and federal employment as biologists, natural resource specialists, environmental scientists, and other classifications.

Environmental Science and Management incorporates course work in water resources, geospatial technologies, wetland ecology, wildlife biology, soil science, forestry, and land use/ environmental quality relationships. Coursework emphasizes the field techniques that underpin environmental assessment and restoration. This is a comprehensive major that includes a solid background in the basic sciences and exposure to a broad array of subject matter relating to environmental science and management. This major provides solid preparation for more specialized study at the graduate level and prepares undergraduate students for professional careers in the public and private sectors of natural resources management. Flexible course requirements allow students to develop individual areas of concentration and prepare for a variety of positions in environmental science and management after graduation. This major is also suitable for students who wish to become certified as teachers of environmental science and natural resources at the secondary level. With proper course selection environmental science majors can meet the educational requirements for certifications by professional and governmental agencies as biologists, soil scientists, natural resource specialists, hydrologists, and other classifications.

The major requires 19 credits of professional courses, which include natural resource conservation, seminar in natural resources, physical geology, resource economics, introductory soil science, and conservation of populations and ecosystems. As part of the basic science requirements, environmental science and management majors must complete eight credits in introductory biological sciences; four credits in introductory chemistry; four credits in organic chemistry; three credits in introductory calculus; three credits in introductory statistics and three to four credits in either introductory biochemistry,

introductory microbiology, or general chemistry II. Required concentration courses (24 credits) must be taken at the 300 level or above.

In addition, one course must be selected from each of the following groups: biological and ecological science; watershed and environmental quality; methods in environmental science; natural resources management; and land use management. These and the remaining concentration credits should be selected from courses offered by the Department of Natural Resources Science or from an approved list of courses. Up to six credits of letter grade experiential learning courses may be taken as concentration courses.

Supporting electives (18–20 credits) must be selected from an approved list of courses, mostly at the 300 and 400 levels. At least nine supporting elective credits must be selected from NRS courses. Up to 15 credits of experiential learning courses may be taken toward satisfying concentration (letter grade courses only) and supporting elective requirements.

## Geology and Geological Oceanography

The Department of Geosciences offers a single degree: the B.S. in geology and geological oceanography, with two options, a geology option and a geological oceanography option. This degree is designed for students with an interest in earth, environmental, or oceanographic science careers or affiliated fields such as environmental law and earth/environmental science education. The two options allow students to take specialty courses focusing on a range of geoscience topics such as environmental geology/hydrogeology, sedimentology/stratigraphy/paleontology, coastal geology/oceanography, geochemistry/petrology, or geophysics/tectonics, and supporting elective courses chosen from geosciences, natural resources science, environmental economics, and oceanography. Students may use their supporting electives to pursue in-depth study within a given field or to broaden their interdisciplinary perspective. Students are required to complete an interdisciplinary core of introductory courses including GEO 103 Understanding Earth (4), NRS 100 Natural Resource Conservation (3), and EEC 105 Introduction to Resource Economics (3); geosciences core courses including GEO 204 Problemsolving in Earth History (4), GEO 210 Landforms: Origins and Evolution (4), GEO 320 Earth Materials (4), GEO 370 Structure of the Earth (4), and GEO 450 Introduction to Sedimentary Geology (4); supporting science/mathematics courses including MTH 131 (3) or 141 (4); MTH 132 (3) or 142 (4); BIO 101 (3) and 103 (1), BIO 102 (3) and 104 (1) or GEO/BIO 272 (4) or CHM 124 (3), 126 (1); CHM 101 (3), 102 (1), 112 (3), 114 (1); STA 308 (3) or 409 (3); PHY 111 (3), 185 (1) or 203 (3), 273 (1), and PHY 112 (3), 186 (1) or 204 (3), 274 (1); and 12 credits of supporting electives taken at the 200level or above from GEO, NRS, EEC, OCG or from another program with prior approval from the GEO department chair.

GEO 480, 497, and 499 and OCG 493/494 are capstone experiences available for this major.

A total of 120 credits and a 2.00 grade point average within the major are required for graduation.

**Geology Option.** This option allows students the flexibility to define their own area of concentration within the geosciences. Students selecting this option complete GEO 483—Hydrogeology (4); GEO 480 (4–6) or a GEO elective at the 200level

or above; and an additional GEO elective at the 200level or above chosen in consultation with their advisor. Example areas of concentration include environmental geology/hydrogeology, sedimentary geology/stratigraphy, and geophysics/tectonics.

**Geological Oceanography Option.** Students completing this option will be well prepared to pursue careers in either conventional geology/earth science or geological oceanography. Students selecting this option complete three upper-level oceanography courses including OCG 301—General Oceanography (3) or OCG 451—Oceanographic Science (3), OCG 440 or 540—Geological Oceanography (4), and an OCG elective taken at the 400level or above; and a 3credit senior research project, OCG 493 or 494—Special Problems and Independent Study in Oceanography (3), taken in the Graduate School of Oceanography (GSO), under the direction of a GSO faculty member. Students entering the URI Graduate School of Oceanography from this program will have a significant head start compared with those entering from most other undergraduate institutions.

Department of Geosciences website: [cels.uri.edu/geo/](http://cels.uri.edu/geo/)

## Landscape Architecture

Landscape architecture is a 126credit curriculum leading to the Bachelor of Landscape Architecture (B.L.A.) degree. Accredited by the American Society of Landscape Architects, the curriculum is designed to prepare undergraduates for professional careers in public and private practice. Landscape architecture is a profession that involves the design, planning, preservation, and restoration of the landscape by applying art, science, and technology to achieve the best use of our land and water resources.

Landscape architects design and plan parks, plazas, and recreation areas; residential, institutional and commercial developments; transportation facilities, waterfronts, new towns and campus landscapes; green roofs, green streets, and bioswales. Their professional skills may be used to preserve and restore natural, historic and coastal environments, and they are increasingly being called upon to work on teams that are dressing particularly challenging conditions associated with climate change.

The requirements of this curriculum include preparation in the basic arts and sciences. The major includes 63–64 credits of professional core classes (LAR 101, 201, 202, 243, 244, 300, 301, 302, 343, 344, 345, 346, 353, 354, 443, 444, 445, 447, 450); 28–29 credits of supporting requirements (ART 207; GEG 101; PLS 150; CHM 100, 101 or 103 or PHY 109, or GEO 100, or 103; CPL 410, CPL 434, 538; MTH 111; and PLS 200); and 7–8 credits of supporting electives. Students will also take general education classes and six credits of free electives. Students accepted into landscape architecture are required to maintain a grade point average of at least 2.50 with no landscape architecture grades below a letter C. Students failing to maintain this minimum may be removed from the program and required to reapply once this requirement is satisfied. Students are required to own a laptop computer by the time they enter the program. Specifications are available from the Landscape Architecture Program Office or from Ram Computer.

URI's Landscape Architecture Program (LAR) is competitive. Accreditation standards regarding staff and facilities limit the

number of students accepted into the major to 20 per year. While enrolled in the program, students will be reviewed twice during the course of their studies: first for admission into the lowerdivision design sequence and again for acceptance into the upperdivision B.L.A. major.

Admission into the lowerdivision design sequence courses (LAR 243 and 244) requires department approval. Approximately 50 percent of the openings are filled by students entering as incoming freshmen and who maintain a minimum 2.50 grade point average with no grades in LAR courses below a C. The remaining openings are filled by matriculated students wishing to transfer into landscape architecture from other majors. These students are required to apply to the program and to submit a transcript of grades and an essay. Applications and transcripts are evaluated in February/March each year for acceptance into the lowerdivision (LAR 243) design sequence for the following fall. In order to encourage underrepresented students to apply, one available space is set aside each year for a suitable applicant who meets the minimal program qualifications.

Acceptance into the upper division (junior design sequence) is based on submission and review of a portfolio of lower-division work, current academic transcript, and written essay. A maximum of 20 students per year are accepted into the upperdivision B.L.A. curriculum. Eligible applicants for upper division are students enrolled in LAR 244/repeat applicants, and students wishing to transfer directly into the upper division from other accredited landscape architecture programs. Only students who have completed comparable lowerdivision courses in external programs will be allowed to compete for these upperdivision positions. Such transfer applicants must first be accepted into the University by the Office of Admission and have their portfolios, transcripts, and essays submitted to the director of the landscape architecture program before February 21 preceding the fall semester in which they wish to enroll. Students will be notified of their acceptance following department review.

Interested students should contact the program advisor or department chair.

## Marine Affairs

URI's Department of Marine Affairs offers the following degrees: B.A., B.S., M.A., M.M.A. (Master of Marine Affairs), and Ph.D.

The B.A. and B.S. in marine affairs focus on coastal and ocean areas and examine environments, resources, and uses from a variety of perspectives. Both degrees qualify for New England Regional Tuition. Topics include coastal and fisheries management, ports and maritime transportation, ocean policy and ocean law.

A marine affairs major establishes a background for careers in the public or private sectors in a wide variety of marinerelated fields. Typical areas of employment include positions in government concerned with coastal zone, environmental, or fishery management, and marine transportation. In the private sectors, students have secured positions in environmental consulting firms, marine insurance, public interest nongovernmental organizations, marinas, ports, and companies involved in shipping. The major serves well as an educational background for continued study in law, especially environmental,

fishery, coastal zone, admiralty, and ocean law. Students have also entered graduate and professional programs in environmental management, public administration, community planning, marine affairs, and related fields.

Students in the Department of Marine Affairs who participate in the New England Regional Student Program must maintain a 2.80 G.P.A. and take at least one MAF course per year to retain their New England regional tuition status. Failure to meet these objectives will result in suspension of the reduced tuition privilege. Reinstatement may occur if the student meets these requirements for one year after the time of the suspension.

Bachelor of Arts in Marine Affairs. Students who obtain the B.A. in marine affairs must fulfill the Basic Liberal Studies requirements of the College of Arts and Sciences (see Basic Liberal Studies Requirements).

Students selecting this field are required to complete at least 30 credits (maximum 45) in marine affairs as follows.

All of the following courses (12 credits): MAF 100, 120, 220, and 410 [capstone]. Five of the following courses (15 credits): MAF 312, 415, 320, 330, 413, 461, 465, 471, 472, 475, 484, and 499. One additional MAF course (three credits) must be taken to complete the required 30 credits in the degree.

In addition, students must also take STA 308 and OCG 123 or 401 (if OCG 123 is taken, it may also be used toward fulfilling the Basic Liberal Studies Natural Sciences requirement).

A total of 120 credits is required for graduation. At least 42 of these credits must be in courses numbered 300 or above.

Bachelor of Science in Marine Affairs. Students selecting this field must complete at least 30 credits in marine affairs with the following required MAF courses: MAF 100, 120, 220, 410 [capstone], 482; and five of the following courses: MAF 312, 320, 330, 413, 415, 461, 465, 471, 472, 475, 484, and 499.

In addition to the above requirements, students must take BIO 101/103; OCG 123 or 401; MTH 111 or 131; and WRT 333 (3). Students must also select a total of 18 credits from the following, of which nine must be at the 300 level or above: AFS 102, 201, 202, 210, 211, 311, 312, 315, 321/322, 332, 362, 432, 483; BIO 252, 345, 355, 360, 418, 455/457; CHM 103, 112, 124/126; EEC 105, 110, 205, 310, 345, 356, 410, 432, 435, 440, 441, 456, 460; GEO 100, 103, 210, 240, 277, 320, 370, 450, 483; NRS 223, 361, 406, 409, 410, 423, 424, 440, 461; NRS/GEO 482; NRS 497; OCE 101, 307, 310, 311, 492; OCG 493, 494; PHY 109, 110, 111, 112, 130, 185, 186, 213, 214, 285, 286, 306; STA 308, 409, 412, 413. A total of 120 credits is required for graduation.

## Marine Biology

See Biology, Biological Sciences, Marine Biology earlier in this section.

## Medical Laboratory Science

This major, offered by the Department of Cell and Molecular Biology, is designed to prepare students for applied careers in the medical laboratory, biomedical, and biotechnology sciences, as well as to prepare students for graduate or professional school. The department also offers the Master of Science (M.S.) degree.

There are two options in the program: Medical Laboratory Science and Biotechnology Manufacturing. Students in both are required to take these courses: BIO 101/103 and 102/104, 121, and 242; CHM 101, 102, 112, 114, 226, 227, and 228 (or 124 and 126 for the Biotechnology option); PHY 111 and 185; MLS 102; MTH 111, 131, or 141. A total of 120 credits is required for graduation.

**Medical Laboratory Science Option.** During the first three years, emphasis is on general education and on basic courses in the biological, chemical, and quantitative sciences. The courses of the senior year are taught off campus by staff from affiliated hospital schools of medical laboratory science. These schools are accredited by the National Accreditation Agency for Clinical Laboratory Sciences. The senior year is an 11 month clinical internship that begins in late July. It is taken at one or more of the following clinical agencies: Rhode Island Hospital, Miriam Hospital, Fatima Hospital, and the Rhode Island Blood Center. The clinical program includes lecture and laboratory instruction in clinical chemistry, clinical microbiology, hematology, immunology, immunohematology, and molecular pathology, and prepares the student for national certification examinations and state licensure.

Applicants to this curriculum should have completed 60 credits and taken most of the required courses by the end of the sophomore year. Students are selected for clinical internships by the departmental curriculum committee and by program officials of the hospital schools. Since the number of students is limited, interested students should consult with the program director early in their college career, so they will be familiar with the requirements and application procedures. Flexibility in the curriculum permits students who are not admitted to the program to fulfill requirements for the Bachelor of Science degree in one of several other concentrations in the department. Students with a degree in a health profession, life science, or related field may apply to the clinical internship as a fifth year of study.

Required courses: MLS 405, 406, 407, 409, 410, 411, 412, 413, 414, 415, 416, 451, and 483; MIC 201 or 211, 333, 432; BCH 311.

*Freshman Year First semester: 14–15 credits*

CHM 101, 102 (4); BIO 101/103 or 102/104 (4); MTH 111 or 131 (3) or 141 (4); and one general education requirement (3).

*Second semester: 15 credits*

CHM 112, 114 (4); BIO 101/103 or 102/104 (4); MLS 102 (1); and two general education requirements (6).

*Sophomore Year First semester: 14 credits*

BIO 121 (4); CHM 227 (3); PHY 111, 185 (4); and general education requirements (3).

*Second semester: 18 credits*

BIO 242 (3); CHM 226, 228 (5); MIC 201 or 211 (4); general education requirement (3) and free elective (3).

*Junior Year First semester: 15 credits*

MIC 333 (3); MLS 483 (3); and general education requirements (9).

*Second semester: 12 credits*

MIC 432 (3); BCH 311 (3); and electives (6).

*Senior Year First semester: 17 credits*

MLS 405 (2), 409 (4), 411 (4), 413 (2), 415 (3), and 451 (2).

*Second semester: 15 credits*

MLS 406 (2), 410 (4), 412 (4), 414 (2), and 416 (3).

**Biotechnology Manufacturing Option.** This option is designed to prepare students for professional careers in the biotechnology and biomedical industries in the areas of manufacturing, processing, operations, and technical support. This option is based at the Providence Campus and includes a 12 credit clinical internship at a regional biotechnology or biomedical company. Students should be aware that internships may be limited in number and are awarded on a competitive basis. Students are selected by the departmental curriculum committee and by program officials of affiliated companies. Students interested in this option should consult with the program director early in their college career, so that they will be familiar with the requirements and application procedures. Flexibility in the curriculum permits students who are not admitted to the program to fulfill requirements for the Bachelor of Science degree in one of several other concentrations in the department.

Required courses: MLS 195, 199 (or 12 credits of alternative courses approved by the program director); MIC 190 and 201 or 211; BCH 311, 437, and 453 (or BIO 341). The program is structured to provide intensive professional and clinical training in the first year of the program so the student may enter the professional field while still pursuing the degree. The remainder of the program may be completed on a fulltime or reducedtime basis. The electives, in consultation with the program director and appropriate department officials, may be utilized to create personalized specializations and/or minors in management, training and development, information technology, bioengineering, and related areas. The recommended program for the first year is:

*Freshman Year First Semester: 16 credits*

BIO 101/103 (4); CHM 101 (3) and 102 (1); MIC 190 (3) and 211 (4); and URI 101 (1).

*Second Semester: 17 credits*

BIO 102/104 (4), 242 (3); CHM 124, 126 (4); MLS 102 (1) and 195 (5).

*Summer Session: 12 credits*

MLS 199 (12)

## Microbiology

As of spring 2012, admission to this degree program has been suspended. Students may choose the microbiology option within the B.S. program for cell and molecular biology.

## Nutrition and Dietetics

This major prepares undergraduates for careers in nutrition-related fields. Two options, dietetics and nutrition, are available.

The major requires 22 credits in sciences (four in general chemistry, four in organic chemistry, three in biochemistry, seven in biology, and four in microbiology), 4 credits in applied general nutrition (NFS 210), 4 credits in introductory professional courses (NFS 110 and 212 or 276); and 32–40 credits in the concentration including the following courses: NFS 336, 394, 395, 410, 440, 441, and 458 [capstone]. WRT 104, COM 100, and STA 220 are required and may be used to fulfill general education requirements. There are 6–12 credits of supporting electives and 8–10 credits of free electives. A total of 120 credits is required for graduation.

Students will be admitted to the nutrition and dietetics degree program after completing a minimum of 30 credits, including CHM 103/105, 124/126; BIO 121; NFS 210, 212 or 276, 375 or 394; WRT 104; COM 100; and STA 220. Students must have earned a 2.50 average in these classes with no less than a C in any one class to be admitted to the nutrition option, or a 3.00 average in these classes with no less than a C in any one class to be admitted to the dietetics option. Students may repeat NFS courses once. Because of national accreditation requirements, students must complete a separate application form for admission to the dietetics option. All students meeting the admission requirements for the dietetics option will be accepted.

**Dietetics Option.** This option is required of all students planning to become registered dietitians. URI's dietetics program is accredited by the Commission on Accreditation Council for Education in Nutrition and Dietetics (ACEND), 120 South Riverside Plaza, Suite 2000, Chicago, IL 60606, 312.899.0040, ext. 5400. Please see our Web site ([cels.uri.edu/nfs](http://cels.uri.edu/nfs)) for complete program information. In addition to the core courses specified for the major, the following courses are required: NFS 337, 375, 376, 443, 444, 495, and BUS 341. SOC 100 and PSY 113 are also required and may be used to fulfill general education requirements. Students must maintain a 3.00 average in all required courses (NFS courses, science courses, and the remaining degree courses), with no less than a C in any one class, in order to graduate. Students are encouraged to use supporting elective and free elective courses to study disciplines related to the field.

After completing their B.S. requirements, students can qualify for the professional title of Registered Dietitian by completing supervised practice requirements and passing a national exam. The supervised practice requirement is met by completing an ACEND-accredited dietetic internship program available to students on a competitive basis nationwide. Admission to internship programs is highly competitive; students are encouraged to review the latest admission information on the Academy of Nutrition and Dietetics website ([eatright.org](http://eatright.org)). Internships may be combined with graduate programs in universities leading to an advanced degree. Students who complete the academic and supervised practice requirements are eligible to take the national registration examination.

**Nutrition Option.** This option is for students who want to study nutrition but do not plan to become registered dietitians. There are three tracks available which provide focused training in specific areas of nutrition:

**Nutrition Science**—designed for students who want to study the science of nutrition and use this background for advanced study in the field or admission to professional health programs. In addition to the core, students will complete NFS 337, 459, 495, and one additional NFS course based on their area of interest.

**Health Promotion**—designed for students who want to work with the public in preventative health education programs. In addition to the core, students will complete NFS 360, 443, 444, and 495.

**Foods**—designed for students who want to work in food service management, food safety, or food sustainability. In addition to the core, students will complete NFS 337, 375, 376 and 495.

Students must maintain a 2.50 average in all required courses (NFS courses, science courses, and the remaining degree courses) in order to graduate. Students are encouraged to use supporting elective and free elective courses to study disciplines related to the field.

## Plant Sciences

The major in plant sciences, offered by the Department of Plant Sciences and Entomology, prepares undergraduates for professional careers in the many public and private sectors of horticulture. There are three tracks in the major: environmental horticulture, sustainable agriculture, and turf grass management. Graduates of this program pursue careers ranging from landscape contractor, golf course superintendent, director of parks, botanical gardens or arboreta, garden center or floral shop proprietor, plant propagator, nursery production manager, vegetable or fruit grower, lawn service manager, horticultural therapist, or technical representative for seed, equipment, and chemical companies, to name just a few of the opportunities available. Other graduates enter graduate school and pursue careers in research and education at public and private institutions. This program has as its unifying theme the sustainable culture and use of plants for amenity or food. The sustainable agriculture track draws on courses in sustainable vegetable and fruit production, animal science and soil management, and prepares students for careers supporting sustainable farming and food systems.

Graduates can meet the standards of several certification organizations. Students in the environmental horticulture track qualify for certification with the Rhode Island Nursery and Landscape Association and the International Society for Arboriculture. Graduates of the turfgrass management track qualify for certification as turfgrass managers or turfgrass specialists with the American Registry of Certified Professionals in Agronomy, Crops, and Soils, Ltd. of the American Society of Agronomy. These same graduates also meet the requirements for registration with the Golf Course Superintendents Association of America.

The major requires a total of 120 credits: 24 credits of pre-professional natural sciences; 30 credits in concentration courses; and 15 credits of supporting electives selected from an approved course list. Many students also minor in business management.

The department manages over 50 acres of turfgrass, horticulture, and agronomy farms for teaching, research, and outreach. The C. Richard Skogley Turfgrass Center is the



oldest turfgrass research/teaching program in the U.S. The department also maintains a 15,000 square foot controlled environment greenhouse complex for hands-on learning and research. These facilities are closely allied with the URI Botanical Gardens and E.P. Christopher Arboretum.

## Resource Economics and Commerce

See Environmental and Natural Resource Economics.

## Wildlife and Conservation Biology

The major in wildlife and conservation biology, offered through the Department of Natural Resources Science, prepares students for professional careers in the public and private sectors of wildlife biology. In addition, the major provides a solid background for graduate study. Wildlife biologists are professionals concerned with the scientific management of the earth's wildlife species and their habitats. They work in the areas of preservation, conservation, and management of wildlife species. Graduates can become Certified Wildlife Biologists (CWBs) who are recognized by the Wildlife Society, an international professional organization. In addition, wildlife majors meet the educational requirements for state and federal employment in the wildlife profession.

The major requires 19 credits of professional courses, which include natural resource conservation, seminar in natural resources, introductory ecology, resource economics, introductory soil science, and conservation biology. As part of the basic science requirements (22–23 credits), wildlife majors must complete eight credits in introductory biological sciences; four credits in introductory chemistry; four credits in organic chemistry; three credits in introductory calculus; and three credits in introductory statistics. Required concentration courses (23–25 credits) include three credits in the principles of wildlife ecology and management; three credits in wildlife field techniques; four credits in field botany and taxonomy; four credits in wetland wildlife or nongame and endangered species management; and 9–11 credits from an approved list of concentration courses that may include, for example, field ornithology, mammalogy, vertebrate biology, herpetology, animal behavior and wildlife biometrics. Supporting electives (24–26 credits) must be selected from the approved list. We encourage students to complete course work so they can become a certified wildlife biologist, which includes the following upper-division course work in their supporting electives: at least one credit in botany; six credits in zoology; six credits in resources policy or administration, environmental law, or land use planning; and six credits in communications. Additional supporting electives must be selected from concentration electives, or from other 300 or 400 level natural resources science courses. Up to 12 credits of experiential learning courses may be taken toward satisfying concentration (letter grade courses only) and supporting elective requirements (letter or S/U courses). Concentration and supporting elective courses must total at least 49 credits. At least 12 credits of natural resources science courses must be completed in concentration and at least 6 more in supporting electives. A total of 120 credits is required for graduation.

In order to transfer from University College for Academic Success to the College of the Environment and Life Sciences as a Wildlife and Conservation Biology major (or be coded as

such in the College of the Environment and Life Sciences), a student must have earned 30 credits including BIO 101, 103, 102, 104 with grades of C or better; NRS 100, 223 with a grade of C or better.

### *Minors in Natural Resources Science*

The following minors are University approved. Students may also design their own minors; see Minor Fields of Study.

**GIS and Remote Sensing.** This minor field of specialization provides students in-depth training in the use of GIS (geographic information system) and remote sensing technology and application of geospatial data processing methods to environmental problem solving. Students who declare a minor in GIS and remote sensing must complete 18 credit hours consisting of the following core courses: NRS 409, 410, 415, 516, and 522. The remaining credits may be taken from NRS 423, 524, 533, or CPL 511. Students minoring in GIS and remote sensing are encouraged to take a capstone course that allows them to apply their analytical skills in a real-world application.

**Soil Environmental Science.** This minor field of specialization provides students in-depth training in the application of soils information to solve environmental problems and issues. Students fulfilling the requirements of the soil environmental science minor meet the qualifications for basic membership in the Society of Soil Scientists of Southern New England, are eligible for certification as soil scientists under the American Registry of Certified Professional Soil Scientists, and meet the requirements for federal job listings under soil scientists. Students who declare a minor in soil environmental science must complete 18 credits from the following courses: NRS 212, 351, 412, 426, 450, 452, 461, 471, 510, or 567. Students minoring in soil environmental science are encouraged to take a capstone course that allows them to apply their analytical skills in a real world application.

**Wildlife and Conservation Biology.** This minor field of specialization provides students in-depth training in the principles of managing wildlife populations and their habitats. Students who declare a minor in wildlife and conservation biology must complete at least 18 credits of NRS courses within the WCB major curriculum, at least 12 of these 18 credits must be at the 200 level or higher, and all courses in the minor must be taken for a letter grade. Students minoring in wildlife and conservation biology are encouraged to take a capstone course that allows them to apply their analytical skills in a real-world application.

A major in this program is also available. See above.

## Human Science and Services

### Introduction

Lori E. Ciccomascolo, Interim Dean

Anne M. Seitsinger, Interim Associate Dean

Nancy Kelley, Assistant Dean

The College of Human Science and Services is a people-oriented college designed to focus on the human and material resources needed to help individuals and groups solve human problems encountered in contemporary society. Our programs prepare students for a variety of professions in teacher education, health-related fields, and fields that have evolved from URI's historic landgrant mission in home economics. These programs include both formal and informal experiences with people in a wide variety of public service settings that enable students to develop the competencies needed in the field of human services. The teacher education programs offered through the college are outlined in the following departmental descriptions. For more information, see "Teacher Education Programs" in Preprofessional Preparation.

Degrees offered include a Bachelor of Science degree with majors in communicative disorders; health studies; human development and family studies; kinesiology; secondary education; textile marketing; and textiles, fashion merchandising, and design; and Bachelor of Arts degrees in elementary or secondary education.

The college sponsors a number of organizations and activities that provide special opportunities for students, including two child development centers, a family therapy clinic, historic textile and costume collection, computer laboratory, physical therapy clinic, and a speech and hearing clinic.

Minors. Students can declare a minor, which will appear on their transcripts as a category separate from their major. See Minor Fields of Study.

The college participates in the following interdisciplinary minors: gerontology, hunger studies, leadership studies, and special populations (see Interdisciplinary Minors). Details on minors offered within the college can be found later in this section.

For more information, visit [uri.edu/hss](http://uri.edu/hss) or call 401.874.2244.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

### Faculty

Communicative Disorders: Professor Kovarsky, chairperson. Professors Kovarsky, Singer, and Weiss; Associate Professor Kim; Assistant Professor Mahler; Clinical Assistant Professors Connors and Theodore; Adjunct Assistant Professor R. Singer.

School of Education: Professor Byrd, director. Professors Byrd, Eichinger, Peno, Seitsinger, Trostle Brand, and Willis; Associate Professors Adamy, Coiro, Deeney, deGroot, Fogleman, Hicks, Kern, and Shim; Assistant Professors Moore and Sweetman; Lecturers Hersey and Semnoski.

Human Development and Family Studies: Professor McCurdy, chairperson. Professors J. Adams, Clark, Kisler, McCurdy, and Xiao; Associate Professors S. Adams, Branch, Kisler, Sparks, and Vaccaro; Assistant Professors Brasher, Dice, Leedahl, and Porto; Lecturers Adler and Kim; Adjunct Instructors Blumen, Kerbel, Penhallow, and Warford; Professors Emeriti Cohen, Maynard, and Schaffran.

Kinesiology: Professor Riebe, chairperson. Professors Blissmer, Lamont, and Riebe; Associate Professors Ciccomascolo, Delmonico, Hatfield, Kusz, and Xu; Assistant Professors Beck, Clapham, Fournier, Greaney, and Sabnik; Lecturers Armstrong, Harper, Lateef, Orendoff, and Steen.

Textiles, Fashion Merchandising, and Design: Associate Professor Hannel, chairperson. Professors Bide, Ordóñez, and

Welters; Associate Professors Harps Logan and Hannel; Assistant Professors Aspelund, Gagnon, and Lu; Adjunct Professor Emery.

Interdisciplinary Programs: Gerontology—Professor Clark, director; Health Studies—Assistant Professor Greaney, director; Human Science and Services—Interim Dean Ciccomascolo, program head; Leadership Studies—Professor McCurdy, acting program head.

### Curriculum Requirements

General Education Requirements. All students pursuing a bachelor's degree in the college are required to develop a 39 credit program in general education within the framework described at the start of the Undergraduate Program Requirements section of this catalog.

Students within the college must take, as part of their English communication requirement, a minimum of three credits from WRT 104 or 106 and a minimum of three credits from COM100; or as part of their social sciences requirement, a minimum of three credits from APG, PSY, and SOC courses approved for general education. Individual programs within the college may require specific courses.

Students in the elementary and secondary education program must follow the basic liberal studies requirements of the College of Arts and Sciences.

Field Work. Many of the college's academic programs require a supervised field work experience as part of the degree requirements. This experience is designed to provide students with the opportunity to apply classroom knowledge in a career-related setting. Placements are made in a wide variety of agencies such as public schools, health care facilities, child care centers, and other human service settings. Satisfactory completion of a required field experience depends on achievement of basic competencies established by the academic department in cooperation with the agency. The University supervisor is responsible for determining whether or not the student has attained the required competencies and, in some cases, may extend the time required for the experience until the student's performance is satisfactory. If in the opinion of the University supervisor the performance of the student is unsatisfactory, and particularly if client/patient safety is at risk, the student may be removed from the field experience prior to the end of the semester or term.

**Course Load.** Approval of the advisor and the dean is needed for a schedule of more than 19 credits per semester.

**Repeating Courses for Credit.** Unless otherwise stated in the course description, a course cannot be repeated for credit. Credit can be counted only once toward the total credits required for graduation. Repeating courses in which a grade of C or better was earned requires approval of the student's academic dean; students may need to take such courses on a pass/fail basis.

**Curricular Modifications.** In consultation with the advisor, and with the approval of the department chairperson, a student will be permitted to modify the normal requirements of the department in which the student is majoring. The decision of the department chair is final. Requirements outside the major may be modified only with the approval of the Scholastic Standing Committee of the College of Human Science and Services. Petition forms are available in the Office of the Dean. Minimum grade point average and total credit requirements are not petitionable.

**Transfer Students.** Transfer students should be advised that admission to some programs in the college requires meeting certain prerequisites or separate admission criteria. Teacher education programs in the School of Education, Department of Human Development and Family Studies, and the Department of Kinesiology have specific admission criteria and generally require that a matriculated student complete at least one semester of work at URI before applying for admission. Transfer students may be admitted to the University, but are not admitted directly into these programs.

The Plan for Early Contingent Admission to the Doctor of Physical Therapy Program in Physical Therapy requires careful and timely course planning typically beginning with the freshman year at URI. It is unlikely that transfer students would have the appropriate sequence of courses, including the prerequisites, that would allow them to take advantage of this option.

Students interested in any of the above programs should refer to the specific program descriptions and consult the department for additional information.

**Graduation.** It is the responsibility of each student to file an Intent to Graduate form and curriculum work sheet approved by his or her advisor in the Dean's Office. The deadline is October 15 for May graduation and August graduation, and April 15 for December graduation.

## HSS Programs

### Communicative Disorders

This curriculum leads to a Bachelor of Science (B.S.) degree. Students seeking admission to this program must receive a grade of C or better in CMD 160, 272, and 273 and maintain a minimum cumulative GPA of 2.50. In addition to general education requirements and appropriate free electives, a major of 43 credits in communicative disorders includes 34 credits of required courses and nine credits of professional electives.

The required courses are CMD 160, 272, 273, 274, 276, 278, 361, 375, 377, 454, 460, 465, and 493. The remaining nine credits (three courses) must be selected from the following courses: BMS 312; COM 221, 251; CMD 440, 475, 491, 492; EDC 312; HDF 200, 201, 203, 312, 314, 400; HIS 117; HSS 120; LIB 120; LIN 200, 220; PSY 232, 254, 300, 388, 442; SOC 224; STA 220, 308.

With careful early planning, students can use free electives to achieve a double major or explore special interest areas in depth. Students should anticipate the necessity for graduate study in speechlanguage pathology. The typical minimum entry requirement for graduate study is a grade point average of 3.3.

A total of 120 credits is required for graduation.

Accelerated Bachelor's/Master's Degree Program in Speech-Language Pathology. URI sixthsemester students pursuing a B.S. degree in communicative disorders with 24 credits of electives remaining may apply for acceptance into an accelerated master's degree program in speechlanguage pathology. This accelerated program is not available to nonURI undergraduates or parttime graduate students. Students accepted to these programs follow a specified sequence of graduate-level course work and clinical practicum during their senior year, and complete the master's degree with an additional one year and one summer of fulltime study in speechlanguage pathology. A cumulative grade point average of 3.00 overall and 3.20 in the major is required, with satisfactory MAT or GRE scores. Two letters of recommendation from URI communicative disorders faculty are also needed. Students should indicate their intent to apply to the accelerated program in the graduate application materials.

Students in the speechlanguage pathology program are required to take a minimum of 24 credits in specified course work and practicum at the 400–500 level in the fifth year. Requirements for the M.S. in speechlanguage pathology are outlined in the Graduate Programs section of this catalog.

### Education

Curriculums in secondary education lead to the Bachelor of Science or Bachelor of Arts degrees, the curriculum in elementary education to the Bachelor of Arts (B.A.) degree. Students wishing to enroll in the early childhood education program must major in human development and family studies and seek admission to the teacher education component of this program, as outlined below. The Master of Arts (M.A.), M.A. in Special Education, and Doctor of Philosophy (joint with Rhode Island College) degree programs in education are described in Graduate Programs.

The curriculums offer a balanced program of academic preparation and professional training. The required professional courses contribute directly to the student's understanding of the teacher's role in society and developing teaching skills.

Successful completion of the early childhood education program leads to an initial teaching certificate for the preschool and primary grades (PK2), while completion of the elementary education program leads to an initial teaching certificate for grades 1–6. The secondary education program leads to an initial teaching certificate for a specific subject area in grades 7–12. If you are a transfer student, see above for information on transferring into these programs.

Admission Requirements. Students interested in undergraduate teacher education programs must apply for admission to the Office of Teacher Education. Students interested in URI's early childhood, elementary, and secondary education programs must submit a portfolio and sit for an interview as part of the admission process. Please visit [uri.edu/hss/education](http://uri.edu/hss/education) for additional information.

Applications for admission to teacher education programs are normally submitted during the sophomore year. Applications will be reviewed by a departmental screening committee based on the following criteria: 1) recommendations from faculty and others who have knowledge of the candidate's experience or interest in working in education; 2) a writing sample expressing career goals, experience in working with children, and expectations as a teacher; 3) passing scores on admissions tests based on Rhode Island Program Approval process, subject to change by the Department of Education (See School of Education website for updated information.); 4) the student's academic record, including a cumulative grade point average of 2.50 or better. In addition, for the secondary education and music education programs, a grade point average of 2.50 or better in the Arts and Sciences major or specialization is required. Students applying to the early childhood education program must attain a C or better in HDF 203 or equivalent for acceptance into the program.

Students should consult with the elementary or HDF advisor at University College, the Office of Teacher Education, or the HSS advisor at the Providence Campus.

Program Requirements. For courses required for early childhood education, see Human Development and Family Studies. For more information, see Teacher Education Programs. For graduate teacher education programs, see the Graduate Programs section.

Undergraduate students who are admitted to the elementary education program are required to compete a bachelor's degree. In addition, students must complete a second major or degree, which may be chosen from the list of undergraduate university majors and degrees. Students choosing a second major/degree in the College of Arts and Sciences must also fulfill the basic liberal studies requirements of the College of Arts and Sciences. The basic liberal studies requirements may overlap but cannot replace the general education requirements of the college where the second major/degree resides.

The professional sequence courses required for elementary education are EDC 102, 250, 312, 402, 423, 424, 452, 453, 454, 455, 456, 457, 458, 459, and 460. These courses are taken prior to student teaching. EDC 484 and 485 make up the student

teaching experience. The following are also required and can be taken as part of the basic liberal studies requirements: COM 100; HIS 141 or 142; PSY 113, 232; WRT 104. Students should contact the School of Education for more details.

Students seeking to teach in a middle school must obtain a middle level certificate extension and be eligible for elementary or secondary certification. The professional sequence of courses required for middle level certificate extension is EDC 400, EDC 415 or an approved adolescent development course, and a practicum. These courses should be taken prior to student teaching. EDC 484 and 485 make up the student teaching semester. Teacher candidates seeking a middle level certificate extension are required to teach in a middle school in addition to their elementary or secondary experience. In addition, 21–30 credits in one of the following content areas is required: English/language arts, mathematics, science, social studies, or foreign language. Final projects for each course must be uploaded into the electronic portfolio along with a self-reflection prior to the end of each course. Admission to the middle level certificate extension program is contingent upon acceptance to the elementary or secondary education program. Prior to student teaching, candidates must successfully meet the standards for EDC 400 and the pre-student teaching review, which includes review of all required courses and efolio tasks by the secondary and elementary teams and the Office of Teacher Education. Elementary education students should see a middle level advisor for specific course requirements.

The education courses required for secondary education are EDC 102, 250, 312, 331, 332, 371, 402, 415, 430, 431, and 448. These courses are taken prior to student teaching. EDC 484 and 485 make up the student teaching semester. PSY 113 is also required. Students in secondary education are required to take a pedagogy and content area exam in their area of certification.

Students pursuing a program in secondary education normally obtain a B.A. degree, double majoring in education and their content area specialization, although a B.S. degree is available in some content areas. Secondary education programs are offered in biology, chemistry, English, general science, history, mathematics, world languages (Chinese, French, German, Italian, Latin, Spanish), physics, and social studies.

Students in all programs must maintain minimum grade point averages of 2.50 overall, 2.50 in their education major, and 2.50 in their academic major area. To be eligible for student teaching, students must earn a grade of at least a C in EDC 430 and 448 (secondary); EDC 424, 425, 452, 453, 455, 456, 457, 458, and 460 (elementary); HDF 203, 301, 303, EDC 424, 426, and 429 (early childhood). Failure to maintain these grades and/or averages will result in “program probation,” a one-semester period during which students have the opportunity to earn acceptable grades but may not student teach. Failure to return grade averages to acceptable standing after one semester leads to dismissal from the program.

Students in the School of Education, graduate and undergraduate certification and licensure programs will be required to take and pass a content area exam(s) in their area of certification and any other exam required for state licensure prior to student teaching or final internship. Contact the Office of Teacher Education for the “passing” scores required for each discipline.

The major in elementary education requires a minimum of 120 credits; secondary education requires 120 credits. The School of Education has designated EDC 485 as its capstone course.

## Health Studies

The interdisciplinary curriculum in health studies leads to a Bachelor of Science degree. The major is designed to prepare students for nonclinical careers in public health, health promotion, health services management, for-profit companies, not-for-profit organizations, and community health agencies.

Students seeking admission to this program must have completed 24 credits and have a minimum GPA of 2.00.

Program Requirements. Students are required to complete the following core curriculum (120 credits):

- 1) The following courses must be taken as part of the general education requirements: BIO 105; CHM 100 or 103; COM 100; MTH 107, 108, 131, 141; PHL 101 or 103 or 212; PSY 113; and WRT 104 or 106.
- 2) 28 credits of core courses including COM 202, 208, 210, or 251; HLT 200, 450; KIN 123; KIN/BIO 122; PHL 314; PHP 405; and STA 307 or PSY 200.
- 3) 18-24 credits (6 courses) from one of the following specializations: global and environmental health; health promotion; or health services.
- 4) 25-31 credits of free electives.

Students select a specialization in one of the following three areas:

**Global and Environmental Health.** This specialization prepares students to address health problems and concerns that transcend national boundaries. The goals of the curriculum are to foster critical thinking about world health problems and disparities; examine biological, social, economic, political, and environmental factors that influence global health problems; develop practical strategies and sustainable international partnerships to address major global health and environmental challenges; and inspire a commitment to real world change. Students select six courses from the following list. At least four courses must be at the 300 or 400 level. Courses must be selected from at least three different disciplines/departments: APG 319; BIO/ENT 286; BPS 201, 202; COM/SUS 315; GCH 104; GWS 325; HPR 319; NRS 100, 411; NRS/CPL 300; NUR/PHP 114; NUR 160; PHL 454; PHP/NUR 143; PSC 113, 402, 403.

**Health Promotion.** This specialization is designed to prepare students for careers in fields whose primary emphasis is on facilitating individual, family, group, worksite, and community behavior change to promote healthy lifestyles and behaviors (e.g., increase exercise, cease smoking, manage stress). It also aims to improve life quality via the prevention and improved management of chronic illness and to help increase the length of life by reducing disease and increasing health-promoting behaviors. Students select six courses from the following list. At least four courses must be at the 300 or 400 level. Courses must be selected from at least three different disciplines/departments: BPS 201, 202; GWS 350, 351; HDF 201, 310, 312, 314, 357, 450; KIN 275, 325, 401, 425; NFS 207, 276, 360, 394, 395; PSY 255, 381, 460, 479.

Health Services. This specialization equips students with a range of skills necessary for careers in the health care industry, with an emphasis on preparing students for roles within the health care workforce of tomorrow that do not involve direct patient care. Graduates will: 1) possess foundational knowledge of human health and disease; 2) gain an awareness of and appreciation for how the current health systems serve those in need; 3) understand economic principles and forces that influence the efficiency of health care service delivery and administration; and 4) be capable of effectively communicating within organizations and with other stakeholders, orally and in written form. Students select six courses from the following list. At least four courses must be at the 300 or 400 level. Courses must be selected from at least three different disciplines/departments: BPS 201, 202; BUS 341, 342; COM 351, 361, 402, 450, 461; ECN 201, 360; HSA 360; PSY 255; SOC 224; WRT 306.

## Human Development and Family Studies

The curriculum in human development and family studies (HDF) leads to a Bachelor of Science degree. The department also offers certification programs in early childhood teacher education and family life education. HDF also offers a Master of Science degree with the following concentrations: College Student Personnel, Marriage and Family Therapy, and Human Development and Family Studies. The Master of Science program is described in the Graduate Program section of this catalog.

The undergraduate B.S. curriculum provides a general background for work with children, families, and adults. Most professions in human development and family studies require academic work beyond the bachelor's degree for continuing professional work and advancement. Individuals with a baccalaureate degree are employed, however, as professionals in preschools, early intervention programs, child care centers, senior centers, health institutions and hospitals, and in recreational, child guidance, casework, and other community agencies. Students completing family finance courses are employed in agencies providing family financial and credit counseling services.

Program student learning objectives: Graduates of the program in human development and family studies will acquire and utilize knowledge and skills necessary for a professional position or graduate/professional training in the human development and family studies field; use acquired knowledge, research skills, and creativity to identify and solve complex human science problems; communicate clearly and effectively using a variety of methods; and acquire knowledge and practice regarding the ethical principles and best practices in human development and family studies discipline. A more detailed description of the student learning objectives can be found at the HDF program website: [uri.edu/hss/hdf](http://uri.edu/hss/hdf).

Admission Requirements. Students seeking admission to this bachelor's degree program must complete the following courses with an overall grade point average of 2.00 or better prior to acceptance for admission: HDF 200 or 201, PSY 113, any 100 or 200-level sociology course, and three general education credits in mathematics.

Program Requirements. Students are required to complete the following core curriculum:

- 1) a one-credit personal and career development course, HDF 180;
- 2) 15 credits of core courses including HDF 200, 201, 202, 205, and 230;
- 3) any two early field experience courses—courses include HDF 203, 306, 310 and 311, 312, 314;
- 4) six to 12 credits of senior-level field experience chosen from the following options: HDF 480/481; HDF 477/478; EDC 484/485 (early childhood education students only); HDF 497; or the OIEE Internship Program (see Center for Career and Experiential Education).

Additionally, students are required to complete a 12-credit concentration in one of the following three areas:

Professional Content for Child Settings: any 12 credits—HDF 301, 302, 305, 357, 400, 420, 430, 432, 434, 455. HDF 203, 306, and 310/311 may also count if not used for an early field experience.

Professional Content for Family and Community Settings: any 12 credits—HDF 357, 418, 421, 428, 430, 431, 432, 433, 434, 437, 440. HDF 301/311, 312, and 314 may also count if not used for an early field experience.

Family Finance: any 12 credits HDF 225, 418, 424, 428, 434.

To enhance their concentrations, students must also complete 12 credits of professional electives including HDF 450. Professional electives must be approved in consultation with an advisor, and nine of the 12 credits must be at the 300 level or above. Field experience does not meet this requirement.

Students must have from 19 to 31 credits of free electives to reach the 120-credit B.S. degree requirements. For information on transferring into this program, see "Transfer Students" earlier in this section.

Minor in Family Financial Counseling and Planning. Students outside the Department of Human Development and Family Studies may declare a minor in family finance by completing 18 credits as follows: HDF 205, 225, 418, 424, 434, 450. The overall URI minimum requirements for a minor apply (see Minor Fields of Study)."

Early Childhood Education. Required courses in the HDF and EDC programs meet the curricular requirements for the Early Childhood Education Teacher Certificate (Preschool through Grade 2) for beginning teachers set by Rhode Island's Department of Education. Students must apply to the Early Childhood Education program through the Office of Teacher Education. See [uri.edu/catalog/education](http://uri.edu/catalog/education) for admission requirements, certification in other states, and other information regarding teacher education.

Students apply to the program in the fall of sophomore year. The application process includes an admission portfolio and interview with program faculty in the spring. The portfolio demonstrates candidates' interpersonal and communication skills, academic knowledge base, work experience and community service with children, and multicultural/diversity awareness. Early consultation with an HDF advisor is important for timely degree completion.

Application requirements/program prerequisites: Pass the Praxis I entrance exam; sophomore standing; completion of HDF 200 or PSY 232, EDC 102, and EDC 250; completion of HDF 203 or concurrent enrollment.

Curriculum requirements for the Early Childhood Education (ECE) program result in a B.S. in Human Development and Family Studies. The courses required include General Education requirements and Core Experiences: HDF200, 201, 202, 205, and 230; Professional Content: EDC 102, 250, 312; HDF 203, 305, 357; Early Childhood Education Certificate Courses: HDF 301, 303, 420, 455; EDC 402, 424, 426 and 350; Senior Field Work experience (Student Teaching): EDC 484 and 485.

To be eligible for student teaching, students must maintain a grade point average of 2.50 overall; 2.50 in the major; and, attain a grade of at least C in HDF 203, 301, 303, 305, 420, 455; EDC 102, 250, 312, 402, 424, and 426. In addition, students must pass the state mandated Praxis II exam for Early Childhood Teacher Certification prior to student teaching.

Failure to meet these requirements will result in program probation, a onesemester period during which students have the opportunity to earn acceptable grades but may not continue on the early childhood course sequence or student teach. Failure to meet the requirements after one semester may lead to dismissal from the program.

A minimum of 120 credits are required for graduation.

## Kinesiology

This curriculum leads to a Bachelor of Science degree. The major is designed for students who plan to pursue careers in exercise science or physical and health education teacher education. The exercise science program can also be used to fulfill the prerequisites for students considering graduate degrees in health care professions. The department also offers a Master of Science degree in Kinesiology, described in the Graduate Programs section of this catalog.

The Department of Kinesiology offers up-to-date research and teaching facilities including laboratories for human

performance, metabolism, body composition, resistance training, plethysmography, bone density, health fitness, biochemistry, and youth fitness.

Students seeking admission to this program must have completed 24 credits, passed BIO 101 and have a minimum GPA of 2.0.

**Kinesiology Options.** Students are strongly advised to seek guidance from their advisor in planning their course of study and choosing a focus area.

**Exercise Science Option.** The exercise science option prepares students to analyze physical activity, exercise, and sport in a physiological context. The Exercise Science PreProfessional Track emphasizes basic sciences courses. This track is for students considering careers or graduate degrees in health care professions such as clinical exercise physiology, cardiac rehabilitation, physical therapy, and occupational therapy. The Applied Exercise Science Track promotes the understanding of the health benefits of physical activity and is designed for students interested in becoming health fitness or strength and conditioning specialists. Career opportunities exist in corporate, community, commercial and hospital-based fitness and wellness centers. The Applied Exercise Science track also prepares students for graduate study in exercise science, health fitness, health promotion, preventive medicine and related fields. Exercise science students will be prepared to become

certified as a health fitness specialist, strength and conditioning specialist, or personal trainer. Students in this option are required to have a cumulative grade point average from core exercise science courses of 2.50 or higher before completing supervised field work.

**Physical and Health Education Teacher Education Option.** This option is designed for students seeking teacher certification in physical education and health education at the elementary and secondary levels. Completion of the NCATE approved certification program fulfills the requirement for teacher certification in Rhode Island and the majority of other states. Students interested in undergraduate teacher education programs must apply for admission to URI's Office of Teacher Education. Applications for admission to teacher education programs are normally submitted during the sophomore year. A departmental screening committee reviews the applications. The committee's decision is based on the following criteria: 1) recommendations from faculty and others who have knowledge of the candidate's experience or interest in working in education; 2) a writing sample expressing career goals, experience working with children, and expectations as a teacher; 3) passing scores on the PPST (see [uri.edu/hss/education/applicants/app\\_material/New\\_admission\\_testing\\_requirements.pdf](http://uri.edu/hss/education/applicants/app_material/New_admission_testing_requirements.pdf) for passing scores); 4) interview with presentation of admission portfolio; 5) completion of at least 30 credits of coursework including KIN 270; and 6) an overall GPA of 2.50 or better and grades of C or better in KIN 270, COM 100, and WRT 104 or 106. If denied admission, students can petition the department for a decision review. Applicants who fail to gain admission should seek counsel from an appropriate advisor. Students may reapply for admission to the teacher education program but should understand that this may delay their anticipated graduation date. Students in the physical and health education teacher education program are required to have a cumulative grade point average of 2.70 or higher in KIN courses before student teaching (EDC 486/7). Students in the physical and health education teacher education certification and licensure program are required to take and pass the Praxis II: Principles of Learning and Teaching (PLT) Test, Health Education Content Knowledge Test, and the Physical Education Content Knowledge Test prior to student teaching. Contact the Office of Teacher Education for the "passing" scores required for each test. Students who do not achieve a passing score on the Praxis II exams may complete their degree in Youth Movement Sciences.

**Early Contingent Admission to URI Physical Therapy Program Option.** This advanced specialization is designed for highly qualified students who have decided on a career in physical therapy and wish to attend the URI D.P.T. program. Students successfully following this track will be allowed to apply for the URI Doctor of Physical Therapy (D.P.T.) program during their junior year. Following acceptance, credits earned the first year in the physical therapy program will be used to complete the B.S. degree in kinesiology. Students in this track must complete the following requirements to stay in this accelerated program:

- 1) complete the required course sequence and have a 3.20 or higher GPA at the completion of freshman year;
- 2) receive a minimum grade of 3.00 in BIO 121; 3) complete the required course sequence and have a 3.30 or higher GPA at the completion of sophomore year; and 4) complete the required course sequence and have a GPA of 3.40 or high-

er following the first semester of the junior year. Students applying for early contingent admission must also complete all admission requirements set by the D.P.T. program (see Physical Therapy in the Graduate Programs section of this catalog). Completion of this specialization does not guarantee admission into URI's D.P.T. program.

General. This option is designed for the student who desires a broad experience in kinesiology. It may also be used for students transferring into the department.

Degree Requirements. The following courses are required of all students in kinesiology: URI 101 (1 credit), 40 credits of general education including WRT 104 or 106; COM 100; NFS 207; and PSY 113. Core curriculum requirements (16 credits) include BIO 121, 242; KIN 300, 278, 381, and 370. A total of 120 credits is required for graduation from exercise science, early contingent physical therapy, and general options. A total of 124 credits is required for graduation from the physical and health education teacher education option. Specific requirements for the different degree options are listed below.

Teacher certification requirements include: KIN 270, 304, 305, 307, 309, 310, 314, 315, 368, 401, 410; PSY 232, 460; EDC 279, 312, 410, 485, 486/487; NFS 207; NUR 150; HDF 357; 7 credits of practicum activity including KIN 116, 117, 118, 121, 322, and 324, 3 credits of approved adaptive physical education courses. There are no free electives.

The exercise science option requires BIO 101, 103; KIN 123, 275, 278, 301, 320, 325, 390, 420, 486. The preprofessional track also requires CHM 103, 105, 124, 126; BIO 244; BCH 211; PSY 232, 235, 254, or 255; and PSY 200, STA 307 or STA

308. Additionally there are 17–18 credits of free electives. Students applying for a graduate program in physical therapy must also take the following classes as free electives: PHY 111, 185, 112, 186; and MTH 111. The applied exercise science track also requires KIN 369, 425, 125; and 2 professional electives (choose from KIN 243, 382, 414, 475, 478, 479; NFS 360; PSY 255). Any student interested in graduate education should check programs of interest for prerequisites. Free electives can be used to satisfy those prerequisites.

The early contingent physical therapy program requires that the following classes be completed during the first five semesters of study: BIO 101, 103, 121, 242, 244; CHM 103, 105, 124, 126; COM 100; KIN 123, 243, 275, 278, 300, 301, 320, 325, 370; MTH 111; PHY 111, 185, 112, 186; PSY 113 and PSY 232, 235, 254, or 255; PSY 200, STA 307 or STA 308; WRT 104 or 106; and 12 credits of general education credits. Other requirements include KIN 381, 420; NFS 207; and 6 credits of general education credits. During the 7th and 8th semesters, the first year physical therapy graduate curriculum is followed.

Requirements specific to the general option include KIN 243, 270, 275, 369, 382, 475 or 478; PSY 255; NSF 207; and HDF

357. Additionally, students must complete 18 credits in a department-approved focus area, or complete a University-approved minor. Students also complete courses to fulfill the general education requirements, and the kinesiology core courses that are common to all options in the department.

## Textile Marketing

This interdepartmental curriculum leads to a Bachelor of Science degree. It combines the professional requirements of a major in textiles with the requirements of the College of Business Administration and is designed to prepare students for wholesale and retail marketing positions in the soft goods industries (textiles, apparel, and related retailing).

Textile marketing managers are responsible for planning and directing the flow of textile products from manufacturers to consumers. The major, which provides a strong background in both soft goods industry and marketing, is designed to give students the opportunity to explore the areas of market research, consumer behavior, sourcing, supply chain management, branding, advertising, promotion, fashion, and sales.

Freshmen who complete a minimum of 27 credits with an overall grade point average of 3.00 or higher and who complete CSC 101 and MTH 131 (or their equivalents BUS 110 and 111) with a B or higher will be admitted to the College of Human Science and Services at the end of the freshman year. Students who have a minimum of 42 credits, a grade point average of 2.40 or higher, and who have successfully (with an average of 2.40 or higher) completed CSC 101, MTH 131, STA 308 (or their equivalents BUS 110, 111, 210), BUS 201, and ECN 201 after the first semester of the sophomore year will be admitted to the College of Human Science and Services. Students not meeting these requirements may be eligible to transfer to the textiles, fashion merchandising, and design program.

Students in this curriculum must take the following courses: TMD 103, 224, 303<sup>1</sup>, 313, 402, 403, 433<sup>2</sup>; one of the following: TMD 240, 440, or 441; six credits of TMD electives; BUS 201, 202, 315, 341, 365, 366, 367; CSC 101; and nine credits from BUS 360, 448, 449, 450, 465, 467 or 468; MTH 131; and STA 308. Students must also take the following courses to complete general education requirements: CHM 101/102 or 103/105; one of the following: BIO 105, MIC 190, NFS 207, 210, PHY 109/110, PHY 111/185, or PHY 112/186; and ECN 201, 202.

A total of 120 credits is required for graduation.

<sup>1</sup> Admission to the degreegranting college in the major is a prerequisite for TMD 303.

<sup>2</sup> ECN 201 and ECN 202 are prerequisites for TMD 433.

## Textiles, Fashion Merchandising, and Design

This curriculum leads to a Bachelor of Science degree. The Master of Science (M.S.) program is described in the Graduate Programs section.

The major is open to men and women with ability and professional interest in the artistic and technical aspects of the subject. Specialized programs of study prepare students for careers in the design, development, manufacture, and merchandising of textiles, apparel, and interior furnishings. Qualified students can prepare for graduate studies.

The following core courses are required: TMD 103, 126, 224, 232, 303<sup>1</sup>, 313, 402, 433<sup>2</sup>; one of the following: TMD 240, 440, or 441; ART 101, 207; ARH 120, 251, or 252; CHM 101/102 or 103/105; ECN 201 and 202; one of the following: BIO 105, MIC 190, NFS 207, 210, PHY 109/110, PHY 111/185, or PHY



112/186. Fifteen credits of TMD electives (nine credits must be upperlevel courses and no more than three credits from TMD 361, 362, or 461, 462) and 18 credits of professional electives (nine credits from any one area) are required. Students should choose TMD electives and professional electives in consultation with an academic advisor. Students must complete 24 credits with an overall 2.00 GPA and complete CHM 101 or 103, and TMD 103 and the general education mathematics requirement with a 2.00 average to transfer to the College of Human Science and Services. (The same requirements apply to students wishing to transfer into TMD from other majors.) TMD 402 is the capstone experience in this major. To complement classroom and laboratory/studio instruction, internships and study abroad are encouraged.

A total of 120 credits is required for graduation.

**Design Studies.** Students choosing this area of emphasis should select 12 credits of electives from TMD 222, 225, 226, 327, 335, 345, 346, 355, 358, 426, 427, and an additional 18 credits of professional electives<sup>3</sup> from art, business, or theatre.

**Fashion Merchandising.** Students choosing this area of emphasis should select 12 credits of electives from TMD 222, 226, 332, 424, 432, 442, 452, and an additional 18 credits of professional electives<sup>3</sup> from business and/or art.

**Historic Textiles.** Students interested in this area should take TMD 240, 426, 440, and 441, and (with a good GPA) appropriate graduatelevel courses in TMD, together with additional courses in art history and history.

**Interior Furnishings and Design.** Students choosing this area of emphasis should select TMD 226, 426, 440, and an additional 18 credits of professional electives<sup>3</sup> from art and/or business.

**Textile Science.** Students selecting this area of concentration should take TMD 113, 403, and 413 as well as additional chemistry, chemical engineering, and/or statistics courses. An internship in textile manufacturing is recommended. Participation in an exchange program may offer additional opportunities for special areas of interest. The 18 credits of professional electives<sup>3</sup> should be selected from MTH 111, 131; PHY 111 and 112 or 213 and 214; STA 308 or 412 or CSC 201; CHM 112, 114, 212, 226, 227, or 228.

**General TMD Program.** Students may structure their own programs by concentrating course work in areas such as consumer studies, public relations, journalism, or gerontology. Selection of the 15 required TMD elective credits and the 18 professional elective credits<sup>3</sup> should strengthen career goals and interests.

**Minors.** Minors generally consist of 18 credits. TMD requires 18 credits of professional electives. Students can thus readily achieve a minor by concentrating their professional electives in a single area. The overall URI requirements for a minor apply (see Minor Fields of Study). Courses particularly appropriate to TMD can be determined by consultation with TMD faculty and faculty in the relevant department.

Students with an interest in apparel design or interior design should consider a minor in art. The requirements for this minor are determined by the Art Department and consist of 18 credits of any art or art history courses, 12 credits of which must be at the 200 level or above.

Minors in other areas that complement areas of the TMD

curriculum, such as business, journalism, and public relations, may also be earned.

**Dual Degree with a "Fashion" Language.** France and Italy lead the luxury fashion market. Students enrolled in the Bachelor of Science program in Textiles, Fashion Merchandising, and Design may earn a Bachelor of Arts in either French or Italian. Students must complete the requirements for both degrees. With careful planning, no extra semesters are required. TMD students who earn a second degree in a "fashion" language are strongly encouraged to participate in a study abroad experience and/or a professional internship in France or Italy. The Office of International Education and the respective departments help students arrange semesterlong programs with affiliate universities. Students who graduate with majors in TMD and either French or Italian are well prepared to compete in the global fashion industry.

<sup>1</sup> Admission to the degreegranting college in the major is a prerequisite for TMD 303.

<sup>2</sup> Economics is a prerequisite for TMD 433.

<sup>3</sup> Courses related to the student's career goals, subject to approval by an advisor.

# Nursing

## Introduction

Mary Sullivan, Interim Dean

Patricia Burbank, Associate Dean for Academic Affairs

Jessica Boisclair, Assistant Dean

The College of Nursing offers a curriculum leading to the Bachelor of Science (B.S.) degree. The college also offers the

Master of Science (M.S.), Doctor of Nursing Practice (D.N.P.), and Doctor of Philosophy (Ph.D.) degrees. For more information, visit [uri.edu/nursing](http://uri.edu/nursing) or call 401.874.2766.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive.

Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

## Faculty

Professors Burbank, Dufault, Ferszt, SchwartzBarcott, and M. Sullivan; Associate Professors Coppa, Curtin, Hames, and Martins; Assistant Professors EricksonOwens and Hawes; Instructor Misto; Associate Clinical Professors DoyleMoss, Lavin, Palm, and Stout; Assistant Clinical Professors Basley, Carley, Cloud, Dassie, Dugas, Fuvich, McGrane, and Paquette; Professor Emerita Joseph; Associate Professors Emeritae Feather, GodfreyBrown, Miller, Viau, and Yeaw; Clinical Professor Emerita Mercer; Assistant Clinical Professor Emerita Evans.

## The Program

URI's baccalaureate program is designed to prepare students with academic and personal potential to become professional nurses. It aims to develop mature, well-informed graduates who will meet the challenges of health care delivery and continued learning.

Nursing is a creative activity that provides human services for the promotion of health, prevention of illness, and care of the ill. It is interdependent with all other disciplines concerned with health. Nursing knowledge is viewed as a unique synthesis drawn from the humanities and the natural, biomedical, and social sciences. Students use a systems perspective as a conceptual base to nursing. This conceptual approach to nursing incorporates the whole person and his or her environment with the nursing process. Our nursing curriculum enhances students' ability to function professionally in community and home care settings with diverse populations.

Clinical practicums include experience in numerous community agencies, schools, nursing homes, ambulatory care facilities, and hospitals throughout Rhode Island.

There are three routes to admission to the college's baccalaureate program:

1) Students with no previous college study are admitted to University College for Academic Success with a major in nursing. After completion of 30–40 credits (which must include required foundation courses) with a minimum 3.00

overall grade point average and a 2.20 grade point average in the foundation courses, they will be considered for admission to NUR 203 and transfer into the College of Nursing. Seats are limited and competitively granted based on GPA, which must be minimally a

3.00 for consideration. Please see the College of Nursing's Academic Policies for a full description of the entry process:

[web.uri.edu/nursing/studentresource/#policies](http://web.uri.edu/nursing/studentresource/#policies)

2) Students with college study in another major or nursing study in another baccalaureate program and a minimum of 45 completed credits, if accepted by the University, may be admitted directly into the College of Nursing. To enroll in clinical nursing courses, transfer students must acquire a URI-based grade point average of 3.00 or higher and 2.20 in the foundation courses. Admission to NUR 203 is competitive based on GPA, which must be minimally a 3.00. Grades from courses taken at the other institution are not included in the student's grade point average. Students who transfer from another college or university are admitted into clinical nursing courses on a space-available basis, usually in the spring semester.

Because the number of students accepted into clinical courses is limited, transfer students are advised to contact the assistant dean before applying for admission to be sure of placement in a specific course.

3) Registered nurse students who have completed diploma or associate degree nursing programs are not required to submit scholastic aptitude scores when seeking admission. As adult students who have developed competence in basic subject areas, they may demonstrate their mastery by obtaining Registered Nurse (R.N.) Licensure in Rhode Island and either a diploma or an associate degree in nursing with a minimum GPA of 2.6.

R.N. – B.S. students are required to take 18 credits of nursing courses as follows: NUR 246, 253, 346, 443, 444, and 503, or 446 (with permission of instructor). A total of 120 credits is required for R.N.s to earn the B.S. degree. Thirty of those credits must be earned at URI. All accepted R.N.B.S. students will have individualized program plans created by the R.N.B.S. coordinator.

R.N.-B.S. students must have an active Rhode Island nursing license and malpractice insurance. Once admitted, a criminal background check and up-to-date health records will be required.

R.N.-B.S. students with a baccalaureate or master's degree in another field, may be eligible for the M.S. program in nursing. Records will be individually evaluated to determine if the candidate must complete any undergraduate course work before starting the M.S. program.

The usual time for completion of all requirements for students with no previous college or nursing study is eight semesters. All students in the College of Nursing meet all the general education requirements of the University.

Students are expected to achieve a C or better in all NUR courses and a C in all foundation courses, and to maintain a minimum GPA of 2.20 in order to progress in the College of Nursing. Students who receive a C– or lower in any two NUR courses will be dismissed from the College of Nursing.

If a student receives a C– or less in a single NUR course, s/he may petition, in writing, the Scholastic Standing Committee to retake the course. Permission to retake the course will be granted on a spaceavailable basis only. Even if successfully repeated, the C– remains on record as the first unsuccessful at-tempt referred to in this dismissal policy. There are no further allowances for repeating a NUR course, and any subsequent NUR coursework of C– or below will result in dismissal. However, if the student should achieve a C– or less in two NUR courses in a single semester, s/he will be dismissed from the College of Nursing.

The faculty reserves the right to require withdrawal from the college of a student who gives evidence academically and/or personally of inability to carry out professional responsibility in nursing. Students are limited to 18 credits per semester except by permission of the dean for special program adjustments or when participating in the Honors Program.

General expenses are approximately the same as for other University students. Nursing students pay a professional fee which covers special items such as academic achievement testing, and lab fees for each clinical course. The use of an automobile

or funds to meet public transportation costs is required for the clinical experiences. Students must maintain car insurance as required by state law.

The program is approved by the Commission on Collegiate Nursing Education and the Rhode Island Board of Nurse Registration and Nursing Education. The graduate is eligible for examination for professional licensure as a registered nurse (R.N.).

Students will be required to have criminal background checks in accordance with the law and with clinical and agency requirements. Updated health requirements and CPR certification are mandated throughout the clinical courses. Students will not be allowed in clinical courses without the completion of these requirements.

## Curriculum Requirements

Foundation Courses. The following are required before transfer from University College for Academic Success: CHM 103 (3), 124 (3); NUR 100 (3); BIO 121 (4), 242 (3), 244 (1); MIC 201; one writing (Cw) course (3), URI 101 (1).

The following are prerequisites for some nursing courses, and therefore are recommended during the first three semesters: NFS 207 (3); MIC 201 (4); STA 220 (3) or PSY 200 (4).

An example of the curriculum plan follows. (Individual programs may vary.)

### *Freshman Year First semester: 14 credits*

BIO 121 Human Anatomy (4)

CHM 103 Introductory Chemistry Lecture (3) URI 101 Freshman Seminar (1)

General Education requirement (Cw) (3) General Education course (3)

### *Second semester: 16 credits*

BIO 242 Human Physiology (3)

BIO 244 Human Physiology Laboratory (1)

CHM 124 Introduction to Organic Chemistry (3)

NUR 100 Foundations of Professional Practice (3) General Education requirement © (3)

General Education course (3)

### *Summer Session*

36 General Education or free elective credits may be taken to reduce junior year requirements

### *Sophomore Year First semester: 16 credits*

MIC 201 Introductory Medical Microbiology (4) NFS 207 General Nutrition (3)

NUR 203 Comprehensive Health Assessment (3)

STA 220 Statistics in Modern Society (or PSY 200 Quantitative Methods in Psychology) (3/4) General Education course (3)

### *Second semester: 15 credits*

NUR 213 Pathophysiology (3)

NUR 233 Foundations of Nursing Practice with Older Adults (3)

NUR 234 Practicum in Foundations of Nursing with Older Adults (3)

NUR 253 Nursing Research (3)

General Education course (3)

### *Junior Year First semester: 15 credits*

NUR 323 MedicalSurgical Nursing (6)

NUR 324 Practicum in Medical-Surgical Nursing (3)

BPS 333 Nursing Pharmacology (3)

General Education Course (3)

### *Second semester: 15 credits*

NUR 333 PsychiatricMental Health Nursing (3)

NUR 334 Practicum in PsychiatricMental Health Nursing (3)

NUR 343 Nursing in Childbearing and Reproductive Health (3)

NUR 344 Practicum in Childbearing and Reproductive Health Nursing (3) General Education course (3)

### *Senior Year First semester: 15 credits*

NUR 433 Nursing of Children (3)

NUR 434 Practicum in Nursing of Children (3)

NUR 443 Community Health Nursing (3)

NUR 444 Practicum in Community Health Nursing (3) General Education course (3)

*Second semester: 15 credits*

NUR 463 Advanced MedicalSurgical Nursing (3)

NUR 464 Practicum in Advanced MedicalSurgical Nursing (3)

NUR 474 Leadership in Professional Nursing [capstone] (3)

General Education courses (6)

Required Nursing Courses. The following 60 credits are required: NUR 100, 203, 213, 233, 234, 253, 323 (6 credits), 324, 333, 334, 343, 344, 433, 434, 443, 444, 463, 464, and 474. Students must achieve a C (73%) or better in each NUR course and maintain an overall GPA of 2.20 in order to progress in the NUR courses. Students who achieve a C– or below in any two NUR courses will be dismissed from the College of Nursing.

General Education Requirements and Electives. The general education requirements must be completed (six credits in each division and three in math) with the exception that one of the following divisions may be reduced by three credits: fine arts and literature (A), letters (L), or foreign language and culture (F).

Six credits of free electives are required. A total of 121 credits is required for graduation.

Minor in Thanatology. For information on this interdisciplinary minor dealing with loss, death, and grief, see thanatology in "Interdepartmental Minors."

## Pharmacy

### Introduction

E. Paul Larrat, Interim Dean

Brian J. Quilliam, Associate Dean

Bongsup P. Cho, Associate Dean

Entering freshmen are admitted to URI's sixyear entrylevel Doctor of Pharmacy (Pharm.D.) degree or the 4year Bachelor of Science in Pharmaceutical Sciences (B.S.P.S.) degree. The college also awards two graduate degrees: the Master of Science (M.S.) and the Doctor of Philosophy (Ph.D.) in pharmaceutical sciences, offered by both departments, Biomedical and Pharmaceutical Sciences and Pharmacy Practice.

For more information, visit [uri.edu/pharmacy](http://uri.edu/pharmacy) or call 401.874.2761.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect Universityapproved curricular and course information.

### Faculty

Biomedical and Pharmaceutical Sciences: Professor Yan, chairperson. Professors Akhlaghi, Chichester, Cho, Kislalioglu, Rosenbaum, Rowley, Shaikh, and Zawia; Associate Professors Deng, King, Kovoor, Seeram, and Slitt; Assistant Professors Dong, Li, Lu, Trzoss and Worthen; Professors Emeriti Lausier, Needham, Rodgers, Shimizu, Swonger, and Zia.

Pharmacy Practice: Professor Barbour, chairperson. Professors Dufresne, Hume, Kogut, Larrat, Owens, and Willey; Clinical Professors Bratberg, MacDonnell, and Taveira; Associate Professors Cohen, Goren, LaPlante, and Quilliam; Clinical Associate Professors Charpentier, Estus, Feret, Marcoux, Matson, Orr, Pawasaukas, and Ward; Associate Research Professor Goldstein; Assistant Professor Caffrey; Clinical Assistant Professors Asal, Eisenhower, Jackson, Lemay, and Thomas; Clinical Instructor DeAngelisChichester.

### Admission Requirements

Each admission candidate is given individual consideration. However, a minimum of 18 units of college (secondary school) preparatory work are expected:

4 in English

3 in algebra and plane geometry

2 in a physical or natural science

2 in history or social science

2 in the same foreign language

5 additional units to total 18

Successful candidates typically have high grades in science and mathematics, do well in SATs or ACTs, and often have earned advanced placement or college credit while in high school.

## Doctor of Pharmacy (Pharm.D.)

The sixyear Doctor of Pharmacy curriculum is patterned on accepted programs of study recommended by the American Association of Colleges of Pharmacy, the Accreditation Council for Pharmacy Education, and other interested organizations. The Doctor of Pharmacy is accredited by the Accreditation Council for Pharmacy Education (135 S. LaSalle Street, Suite 4100, Chicago, Illinois, 60603; <https://acpeaccredit.org/>).

Medication therapy management is the responsible provision of drug therapy to achieve specific outcomes that improve a patient's quality of life. A pharmacist, in cooperation with a patient and other healthcare professionals, designs, implements, and monitors a plan of care that will produce desired patient outcomes. A key element in medication therapy management is that the pharmacist accepts personal responsibility in achieving the desired outcomes. In learning to provide medication therapy management, pharmacy students must exhibit the highest level of ethical behavior and moral values in all of their decisionmaking, as well as in their actions both in and outside of the college. Furthermore, students must acknowledge that the profession and medication therapy management are based foremost on caring, trust, and communication for the benefit of patients and society in general. All students must be committed to maintaining these standards, to fostering the professional development of other pharmacy students, and to responding appropriately when the ethical and moral standards of the profession have been breached.

Graduates of our program have a strong record of passing the national licensing examination (NAPLEX). Over the past 5 years, the passage rates have ranged from 95–100% for graduates who are taking the NAPLEX exam for the first time. The Pharm.D. program provides preparation for community, institutional and other areas of pharmacy practice. Students have the opportunity to take professional electives that will advance their knowledge in different areas of pharmacy, including hospital, clinical, manufacturing, managed care, natural products, drug analysis, special populations (e.g. pediatrics), administration, and research.

A recent survey of graduates (AACCP) indicates that 62% work in a community practice setting, while 10% work in hospitals. Others are pursuing advanced training in residencies (20%) and graduate studies (6%). Job responsibilities vary from staff pharmacists, manager, clinical specialist, consultant, executive, to professor. Ninety-nine percent of graduates indicate that they would select the URI College of Pharmacy if they were starting their pharmacy programs over again.

### Technical Standards

Technical Standards. In addition to the academic requirements for admission, applicants must also meet the technical standards that the college deems essential for training and practice in the profession of pharmacy. Upon admission, students in the Pharm.D. program will affirm that they have reviewed the technical standards and further acknowledge that they are capable of meeting the program's technical standards with or without accommodations. Students who have concerns about their ability to meet these standards should contact the associate dean of the college. When requested,

the college will provide reasonable accommodation to otherwise qualified students with disabilities. Disabled students must work with and be approved by URI's Disability Services for Students.

These functions include, but are not limited to:

**Observation:** A candidate with or without accommodations must be able to observe demonstrations and experiments in the basic sciences. A candidate must be able to observe a patient accurately at a distance and close at hand. The candidate must be able to visually observe and interpret presented information. This will necessitate the functional use of vision, hearing, and somatic senses.

**Communication:** A candidate with or without accommodations must be able to communicate effectively and sensitively with patients, caregivers, faculty/staff, and all members of the healthcare team. The focus of this communication is to elicit information, describe changes in mood, activity, and posture, and perceive nonverbal communication. An applicant must be able to communicate effectively and efficiently in oral and written English.

**Sensory/Motor:** The candidate with or without accommodations must have sufficient motor function and skills necessary to perform basic tasks in the practice of pharmacy. Examples of such tasks may include the compounding of medicinals, physical assessment, the administration of drugs, and the provision of basic cardiac life support. Such actions require the coordination of both gross and fine muscular movements, equilibrium, and functional use of the senses.

**Intellectual:** A candidate must have the ability to measure, calculate, reason, analyze, synthesize, and integrate information that is essential to fully develop these skills. A candidate must be fully alert and attentive at all times in clinical settings.

**Behavioral/Social:** A candidate must be of sufficient emotional health to utilize fully his or her intellectual abilities, the exercise of good judgment, and the prompt completion of all patient care responsibilities. A candidate must possess the ability to develop mature, sensitive, and effective relationships with patients. A candidate must be able to tolerate physically and emotionally taxing workloads and to function effectively under stress. A candidate must be able to adapt to changing environments, to display flexibility and learn to function in the face of uncertainties inherent in the clinical problems of many patients. A candidate must possess compassion, integrity, interpersonal skills, and motivation to excel in pharmacy practice.

**Health:** Certain illnesses impair a student's performance. These include, but are not limited to, active drug and/or alcohol addiction, severe depression, and other psychiatric illnesses. It is not permissible for students to interact with patients while impaired by these conditions. It is the policy of the College of Pharmacy to encourage recognition of these conditions and to support treatment so that the student may resume his or her studies in the college.

The term "candidate" means candidates for admission into the Pharm.D. program and students enrolled in the Pharm.D. program who are candidates for promotion and graduation.

## Selection Factors

**Selection Factors:** Due to the large number of applications received for a limited number of spaces, admission to URI's College of Pharmacy is highly selective. The Admission Office carefully evaluates each candidate's strength in the following areas:

High School Transcript including the rigor of the high school curriculum and academic performance.

Standardized Test Scores (only SAT or ACT results are reviewed).

Personal Essay (including an additional paragraph required of all Pharmacy applicants—details are available on the application).

Letters of Recommendation (two letters are required: one from a science or math teacher and one from a guidance counselor or a teacher from another subject area). These letters of recommendation should comment on your personal motivation, initiative and interpersonal skills.

Extracurricular Activities (including employment experiences) and unique talents.

Pharmacy applicants are strongly encouraged to submit all of their application materials by the Early Action deadline. The Admission Committee makes every effort to notify pharmacy applicants of their admission status by January 31.

## Professional Standards of Behavior

**Professional Standards of Behavior For Pharm.D. Students.** The College of Pharmacy demands that its students adhere to the highest standards of professional behavior. Specific requirements include the following:

**Pledge of Professionalism:** The College of Pharmacy expects all Pharm.D. students to sign a pledge of professionalism when they enter the professional program.

**Honesty and Academic Integrity:** Students are expected to abide by the University of Rhode Island's Community Standards of Behavior as outlined in the University of Rhode Island Student Handbook. Pharmacy students are expected to adhere to the highest standard of academic integrity in both the preprofessional and professional programs. Any evidence of cheating or plagiarism may be grounds for dismissal from the program (see URI Student Handbook for definitions of cheating and plagiarism).

**Ethical Values:** Students must demonstrate the highest level of professional demeanor and behavior, and must perform in an ethical manner in all dealings with peers, faculty, staff, preceptors, and patients.

Alleged violations of professional standards of behavior will be evaluated by the college's Professional Conduct Committee in coordination with the Office of Student and Academic Affairs. Students who violate these standards of behavior may be given a reprimand, placed on probation, suspended for a period of time, required to acquire professional evaluation and counseling or other medical care, required to complete community service, or dismissed from the program. Incidents including, but not limited to, academic dishonesty, violation of HIPPA or privacy regulations, chemical impairment, violation of state and federal laws, sexual harassment, may delay or

permanently prohibit progression in the Pharm.D. curriculum and may result in dismissal from the program.

## Requirements for Progression to the Professional Program

Requirements for Progression to the Professional Program. Pharm.D. students must request transfer from University College to the College of Pharmacy at the end of three semesters. During their sophomore year, all students are required to have a formal interview. The student's progression to the professional program will be contingent upon a successful interview. The interview is designed to assess students' commitment to the profession of pharmacy, knowledge of the profession, and ability to communicate with patients.

After three semesters, only those pharmacy students having a 2.50 grade point average or better in 11 of the 15 required preprofessional courses (BCH 311; BIO 101, 121, 242, and 244; CHM 101, 102, 112, 114, 226, 227, and 228; MIC 201; MTH

131; and STA 307) with no grade less than C- in any of these courses, and an overall grade point average of 2.00, will be admitted at this time, provided they have successfully completed the interview. Successful candidates must maintain a grade point average of 2.50 in the remaining four prerequisite courses. Students who lose their seat at the end of three semesters will be considered for admission on a competitive basis along with other URI undergraduate students and transfer students from other institutions at the end of four semesters. Applicants with a grade point average of less than 2.50 for the designated preprofessional courses will not be considered for admission to the college. For purposes of admission among transfer students (both internal and external), all of the preprofessional courses listed above (or equivalent courses) must be completed. All applicants must have a 2.50 in these courses, and successful candidates will be competitively selected from

the applicant pool. They must also successfully complete a formal interview. In addition, all students must complete WRT 106, ECN 201, COM 100, and PHL 212 as a specific component of their general education prior to admission to the professional curriculum. PCAT exams, work experience, and letters of recommendation are required for all transfer applicants. Please note that it is a competitive program and seats are limited. For a more detailed description of these requirements, see the Admission website.

Beginning in the professional curriculum third year (P1) students must have their own laptop computer for use in the classroom. There are lease and purchase options at the University Bookstore for interested students.

Unless otherwise indicated, courses offered by the college are restricted to pharmacy majors.

## Retention and Graduation Requirements

Retention and Graduation Requirements. Starting with the first professional year (P1), the College of Pharmacy calculates a Quality Point Average (QPA) for all students, which differs from students' GPA calculated by the University. The QPA calculated by the College includes only required didactic pharmacy courses. Students must earn a minimum QPA of 2.30 in

all required didactic professional courses in order to qualify for graduation in the Pharm.D. program. Students can repeat up to

6 credits per semester, up to a maximum of fifteen credits of pharmacy courses, in which they received a C or less, in order to achieve the 2.30 QPA graduation requirement. Students who have reached the 15 credit maximum repeats without achieving the 2.30 QPA required for graduation will be dismissed from the program.

A student who receives any grade of less than a C in any required didactic pharmacy course or whose cumulative QPA in professional courses falls between 2.20 and 2.30 at the end of any semester will be reviewed by the scholastic standing committee and presented with a remediation plan that must be successfully completed to progress in the curriculum. Remediation plans may include repeating courses, additional selfstudy and faculty assessment of proficiency through assignments and examinations. Remediation plans will be developed by the scholastic standing committee taking into account the student's QPA, length enrolled in the professional program (i.e. P1, P2 or P3 professional years), the number and types of deficiencies and trends in academic performance.

The student whose cumulative QPA in professional courses falls below a 2.20 at the end of any semester may be dismissed from the program. Students subject to dismissal for failing to meet retention requirements shall have the right to appeal to the Associate Dean of Student and Academic Affairs of the College of Pharmacy within five days of the date of notice. The appeal will be reviewed by the College of Pharmacy's Scholastic Standing Committee that shall confirm the dismissal or continue the student on probation. The decision of the scholastic standing committee shall be final.

Students will not be allowed to proceed into Advanced Pharmacy Practice Experiences (APPE) without at least a 2.30 QPA in required professional pharmacy courses. Students must earn a C or better for any APPE rotation.

Professional and/or legal exigencies arise from time to time which may necessitate changes in a pharmacy course, progression, and/or graduation requirements. Students should review their status with academic advisors on a timely basis and refer to current publications for updated information.

Students in certain other New England states may enroll in pharmacy at a discounted tuition rate (see New England Regional Student Program: <http://www.uri.edu/admission/newenglandprog.html>).

## Six-year Entry Level Pharm.D. Curriculum Requirements

Sixyear Entry Level Pharm.D. Curriculum Requirements. A total of 203 credits is required for graduation. Proficiency in American Red Cross standard first aid, community CPR, and physical assessment (PHP 900) is also expected of each student prior to initiating advanced pharmacy practice experiences.

Experiential Rotations. Introductory and advanced pharmacy practice experiential rotations may be scheduled at a distance from the Kingston campus. These rotations contribute importantly to the depth and breadth of the experiential program. While the college makes every effort to accommodate student requests regarding rotations, students should anticipate hav-

ing some rotations assigned at a distance. For these rotations, students are responsible for their costs of transportation and housing if needed.

**Criminal Background Checks.** All students must undergo a criminal background check annually during the professional (P1 to P4) years of the program. The criminal background check must be completed prior to the fall semester of each professional year and before any Introductory Pharmacy Practice Experience (IPPE) is initiated. Many hospitals, clinical facilities, and other professional sites that participate in both the IPPE and advanced pharmacy practice experience (APPE) programs require certification that students have a clear criminal record (or a criminal record which, due to the timing or nature of the criminal behavior, or the relevant circumstances, does not, in the judgment of the site preclude the student's participation in the practicum experience at their site) prior to initiating pharmacy practice experiences. Students with criminal records, therefore, should be aware that their criminal record may preclude their participation in clinical experiences at some sites, and as a result, their progression to meet the degree requirements may be impeded.

**Drug Testing.** Many hospitals, clinical facilities, and other professional sites that participate in both the introductory practice experiences (IPPE) and advanced practice experiences (APPE) require students to undergo a drug test. Students who test positive for an illegal drug will be denied positions at these sites. As a result, their progression to meet the degree requirements will be impeded.

**Intern License Requirement.** Registration as an intern pharmacist is a requirement of the program; therefore all students in the professional PharmD program must hold a valid Rhode Island intern license when they enter the fall semester of their first professional year and before any Introductory Pharmacy Practice Experience (IPPE) is initiated. The Rhode Island intern license must be maintained throughout the professional program (P1 to P4 years). Students completing IPPE or APPE experiences in other states must obtain an intern license through the board of pharmacy of the state(s) in which they have those practice experiences. Intern licensure in Massachusetts is recommended for all students, but not required.

To be eligible for an intern license, students must be currently enrolled in a pharmacy program. Intern licenses must be returned to the board if a student withdraws or takes a leave of absence from the college.

Applications for an intern license also normally require the applicant to disclose, and provide an explanation of, any criminal conviction (or any plea or other form of admission or acceptance of responsibility for criminal conduct, including driving under the influence), as well as any state disciplinary action involving or affecting the applicant's license to practice, any other pending state charges or investigations relating to the applicant, and any adverse proceeding or action relating to the applicant's membership in a professional society.

## Pre-Professional Curriculum

*First Year First semester: 15 credits*

CHM 101 (3), 102 (1); COM 100 or WRT 106 (3); BIO 101/103 (4); one 3credit elective or PHL 212 (3); and URI 101 (1).

*Second semester: 17 credits*

CHM 112 (3), 114 (1); MTH 131 (3); COM 100 or WRT 106 (3); BIO 121 (4), and one 3credit elective or PHL 212 (3).

*Second Year First semester: 17 credits*

CHM 227 (3); ECN 201 (3); MIC 201 (4); BIO 242 (3), 244 (1), and one 3credit elective.

*Second semester: 17 credits*

BCH 311 (3); CHM 228 (3), 226 (2); STA 307 (3), and 6 credits of electives.

## Professional Curriculum

*First Professional Year (P1) First semester: 16 credits*

PHP/BPS 311 (2); BPS 301 (2), 303 (2), 305 (2), 313 (2), 318 (1), 321 (2); PHP 317 (3).

*Second semester: 18 credits*

PHP/BPS 310 (2); BPS 325 (2), 334 (2); PHP 305 (3), 316 (3), 332 (3), 340 (1); PHC 316 (1), 327 (1)\*.

*Second Professional Year (P2) First semester: 15 credits*

PHP/BPS 409 (2), 418 (3); BPS 421 (2); PHP 401 (3), 413 (3), 450 (0); PHC 415 (1), 417 (1)\*.

*Second semester: 17 credits*

PHP/BPS 412 (2); BPS 432 (2), 403 (3); PHP 424 (2), 451 (0); NFS 444 (3); professional elective (3); PHC 416 (1), 427 (1)\*.

*Third Professional Year (P3) First semester: 16 credits*

PHP/BPS 410 (2); BPS 422 (2), 504 (3); PHP 414 (3); professional elective (3); PHC 515 (2), 517 (1)\*.

*Second semester: 16 credits*

PHP/BPS 526 (2); BPS 521 (3); PHP 504 (3), 513 (2); professional elective (3); PHC 516 (2), 527 (1)\*.

*Fourth Professional Year (P4)*

Combined summer, first, and second semester: 36 credits

To complete the curriculum, students must complete six 6week advanced pharmacy practice experiences in community (PHP

591), ambulatory care (PHP 595), inpatient (PHP 592), institutional (PHP 594), and two different elective areas (PHP 593) for a total of 36 credits. The rotations will take place over summer, fall, and spring semesters in any order and are all capstone requirements in the program.

\* Interactive learning courses and integrated laboratory courses will be shared by PHP and BPS under the code of PHC.



## Doctor of Pharmacy Professional Electives

Doctor of Pharmacy Professional Electives. As part of the College's professional curriculum, students must complete three courses (minimum of 3 credits each) to improve their knowledge and understanding in a variety of practice areas. Students must complete a minimum of two of the three courses within the College of Pharmacy (BPS, PHC or PHP designation; excluding BPS 497, BPS 498, PHP 497 and PHP 498). Students may use a 3credit independent study (BPS 497, BPS 498, PHP 497 or PHP 498) or an approved course outside of the college for their third required elective.

A listing of approved courses for professional electives is available on the College's website: [uri.edu/pharmacy/academic/pharmd/curriculum/professionalelectives](http://uri.edu/pharmacy/academic/pharmd/curriculum/professionalelectives). All requests for nonapproved courses as professional electives must be reviewed and approved by the Associate Dean for Student and Academic Affairs.

Students desiring to expand their understanding in biomedical, pharmaceutical, and pharmacy research may select professional electives that focus learning on the theory and practice of laboratory research techniques, the evaluation and quantification of results, and on the understanding and interpreting of scientific literature. They will develop skills for oral and written communication of hypotheses, methods, and interpretations, and will carry out basic scientific research in one of the following four areas of specialization: medicinal chemistry and pharmacognosy, pharmaceuticals and pharmacokinetics, pharmacoepidemiology and pharmacoconomics, or pharmacology and toxicology. Students focusing their elective professional courses in this manner may also be able to apply and work toward an M.S. degree with a focus in one of the following areas:

**Medicinal Chemistry and Pharmacognosy:** Molecular mechanisms of chemical carcinogenesis; combinatorial chemistry; solid phase peptide synthesis; screening, isolation, and structure elucidation of physiologically active natural products; biosynthesis of microbial and plant natural products; herbal medicine.

**Pharmaceuticals and Pharmacokinetics:** Design, development, production, evaluation, and regulatory approval of pharmaceutical and self care products as well as pharmacokinetic and pharmacodynamic studies using virtual, clinical, and preclinical data, often with an emphasis on population approaches.

**Pharmacoepidemiology and Pharmacoconomics:** Health and economic outcomes research pertaining to pharmacotherapy as used in human populations. Specializations include medication adherence, decision and costeffectiveness analyses, post marketing surveillance, epidemiologic methods, and quality improvement and measurement.

**Pharmacology and Toxicology:** Research projects explore the mechanisms involved in various disease states and their pharmacological intervention, and mechanisms of toxicity of various environmental agents. Ongoing topics include the effects of hormonal imbalances and antihypertensive agents on cardiac function and metabolism in hypertension, diagnosis and treatment of arthritis, effect of septic shock on drug metabolism, developmental neurotoxicity of environmental agents, hepatotoxicity and nephrotoxicity of heavy metals, interindividual variation in metabolism of heterocyclic amine carcinogens, regulation and genetic heterogeneity of

enzymes involved in drug and xenobiotic metabolism, calcium and noncalcium mediated pathways of cell death, and the development of inhibitors to cell signaling events.

## Pharmacy and French

Pharmacy and French. Qualified students can graduate in six years with both a Pharm.D. degree and a B.A. degree in French. It is recommended that students wishing to double major come to URI with four years of high school French and advanced placement credits.

## B.S. in Pharmaceutical Sciences (B.S.P.S.)

The fouryear program offers students a solid foundation in the basic sciences, broad exposure to the liberal arts, and expertise in one of several areas of specialization within the pharmaceutical sciences. It is designed to provide educational

and training experiences that prepare students for careers in the pharmaceutical, consumer product, and health care industries. Graduates of the B.S.P.S. program will be qualified to seek a diverse range of career options that include: research and development, manufacturing, product marketing, sales, testing, and administrative positions within the pharmaceutical industry; research and regulatory oversight careers within government agencies; and research and teaching positions in academia. As a prelude to many of these career opportunities, the program prepares students for graduate studies in the expanding fields of pharmaceutical and biomedical sciences.

The first two years of the program include rigorous basic science requirements plus a broad exposure to the humanities, arts, and social sciences. The science component of the curriculum is consistent with the admission requirements of most basic science graduate programs and professional schools. Courses offered in the third and fourth year will be drawn primarily from our existing curriculum, and will be taught by Department of Biomedical and Pharmaceutical Sciences (BPS) and Department of Pharmacy Practice (PHP) faculty. They provide solid, fundamental training in the pharmaceutical sciences. The fourthyear curriculum also includes BPS course offerings and selected electives from other departments on campus, such as the basic sciences and business. Students may also elect to obtain course credits for laboratory research performed under the

guidance of a faculty mentor. These fourthyear offerings will present students with the opportunity, under the supervision of the B.S.P.S. program advisor, to tailor their academic program to prepare them for the specific career paths that they choose. The 120credit requirement for graduation provides education and training comparable to that offered by similar B.S.P.S. programs, and conforms to University credit requirements for fouryear degree programs.

## B.S.P.S. Curriculum Requirements.

B.S.P.S. Curriculum Requirements. The curriculum contains four distinct components. The first component consists of 35 credits of general education requirements that will provide broad exposure to the humanities, arts, and social sciences. The second component consists of 41 credits of basic science and mathematics courses that will deliver a firm foundation in

the sciences, and satisfy admission requirement for most basic science graduate programs and professional schools. The third component is the B.S.P.S. core requirement, consisting of 38 credits of new and existing BPS/PHP courses, which will offer students a strong, basic, and applied understanding of the pharmaceutical sciences. The fourth component of 6 credits, comprising B.S.P.S. electives, is drawn from upper level B.S.P.S. courses and selected electives from other programs on campus, particularly those from the basic sciences and business. These courses allow our students to tailor a program of study to suit their specific career goals.

*Freshman Year First Semester: 15 credits*

CHM 101 (3), 102 (1); BIO 101/103 (4); COM 100 (3); URI 101 (1); general education elective (3)

*Second semester: 14 or 15 credits*

CHM 112 (3), 114 (1); BIO 121 (4); MTH 131 (3) or 141 (4); WRT 106 (3)

*Sophomore Year*

First Semester: 17 credits

CHM 227 (3); MIC 201 (4); BIO 242 (3); PHY 111 (3), 185 (1); ECN 201 (3)

*Second semester: 17 credits*

CHM 226 (2), 228 (3); BCH 311 (3); STA 308 (3), general education electives (6)

*Junior Year First Semester: 15 credits*

BPS 301/303/305 (6); 311 (2); 313 (2); 321 (2); B.S.P.S. or general education elective (3)

*Second semester: 13 credits*

BPS 325 (2), 443 (2), 445 (3); general education electives (6)

*Pharmaceutics Specialization Senior Year First semester: 15 credits*

BPS 425 (3), 487/587 (3), 503 (3); PHP 580 (3); CHM 522 (3)

*Second semester: 13 credits*

BPS 405 (3), 442 (3), 451 (4); B.S.P.S. or general education elective (3)

*Natural Products Specialization*

*Senior Year First semester: 15 credits*

BPS 425 (3), 487/587 (3), 503 (3); PHP 580 (3); CHM 551 (3)

*Second semester: 13 credits*

BPS 442 (3), 451 (4), 535 (3); B.S.P.S. or general education elective (3) Cosmetic Specialization

*Senior Year First semester: 15 credits*

BPS 425 (3), 487/587 (3), 503 (3), 530 (3); PHP 580 (3)

*Second semester: 13 credits*

BPS 442 (3), 451 (4), 560 (3); B.S.P.S. or general education elective (3)

*Pharmacology/Toxicology Specialization*

*Senior Year First semester: 15 credits*

BPS 425 (3), 487/587 (3), 503 (3), 551 (3); PHP 580 (3)

*Second semester: 13 credits*

BPS 442 (3), 451 (4), 533 (3); B.S.P.S. or general education elective (3)

# Alan Shawn Feinstein College of Continuing Education

## Introduction

John H. McCray Jr., Dean, Vice Provost for Urban Programs

Kathryn Quina, Associate Dean

The Alan Shawn Feinstein College of Continuing Education (ASFCE) confers the University's Bachelor of Interdisciplinary Studies (B.I.S.) degree and sponsors nearly 500 additional courses per semester, allowing students to pursue or complete a number of other University degree programs at the Feinstein Providence Campus. All ASFCE-sponsored programs and courses are designed to respond to the needs of busy students with jobs, families, and personal responsibilities that may conflict with the more traditional fulltime residential college experience. At ASFCE students will find a dedicated staff, a flexible class schedule, and a supportive community composed of commuter, parttime, adult, financially independent, or otherwise nontraditional students who are assuming multiple roles as they pursue their University studies.

ASFCE offers the following degree and majors:

*Bachelor of Interdisciplinary Studies*

Applied Communications

Business Institutions

Health Services Administration

Human Studies

In addition, the Feinstein Providence Campus sponsors courses leading to the following degrees in other University colleges:

*Bachelor of Arts Communication Studies English*

Film/Media History Psychology

Bachelor of Science

General Business Administration

Human Development and Family Studies

Medical Laboratory Science (specialty in Biotechnology Manufacturing)

Graduate-Level Programs

Education (M.A., specialty in adult education) Business Administration (M.B.A.) Communication Studies (M.A.)

Labor Relations and Human Resources (M.S.) Library and Information Studies (M.L.I.S.) Medical Laboratory Science (M.S.)

Public Administration (M.P.A.)

Information on the college's B.I.S. degree follows. For curriculum requirements on any of the other programs listed above, see the Undergraduate Programs and Graduate School Program Descriptions sections of this catalog.

LEAP (Learning Enhancement for Adults Program), which helps students build confidence and skills in reading, writing, and basic computer applications, is available to interested returning adult students. Also, students may qualify for scholarships offered exclusively to ASFCE students.

ASFCE also offers forcredit certificate programs in applied behavioral psychology, alcohol and drug counseling, and

thanatology, as well as noncredit certificate programs.

Individual credit and noncredit Continuing Education Unit (CEU) courses are offered in addition to institutes and special courses planned for business, industry, labor, and government agencies.

Courses are offered on weekday mornings, afternoons, evenings, and Saturdays. The college also offers distance learning courses through the Internet. Students enrolling in a degree program may attend at times most convenient for them.

For more information, visit [uri.edu/prov](http://uri.edu/prov) or call 401.277.5000.

In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive.

Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect University-approved curricular and course information.

## Bachelor of Interdisciplinary Studies

Coordinator: Anne Hubbard, Ph.D.

The Bachelor of Interdisciplinary Studies (B.I.S.) program is designed for adults who have been away from high school for three or more years. It is a good choice both for people who have never been to college and for students who attended college in the past but did not complete a degree. For the latter, the B.I.S. program makes it possible to apply their previous educational experience toward a degree program. The admission process should begin with an interview with a B.I.S. advisor in the Providence Campus's Admission and Advising Office.

Qualified applicants interested in other programs at ASFCE may also be interested in the college's performancebased admission policy; see PerformanceBased Admission for details.

The B.I.S. program consists of the following required sections: 1) ProSeminar (BIS 100), 2) Traditions and Transformations

(URI 101B), 3) general education, 4) major curriculum, 5) electives, and 6) Senior Project (BIS 399). A total of 118 credits is required for the Bachelor of Interdisciplinary Studies degree.

ProSeminar for Returning Students (3 credits). This is the required entry course that introduces returning students to the college's academic environment. The BIS 100 course helps students identify their scholastic strengths and interests, and assists adults in building the selfconfidence to pursue a degree plan. The ProSeminar is limited to 16 students and opens the door to the University by helping returning students adjust to academic life. The instructors are carefully chosen and all have prior experience in teaching adults.

While enrolled in the ProSeminar, B.I.S. students are encouraged to take one or more College Level Examinations Program (CLEP) tests to measure academic knowledge acquired through prior experience. Credits gained through these tests are applied to the general education requirements. (See "CLEP Examination Program" in Advanced Standing.)

Traditions and Transformations (1 credit). URI 101B is a Universitywide seminar to introduce new students to the academic culture of higher education and to significant issues that bear on the development of each student's goals for the undergraduate years. Students enroll concurrently in URI 101B and the ProSeminar (BIS 100).

General Education Requirements (39 credits). Students in the

B.I.S. program must meet the University's General Education Requirements, including the URI 101 requirement. (Note: Health services administration majors must take MTH 107 or STA 220 as the math requirement. Business institutions majors should take BUS 111 as the math requirement.) B.I.S. students use Senior Seminars BIS 390, 391, 392 to fulfill general education requirements. Students should consult frequently with their B.I.S. advisor to be sure all general education requirements are met.

Senior Seminars (18 credits). The Senior Seminars are a distinctive feature of the B.I.S. program. These three six-credit seminars are interdisciplinary in nature and enable students to integrate and synthesize their educational experiences. These seminars are normally begun when students have completed their other general education courses and most of the courses required for their major.

BIS 390 Social Science Seminar (6 crédits) BIS 391 Natural Science Seminar (6 credits) BIS 392 Humanities Seminar (6 credits)

Major Curriculum (45 credits). B.I.S. students can choose from the following majors: applied communications, business institutions, health services administration, and human studies. These majors allow students to take courses in several disciplines to meet their educational goals in a nontraditional way. A major may be made up of a carefully prescribed set of courses or it may be flexible in its requirements, allowing students to work creatively with an advisor to design an individualized program that meets both the student's needs and the general goals of the B.I.S. program.

Electives (24–27 credits). Electives permit students to complete the B.I.S. degree in a number of creative ways, through course work, carefully designed work experience, internships, or previous but relevant educational experience.

Senior Project (3 credits). All B.I.S. students must complete BIS 399. This capstone experience for B.I.S. students provides a structure that enables the student to integrate knowledge and skills from coursework and related experiences with a research project or field experience. The project must be designed so that it allows the student to demonstrate the relationship of subject matter, theory, and practice. Students are required to meet with the B.I.S. coordinator to plan a project proposal. This written proposal must meet with the approval of both the coordinator and an appropriate faculty advisor before the student can register for BIS 399.

## Applied Communications Major

Students interested in the broad field of applied communications will be interested in this major. It allows a student, working with an advisor, to design an individual program that must then be approved by the program coordinator.

Communications Core (24 credits). These courses, all at or above the 200 level, must be chosen from communication studies, journalism, and writing (or ENG 205 or 305), with 12 credits from one department and 6 credits from each of the other two. Prerequisite communications courses are COM 100 and WRT 104.

Methodology Course (3 credits). Students may select COM 381, 382, 383, HDF 202, PSY 200, or STA 308.

Major Seminar (BIS 398) (3 credits). Students take this course near the end of their degree program, as it gives them an opportunity to review and evaluate the skills and knowledge they have acquired through their major.

Area of Emphasis (15 credits). With the help of an advisor, students select 15 credits that will comprise an area of emphasis, which may be used either to further develop skills in communications or for study in related areas. This area of emphasis must be approved by an advisor and the program coordinator by the beginning of the student's junior year.

## Business Institutions Major

Students interested in the broad field of business will be interested in this major. This is a fully prescribed program with a specific list of required courses (course codes in parentheses refer to the former codes for these courses):

BUS 110 Business Computing Applications (BAC 110) or CSC 101, Computing Concepts

BUS 201 Financial Accounting (ACC 201) BUS 202 Managerial Accounting (ACC 202)

BUS 210 Managerial Statistics I (BAC 201) or STA 308, Introductory Statistics

BUS 315 Legal and Ethical Environment of Business I (BSL 333) BUS 320 Financial Management (FIN 301)

BUS 340 Organization and Management Theory I (MGT 301)

BUS 355 Operations and Supply Chain Management (MSI 309) BUS 365 Marketing Principles (MKT 301)

ECN 201 Principles of Economics: Microeconomics ECN 202 Principles of Economics: Macroeconomics WRT 227 Business Communications

Business Elective (3 credits) or BUS 111 (if not taken as general education math requirement)

In addition to the courses above, students must elect one liberal elective course offered by a department outside their major. Most courses that fulfill these major requirements are available in Providence in the evening.

## Health Services Administration Major

This interdisciplinary major offers students a broad overview of the health care system, while allowing them to focus on a specific area of interest. The program provides strong preparation for entry or midlevel managerial and supervisory positions in organizations such as skilled nursing facilities, adult day care centers, home health care agencies, hospitals, clinics, laboratories, physicians' offices, governmental and regulatory agencies, and health plans. This course of study may also be applied in industries related to the health field, such as research and development, pharmaceuticals, and the insurance or computer industry.

This major is appropriate for students who have no previous exposure to this field, and for those who may already be employed in the field and are looking for a degree to give them the skills and knowledge to assume more significant responsibilities.

This major is also appropriate for students with 2-year allied

health degrees who wish to continue their undergraduate studies. In most cases, a substantial portion of credits earned in the 2-year program will transfer toward the bachelor's degree.

Major Courses (30 credits)

BUS 201 Financial Accounting (formerly ACC 201) ECN 201 Principles of Economics: Microeconomics ECN 360 Health Economics

HDF 202 Research Perspectives in Human Development & Family Studies

HDF 357 Family and Community Health

HSA 360 Health Services Administration

HSA 380 Introductory Health Services Practicum

PHL 314 Ethical Problems in Society and Medicine

PSC 481 Political Science Seminar: Health Care Policy and Politics

SOC 224 Health, Illness, and Medical Care

Areas of Emphasis within the Health Services Administration Major (18 credits): Students fulfill the area of emphasis requirement by designing an area of emphasis to fit the student's experience and career interests, or by choosing from existing minors (see Minor Fields of Study).

## Human Studies Major

Students interested in the wide range of human studies or human services will be attracted to this major. It permits the student, working with an advisor, to design a major that will meet both personal and career goals. All human studies majors

must have their program design approved in advance by an academic advisor and the program coordinator. It must include the following four parts:

**Social Science Core (24 credits).** Students are required to select 24 credits from three of the following departments in the College of Arts and Sciences: economics, history, political science, psychology, and sociology and anthropology. These departments determine which of their courses are suitable for the B.I.S. major.

The 24 credits must be distributed as follows: four courses from one department, two courses from a second department, and two courses from a third. Only two prerequisite or introductory-level courses are allowed in the major. Students should meet with an advisor for more information regarding these courses.

**Methodology Course (3 credits).** Students are strongly advised to fulfill this requirement by taking HDF 202. In exceptional cases, students may be allowed to meet the methods requirement by taking PSY 200, SOC 301, or STA 220.

**Major Seminar (BIS 397, 3 credits).** Students take this course near the end of their degree program. It will give them an opportunity to review and evaluate the skills and knowledge they have acquired through their major.

**Area of Emphasis (15 credits).** The area of emphasis provides the student with an opportunity to select a group of courses that focus on a particular problem or population of interest.

Once a particular focus is identified, students select 15 credits at or above the 300 level from a wide variety of departments. The advisor and the B.I.S. coordinator must approve the Area of Emphasis.

## Registration and Admission

Students must enroll in courses prior to the beginning of each semester. Being enrolled in a course is not the same as being admitted to the University. To apply for admission to an undergraduate degree program, a student must follow the application procedure (description follows). However, credits earned through successful completion of courses may eventually be applied toward a degree program after a student is accepted as a degree candidate.

Beginning students who have been away from school for some time with little or no course work beyond high school are encouraged to register in the ProSeminar (BIS 100) and URI 101B (see explanation in Bachelor of Interdisciplinary Studies).

Any adult may enroll as a nonmatriculated student in ASFCEE. Most courses at the University are open to nonmatriculated students; however, day courses at the Kingston campus are open only on a space-available basis.

All information and forms necessary for registration are available on the Providence campus website at [uri.edu/prov](http://uri.edu/prov). For more information, call 401.277.5160.

**Application Procedure.** A student who wishes to enroll in an undergraduate degree program at ASFCEE should begin by scheduling an interview with an academic advisor to explore the options available and to discuss the student's previous educational experiences. The student then fills out an admission application and provides the necessary transcripts and other paperwork.

Once a student is admitted to an undergraduate degree program, he or she should consult frequently with the advisor. The student and advisor will fill out a program worksheet that lists the courses necessary to complete the degree.

**Alternate Ways to Earn Credit.** ASFCEE recognizes a number of ways to earn college credits. Students may take CLEP (College Level Examination Program) exams in a wide variety of areas to earn credit. For more information, see "CLEP Examination Program" in Advanced Standing.

Students also have the ability to earn credit towards a degree for documented college-level learning acquired outside a college classroom through the Prior Learning Assessment (PLA) program. There are many situations in which adults may have accomplished college-level work: through paid and/or volunteer work, travel or living in another culture, community activities, or in-depth study of a topic of interest. Students develop a portfolio (résumé, compilation of data, experiences, theory and applied knowledge that demonstrates college-level learning) in the required one-credit PLA 100 seminar. See course descriptions under "Prior Learning Assessment." Check with your advisor to see if a PLA portfolio can be used towards your degree requirements.

## Services for Students

The ASFCCE provides a number of services for students, including free academic advising, peer counseling, career counseling, tutoring, writing assistance, services for students with disabilities, and counseling and testing services. The Providence campus also has a bookstore, a library, and a snack bar, plus a comfortable student lounge area where students and faculty can meet, talk, and relax.

## Fees and Finances

Tuition and fees for ASFCCE students are given in the Tuition & Fees section of this catalog. They may also be found at [uri.edu/es/acadinfo/acadyear/tuition](http://uri.edu/es/acadinfo/acadyear/tuition). The registration fee is not refundable except when URI cancels or closes a course. The Student Services Fee supports a student government, and various lectures and cultural events determined by an activities board of elected ASFCCE students. Fees for Special Programs courses vary (consult the course schedule or contact the Special Programs Office). For information on refunds, see Refund Policy.

Financial Aid. Financial Aid advising is available to all ASFCCE students through our Admission and Advising Office. Only matriculated students enrolled on at least a halftime basis (six credits) may be considered for an award. Student Financial Assistance determines eligibility for all grants, loans, and employment, which are awarded on an academic year basis. Financial aid will be awarded only after a student has applied for a Pell Grant and has submitted a Pell Student Eligibility Report to this office.

A limited number of scholarships are available to students matriculating at ASFCCE. Students are required to complete a FAFSA application to be considered. For a brochure, call 401.277.5160.

## Graduate Programs

Persons holding the baccalaureate degree and wishing to take graduatelevel courses at the University may do so through admission to the Graduate School.

Nasser H. Zawia, Dean

Keith Killingbeck, Associate Dean

For more information, visit [uri.edu/gsadmis](http://uri.edu/gsadmis) or call 401.874.2262. In case of discrepancies between this Catalog and the departmental materials, this URI Catalog is considered definitive. Departmental websites and departmental curricular and course materials are maintained independently and do not necessarily reflect Universityapproved curricular and course information.

## Graduate Admission and Registration

### ADMISSION

Students may be admitted to URI's Graduate School to pursue a specific graduate degree or they may pursue postbaccalaureate work in nonmatriculating status (see below). Admission to the Graduate School is based on academic qualifications and potential without regard to race, gender, religion, age, color, creed, national origin, disability, or sexual orientation, and without discrimination against disabled and Vietnam era veterans.

Prospective students can find information on application procedures as well as a link to the application at the Graduate School website at [uri.edu/gsadmis](http://uri.edu/gsadmis). Inquiries concerning particular degree programs or courses of instruction should be addressed to the appropriate department chair or graduate program director, as listed in the Graduate Degree Program Descriptions section of this catalog and on the Graduate School website.

Applications are initially reviewed by the department or program to which admission is sought. Final decisions rest with the Graduate School, which, after considering the recommendation of the department concerned, will notify the applicant of the decision.

While admission to a doctoral program is possible for those holding the bachelor's degree and meeting other requirements, the Graduate School reserves the right to offer admission only to the master's program while postponing a decision on admission to the doctoral program until at least a substantial portion of the master's work has been completed.

Applications must be accompanied by a \$65 nonrefundable application fee. Simultaneous application to more than one department requires duplicate applications and credentials and separate application fees.

The completed application and all supporting documents must be received by April 1 for summer admission, July 15 for fall admission, and November 15 for spring admission (dates for international applicants are below). The application must be received by February 1 for consideration for financial aid for the following year. As indicated in the Graduate Degree Program Descriptions section in this catalog, certain programs admit students only for the fall semester or have earlier deadlines. There is no assurance that applications completed after specified deadlines will be processed in time for enroll-

ment in the desired semester. Admission is valid only for the term offered and must be reconsidered if a postponement is subsequently requested.

**International Applicants.** Applicants from foreign countries must demonstrate proficiency in the English language. Applicants whose native language is not English must submit an official test report from the Test of English as a Foreign Language (TOEFL), the International English Language Testing System (IELTS), the Pearson Test of English (PTE), or the Common European Framework of Reference (CEFR). Scores are valid for two years. Minimum scores needed to be eligible to be considered for admission are published at [uri.edu/gsadmis/gs\\_apply\\_int.htm](http://uri.edu/gsadmis/gs_apply_int.htm). If a higher minimum is required for admission to a specific program, it is listed under that program's admission requirements. Prospective students can find information on application procedures as well as a link to the application at the Graduate School website at [uri.edu/gsadmis](http://uri.edu/gsadmis). Applications not received by February 1 for fall admission and July 15 for spring admission will be considered for the next admission period. Inquiries from international students concerning nonimmigrant visas, transfers, funding, etc., should be sent to the Office of International Students and Scholars. Inquiries concerning housing should be sent to the Department of Housing and Residential Life (for apartments on campus) or to the Commuter Housing Office (for rooms, apartments, and houses in the nearby community).

**Transfer Credit.** Transfer credit can be requested for graduate work taken at other accredited institutions of higher learning. Under usual circumstances, such credits may not exceed 20 percent of the total credits required in the program. The transfer work must have been taken at the graduate level (equivalent to the 500 level or higher in URI's course numbering system) and a passing grade earned at that institution. It must have been completed not more than seven years prior to the date of admission and must have a clear and unquestioned relevance to the student's Program of Study. The request for transfer credit should be accompanied by a proposed Program of Study. If transfer credit is desired for work taken elsewhere after a graduate student is enrolled at the University, prior approval must be obtained from the Graduate School. Doctoral candidates holding a master's degree in the same or a closely related area can request that up to 30 credits from their master's degree be applied to their Program of Study.

**Prospective Students.** Applicants must submit a completed application, containing all of the requested materials, directly to the department to which admission is being sought. Where required, test scores in the appropriate nationally administered tests should be sent to the University directly by the testing service. Tests required for specific programs can be found in the Graduate Degree Program Descriptions section and the Graduate School website. Scores (GRE, MAT, or GMAT) earned more than five years prior to the term of application will not be accepted. If test results exceed the fiveyear limit, applicants must retake the examination.

To be accepted into a degree program, applicants must have maintained an average of B (3.00 on a 4.00 scale) or better in their undergraduate work. For programs that require standardized tests, students must also have satisfactory scores on the appropriate nationally administered test. Applicants with undergraduate averages below the B level may possibly be admitted with submission of other evidence of academic potential; i.e., satisfactory performance in postbaccalaureate

work, professional experience as evidenced by publications or letters of recommendation, and/or high scores in the standardized tests referred to above.

Once accepted into a graduate degree program, students are expected to maintain a cumulative average of B (3.00) or better. Students who do not maintain a cumulative B average will have their status reviewed and may be placed on provisional status or be dismissed. A student placed on provisional status must achieve a cumulative B average within one semester (or nine credits, if parttime) or be subject to dismissal.

**Advanced Standing.** Advanced standing refers to credits taken at URI by a nonmatriculating student, or by a student in one degree program before formally beginning another degree program. In instances where a student plans to take a course or courses while in one degree program so as to apply those credits to a more advanced degree at a later date, the student must request and receive written prior approval from the dean of the Graduate School before enrolling in said course(s). Credits earned at the University of Rhode Island by a nonmatriculating student may be applied as advanced standing toward degree requirements only upon the recommendation of the student's major professor and the graduate program director and with the approval of the Graduate School. For the credits to be applied to advanced standing, they must have been earned within a five-year period before the student matriculated into the degree program. For a master's degree program, advanced standing and transfer credit may not total more than 40 percent of the credits required for the degree. For Ph.D. students admitted without a master's degree, advanced standing may not total more than 20 percent of the credits required for the degree. In special cases, Ph.D. students admitted with a master's degree in the same or a closely related area may request up to nine credits of advanced standing. The request should be accompanied by a proposed Program of Study and satisfy the time constraints listed for transfer credit.

In certain cases, applicants who have been denied admission may be advised to take several courses in nonmatriculating status (see following paragraph) to provide a basis for later reconsideration of their applications. In such cases, these courses are usually regarded as if they were entrance deficiencies and are not accepted for advanced standing in minimum-credit Programs of Study.

**Nonmatriculating Status.** Individuals holding a bachelor's degree who are not enrolled in a graduate degree program may take courses during the academic year or in the summer in nonmatriculating status. Normally, to take courses for personal satisfaction or professional advancement, postbaccalaureate students enroll in the Alan Shawn Feinstein College of Continuing Education. Any nonmatriculated student wishing to take courses on the Kingston Campus must file an application with the Office of Enrollment Services. If nonmatriculated students later wish to be admitted to a degree program, they must complete the regular admission procedure.

Nonmatriculated students do not have the privileges regularly enjoyed by students enrolled in graduate degree programs. For example, on the Kingston Campus they may not register until one week before classes begin and must make payment before accessing the registration system. Their enrollment is subject to the accommodation of matriculated students wishing to take these courses. In addition, there is a limit to

the number of courses taken in this status that may be used as advanced standing to satisfy degree requirements. Nonmatriculated students are not eligible for financial aid.

## REGISTRATION

The responsibility for being properly registered rests with the student. Students must complete their registration within the time period announced by the University at [uri.edu/es/cal-exams/detailedcalendar.pdf](http://uri.edu/es/cal-exams/detailedcalendar.pdf). The chair of the student's major department will assign an advisor to assist the new graduate student in planning a program. All students must register for courses through the Office of Enrollment Services in order to be properly enrolled.

For information on late registration, course schedule, payment of fees, drop and add, auditing, Veterans Administration educational benefits, transcripts, change of address, and required identification, please see "Registration Policies"

in Enrollment Services.

**Summer Session.** Although some graduate-level courses are offered during the summer sessions, the University does not guarantee that any particular course will be offered. The availability of individual faculty members to supervise research or to participate in comprehensive examinations and in examinations in defense of theses or dissertations during the summer sessions varies from year to year. During the summer sessions, special arrangements must be made with both the Graduate School and the department for scheduling comprehensive examinations and thesis or dissertation defenses. Students must be registered to be eligible to schedule these exams. Graduate students must make prior individual arrangements for taking directed studies or special problems courses.

**Time Limit and Continuous Registration.** Graduate students are required to complete their course work and research within the five-year time limit prescribed for the master's degree and the seven-year time limit for the doctorate. In exceptional circumstances, requests to the Graduate School for an extension of the time limit must be accompanied by an explanation of delay in program progress, a detailed proposed schedule for completing the degree, along with the approval of the major professor and the graduate program director. The dean of the Graduate School will review such requests and determine whether a variance to the time limit requirement is warranted (see the Graduate School Manual, sections 7.42 and 7.51).

Graduate students must remain continuously enrolled—except for summer sessions, which are optional—until they have completed all requirements and have received their degree. Unless they are on a Leave of Absence approved by the department and the Graduate School, students who wish to maintain graduate status must be enrolled in at least one course/research credit. For students who have completed all degree requirements with the exception of removing grades of Incomplete or submitting the final, formatted copies of a successfully defended thesis/dissertation, enrolling in CRG 999 (continuous registration) will maintain their graduate status.

Students who are on a Leave of Absence or are on continuous registration do not have the privileges of consulting regularly with faculty on research or thesis preparation, nor of using laboratory, computer, or other educational facilities at URI.



Students on continuous registration are not eligible for continuation of educational loan deferments based on student status.

A student who does not register for a semester, or obtain approval for a Leave of Absence, will be considered as having voluntarily withdrawn from the University. Students who are later permitted to reenroll must pay the continuous registration fee for each semester in which they did not maintain graduate status.

**FullTime and PartTime Students.** Minimum fulltime registration is nine credit hours during a regular semester and six credit hours during a summer session. Maximum registration of 15 credit hours during a regular semester and eight credits during each summer term may not be exceeded without prior written permission of the Graduate School, based on extraordinary circumstances. (Students on graduate teaching and research assistantships are limited to a minimum of six and a maximum of 12 credits.) Credits in excess of 15 will be billed at the percredit rate. Fulltime registration is required of all international students and of all students holding fellowships, assistantships, full scholarships, and traineeships administered by the University.

**Credits Earned Off Campus.** Students wishing to register for credits to be counted toward a degree, who will be earning these credits through offcampus activities (such as research or independent study at a national laboratory), must obtain prior approval from the Graduate School to have these activities listed as part of their Programs of Study.

**Intellectual Opportunity Plan (Pass/Fail Option).** To allow graduate students to venture into new areas of knowledge without fear that their scholastic average will suffer, the Graduate Council has approved the Intellectual Opportunity Plan. (Please note that courses below the 400 level are automatically excluded from the scholastic average.) To be eligible for this option, the student's major professor or advisor must certify that the course or courses are outside the student's major field of study, are not entrance deficiencies, and are not specific requirements of, but are relevant to, the student's program. A maximum of four credits may be taken by the master's degree student and a maximum of eight credits, including any taken as a master's student, by the doctoral student.

## Graduate School Calendar

### FALL SEMESTER 2014

September 2, Tuesday. New Graduate Student Orientation.

September 3, Wednesday. Classes begin, Kingston campus.

October 1, Wednesday. Final date for Leave of Absence requests for Fall 2014.

October 1, Wednesday. Final date for nominations for December 2014 graduation.

November 7, Friday. Final date for potential December 2014 graduates to submit completed defense copies of theses/dissertations in a form acceptable for examination purposes, along with the request for oral defense of thesis/dissertation. **NO EXTENSIONS OF TIME CAN BE GRANTED.** Theses/dissertations must be submitted at least 20 calendar days prior to the date requested for oral defense. Selection of date should al-

low sufficient time for necessary revisions and retyping before final submission. See December 5 deadline and important note at end of calendar below.

November 14, Friday. Final date for all applications to be submitted via IRBNet in the Office of Research Integrity for IRB or IACUC approval for potential May 2015 graduates. (IRB= Institutional Review Board – research involving human subjects; IACUC = Institutional Animal Care and Use Committee – research involving vertebrate animals)

November 15, Saturday. Deadline for the submission of applications for graduate programs for Spring 2015, except for programs with earlier deadlines.

December 5, Friday. Final date for potential December 2014 graduates to submit, in final, correctly formatted form, theses/dissertations that have been successfully defended, and fully approved. **NO EXTENSIONS OF TIME CAN BE GRANTED.**

December 8, Monday. Classes end. Programs of Study due for students admitted for Fall 2013.

December 29, Monday. Final date for changes of grades, changes to Programs of Study, results of master's examination(s), results of comprehensive examination(s), etc. for potential December 2014 graduates to be received in the Graduate School for certification for December graduation. **NO EXTENSIONS OF TIME CAN BE GRANTED.**

December 29, Monday. Final date for submission of approved thesis/dissertation proposals for potential May 2015 graduates. Thesis/dissertation proposals should be submitted before substantial research has been completed, typically during the first or second semester in which the student registers for research credits. For master's students, the proposal must be submitted at least 1 semester before the semester in which the thesis is to be submitted and defended. (NOTE: For doctoral students, the proposal must be submitted during or before the seventh semester in which a doctoral student is enrolled in their program, and at least 6 months before the dissertation is defended.)

### SPRING SEMESTER 2015

January 21, Wednesday. Classes begin, Kingston campus.

February 1, Sunday. Final date for the submission of admission applications to graduate programs from individuals seeking financial aid for 2015. Applications for financial aid received after this date cannot be assured of full consideration.

February 1, Sunday. Deadline for submission of international applications to graduate programs for Fall 2015.

February 6, Friday. Final date for nominations for May graduation.

February 6, Friday. Final date for submission of approved thesis/dissertation proposals for potential Summer 2015 graduates. Thesis/dissertation proposals should be submitted before substantial research has been completed, typically during the first or second semester in which the student registers for research credits. For masters students, the proposal must be submitted at least 1 semester before the semester in which the thesis is to be submitted and defended. (NOTE: For doctoral students, the proposal must be submitted during or before the seventh semester in which a doctoral student is enrolled in their program, and at least 6 months before the dissertation is defended.)

February 27, Friday. Final date for receipt of all applications to be submitted via IRBNet in the Office of Research Integrity for IRB or IACUC approval for potential December 2015 graduates. (IRB = Institutional Review Board – research involving human subjects; IACUC = Institutional Animal Care and Use Committee – research involving vertebrate animals)

March 2, Monday. Final date for Leave of Absence requests for Spring 2015.

March 20, Friday. Final date for potential May 2015 graduates to submit completed defense copies of theses/dissertations in a form acceptable for examination purposes, along with the request for oral defense of thesis/dissertation. **NO EXTENSIONS OF TIME CAN BE GRANTED.** Theses/dissertations must be submitted at least 20 calendar days prior to the date requested for oral defense. Selection of date should allow sufficient time for necessary revisions and retyping before final submission. See April 17 deadline, and important note at the end of calendar below.

April 1, Wednesday. Application deadline for Summer 2015 admission, except for programs with earlier deadlines.

April 17, Friday. Students who have completed their coursework, successfully passed their master's examination(s) (if required), successfully passed their comprehensive examination(s) (if required), and successfully defended their theses/dissertations (if required) by this date are eligible to march in the 2015 Graduate Commencement ceremonies to be held May 16th. Results of examinations and defenses must be received in the Graduate School by this date to participate in the 2015 Graduate Commencement. (For complete listing of eligibility regulations, visit [here](#) or see the Graduate School Manual Appendix B.)

April 17, Friday. Final date for potential May 2015 graduates to submit, in final, correctly formatted form, theses/dissertations that have been successfully defended, and fully approved. **NO EXTENSIONS OF TIME CAN BE GRANTED.**

April 17, Friday. Final date for changes of grades for courses taken in previous semesters, changes to Programs of Study, results of master's examination(s), results of comprehensive examination(s), etc. for potential May 2015 graduates to be received in the Graduate School for certification for May 2015 graduation. **NO EXTENSIONS OF TIME CAN BE GRANTED.**

April 29, Wednesday. Classes end. Programs of Study due for students admitted for Spring 2014.

May 1, Friday. Final date for approved thesis/dissertation proposals for potential Fall 2015 graduates. Thesis/dissertation proposals should be submitted before substantial research has been completed, typically during the first or second semester in which the student registers for research credits. For master's students, the proposal must be submitted at least 1 semester before the semester in which the thesis is to be submitted and defended. (NOTE: For doctoral students, the proposal must be submitted during or before the seventh semester in which a doctoral student is enrolled in their program, and at least 6 months before the dissertation is defended.)

May 14, Thursday. Final date for changes of grades for courses taken in Spring 2015 to be received in the Graduate School for certification for May 2015 graduation. **NO EXTENSIONS OF TIME CAN BE GRANTED.**

May 16, Saturday. Graduate Commencement.

## 2015 SUMMER SESSIONS

Note: All courses taken by graduate students during summer sessions are subject to the same regulations regarding inclusion in Programs of Study and calculation of overall academic average, etc., as courses taken during the regular academic year. Students wishing to take directed studies or special problems courses during summer sessions must obtain individual approval for these courses from the Continuing Education office unless the specific offering is listed in the summer Course Schedule for that year. Students wishing to enroll for thesis or dissertation research during summer sessions must first determine that their major professors and/or members of their thesis or dissertation committees will be available and are willing to provide the necessary supervision. See also the important note at the end of this calendar regarding scheduling of examinations, including defense of theses/dissertations, during summer sessions. See the schedule of summer courses available online at [uri.edu/summer](#), or visit the Continuing Education (Summer Session) office in Kingston.

Session I: May 18–June 19

May 18, Monday. Classes begin.

June 1, Monday. Final date for nominations for August 2015 graduation.

Week of June 15. Classes end. Exams.

Session II: June 22–July 24

June 22, Monday. Classes begin.

July 3, Friday. Final date for all potential August 2015 graduates to submit completed defense copies of theses/dissertations in a form acceptable for examination purposes, along with the request for oral defense of the thesis. **NO EXTENSIONS OF TIME CAN BE GRANTED.** Theses must be submitted at least 20 calendar days prior to the date requested for the oral defense. Selection of date should allow sufficient time for necessary revisions and retyping before submission in final form. See July 30 deadline.

July 15, Wednesday. Deadline for submission of Fall 2015 graduate program applications, except for programs with earlier deadlines.

Week of July 22. Classes end. Exams.

July 30, Thursday. Final date for potential August 2015 graduates to submit, in final, correctly formatted form, theses/dissertations that have been successfully defended, and fully approved. **NO EXTENSIONS OF TIME CAN BE GRANTED.**

July 31, Friday. Final date for changes of grades, changes to Programs of Study, results of master's examination(s), results of comprehensive examination(s), etc. to be received in the Graduate School for certification for August 2015 graduation. **NO EXTENSIONS OF TIME CAN BE GRANTED.**

**IMPORTANT:** Requests for scheduling exams must be submitted to the Graduate School at least 20 calendar days prior to the date(s) requested. Theses and dissertations must be distributed to members of the examining committee at least 15 days prior to the date of the defense. Oral and written (including qualifying and comprehensive) exams and defenses of theses will be scheduled only at the convenience of the faculty members involved and depending on the availability of the student's program committee and additional qualified examiners. Such exams will not be scheduled during periods

when the University is in recess. Students wishing to take any exams should first check the availability of the faculty members. Each faculty member must initial the request to indicate his or her willingness to serve. Faculty should be consulted well in advance for exams being scheduled during the summer sessions. If they are not registered for course work or research during the summer sessions, students must register for one credit of research to defend theses/dissertations.

## Graduate School Requirements and Policies

Each advanced degree awarded by the University requires as a minimum the successful completion of a specified number of approved credits of graduate study at the University and the passing of prescribed examinations. Credit hours for a master's or doctoral degree may include formal course work, independent study, research, preparation of a thesis or dissertation, and such other scholarly activities as are approved by the student's program committee and the Graduate School.

It is the student's responsibility to know the calendar, regulations, and pertinent procedures of the Graduate School and to meet its standards and requirements. These are set forth in this catalog, the Graduate School Manual, the Statement on Thesis Preparation, and other publications, all of which are available to graduate students at [uri.edu/gsadmis](http://uri.edu/gsadmis). These documents are also available in some department offices. The manual is available at the library and, for a fee, at commercial centers in Kingston. These documents govern both master's and doctoral degree programs.

The Graduate School Manual gives detailed information on responsibilities of major professors and program committees, examination procedures, preparation of theses and dissertations, academic standards, and the Graduate Student Academic Appeals System.

The requirements immediately following are general requirements for all graduate students. Specific requirements for individual programs are itemized in the Graduate Degree Program Descriptions that follow.

### PROGRAM OF STUDY

The purpose of the Program of Study is to ensure that students, at an early stage in their graduate study, organize coherent, individualized plans for their course work and research activities. It is expected that the successful completion of students' Programs of Study along with collateral readings, research, etc., will enable them to demonstrate that they have achieved the high level of competence required of graduate students in their respective fields.

All students matriculated in a graduate degree program are required to prepare a Program of Study with the guidance of their major professors (for master's degree programs) or of their program committees (for doctoral programs) in accordance with the guidelines in the Graduate School Manual. After the program has been approved by the major professor or by the program committee, the Program of Study is submitted for approval to the Graduate School.

### COURSE NUMBERING SYSTEM

All regular graduate courses are numbered at the 500 and 600 levels. All 900-level courses are special graduate courses

for which no graduate program credit is given. Courses numbered at the 400 level are for advanced undergraduates, but may, with approval and to a limited extent, be accepted toward meeting degree requirements at the master's level. For doctoral students who have completed the master's degree in the same field or one closely related, all program work must be at the 500 or 600 level.

### SCHOLASTIC STANDING

Graduate work is evaluated by letter grades. All grades earned will remain on the student's record, and unless the courses were approved for no program credit prior to registration, all unacceptable grades will be included in calculating the student's scholastic average.

A grade of C+ (2.33) or lower in courses numbered at the 400 level is considered a failing grade. In such cases of failure the course must be either repeated, if it is a required course, or else replaced by another course approved by the student's program committee and the Graduate School.

Grades of C- or lower are failing grades in courses at the 500 and 600 levels and require immediate review of the student's status. Students failing these courses must repeat them, if they are required courses, or else they must replace them with courses approved by the student's program committee and the Graduate School.

The grades S (satisfactory) and U (unsatisfactory) are used for courses of study involving research undertaken for the thesis or dissertation and for certain courses and seminars so designated. The letter I (incomplete) is used for excused unfinished work. Graduate students have one year to make arrangements with the instructor to remove the incomplete. If the grade of I (incomplete) is not removed within three calendar years, it will remain on the transcript. Incomplete grades may not be used for program credit. Grades of S, U, I, and all grades in courses below the 400 level are not included in the academic average.

To qualify for continuation of degree student status and for graduation, a cumulative average of B (3.00 on a 4.00 scale) in all work is required, except for courses approved for no program credit prior to registration in the course. At any time when the academic record indicates unsatisfactory performance, the student's status is subject to review. A student who fails to maintain a satisfactory grade point average or to make acceptable progress toward the degree may be dismissed as a graduate student.

### DEGREE REQUIREMENTS

Master's Degree. There are no major or minor area requirements for the master's degree. However, no degree can be awarded for the accumulation of credits without a planned and approved Program of Study. Courses for the degree are expected to be concentrated in the student's field of interest and related areas to produce a well-developed and coherent program.

The requirements listed here must be met within five years after the date the student is first enrolled as a matriculated graduate student at the University. In exceptional circumstances, requests to the Graduate School for an extension of the time limit must be accompanied by an explanation of delay in program progress, a detailed proposed schedule for completing the degree, along with the approval of the major

professor and the graduate program director. The dean of the Graduate School will review such requests and determine whether a variance to the timelimit requirement is warranted (see the Graduate School Manual, sections 7.42 and 7.51). The master's degree may be earned through full or parttime study, or a combination of the two.

Some departments offer both a thesis and a nonthesis option, while others offer only one plan. Please refer to the "Graduate Degree Program Descriptions" for specific information on each program. General requirements for these options are as follows.

**Thesis Option.** The minimum requirements for a master's degree are 1) the successful completion of 30 credits, including six to nine thesis research credits; 2) at the discretion of the department, the passing of written comprehensive examinations toward the end of the course work; 3) the submission of an acceptable thesis and the passing of an oral examination in defense of the thesis. A statement on the preparation of theses is available from the Graduate School Office.

**Nonthesis Option.** Depending on departmental requirements, some master's degrees may be earned without a thesis. The minimum requirements for a nonthesis master's degree program are: 1) the successful completion of a minimum of 30 credits;

2) completion of practicums, internships, or other experiences useful to the student's future professional career; 3) registration in one course that requires a substantial paper involving significant independent study; 4) the passing of a written comprehensive examination toward the end of the course work. Some departments may also require a final oral examination.

**Research Competency.** Although not normally required for the master's degree, a student's major professor or thesis committee may require proficiency in a foreign language, statistics, or computer science where appropriate for the subject chosen.

**Professional Degrees.** Students should refer to the specific program requirements for professional degrees and consult with the appropriate dean or director.

**Doctor of Philosophy Degree.** The Doctor of Philosophy degree must be completed within seven years of the date when the student first enrolled as a matriculated student.

The requirements for the doctoral degree are 1) the completion of a minimum of 72 credits of graduate study beyond the baccalaureate degree, of which a minimum of 42 credits must be taken at the University of Rhode Island; 2) the passing of a qualifying examination or the completion of a master's degree; 3) if required by the department, proficiency in one or more foreign languages and/or in an approved research tool; 4) the passing of a comprehensive examination; 5) the completion of a satisfactory dissertation; 6) the passing of a final oral examination in defense of the dissertation; and 7) fulfillment of the residence requirement by taking a minimum of six credits per semester (specific graduate programs may require more) for at least two consecutive semesters after satisfying qualifying examination requirements. Residence is interpreted as attendance on campus or in the Alan Shawn Feinstein College of Continuing Education during a regularly scheduled semester. Fulltime registration for both terms of a summer session counts as one semester of residence.

The department in which the student studies for the doctoral degree may or may not require a master's degree preliminary to, or as part of, the regular course of study.

**Qualifying Examination.** This examination is intended to assess a student's potential to perform satisfactorily at the doctoral level. A student without a master's degree who is accepted as a matriculated doctoral student is expected to take a qualifying examination, usually after 24–30 credits have been completed. A student who holds a master's degree in the same or a closely related field is normally not required to take the examination. If an examination is required, it will be stipulated at the time of admission.

**Research Competency.** Each department, in cooperation with the Graduate School, is authorized to formulate and to amend its own requirements and methods of testing for competency in research tools such as foreign language(s), computer science, or statistics. The department may, in turn, delegate this responsibility to the program committee for each individual doctoral student.

**Comprehensive Examination.** Each doctoral student will take comprehensive examinations at or near but not later than 12 months after completion of the formal courses stipulated in the Program of Study. The examination is designed to assess the student's intellectual capacity and adequacy of training for scholarly research.

The comprehensive examination consists of two parts: written and oral. The student, with the approval of his or her program committee, applies to the Graduate School to take the examination. The oral examination committee includes the student's committee and two additional members of the graduate faculty appointed by the Graduate School. One of the additional members represents a field of study allied to that of the student's major. The student's major professor arranges for and chairs the examination. Unanimous approval by the examining committee is required for the passing of the comprehensive examination.

A student whose performance fails to receive unanimous approval may, with the committee's recommendation and the approval of the Graduate School, be permitted one re-examination in the part or parts failed, to be taken no sooner than ten weeks, and no later than one year after the initial examinations.

**Final Oral Examination.** This examination is a defense of the dissertation and is open to all members of the faculty and, generally, to all students. The examination, usually a maximum of two hours, is conducted by an examining committee made up of the student's program committee and two additional graduate faculty members appointed by the Graduate School. One of the appointed members will be designated by the dean to chair the examination.

Unanimous approval of the examining committee is required for passing. If the student does not perform satisfactorily, the committee may recommend to the Graduate School that the student take one reexamination under stated conditions.

## THESES AND DISSERTATIONS

For the oral defense, a sufficient number of completed copies of the thesis or dissertation, acceptable in form and substance to each member of the examining committee and the

Graduate School, is required. At least 20 calendar days prior to the proposed defense, the copies must be submitted to the Graduate School for scheduling of the examination.

Following a successful defense, and after all changes and corrections have been made, copies prepared in accordance with requirements of the Graduate School and the library must be submitted to the Graduate School. Doctoral students must submit an additional abstract, not exceeding 350 words.

Students are advised to consult the Statement on Thesis Preparation and Instructions for Thesis Defense, both available in the Graduate School (and at [uri.edu/gsadmis](http://uri.edu/gsadmis)), and the most recent edition of Kate L. Turabian's *A Manual for Writers of Term Papers, Theses, and Dissertations*, published by the University of Chicago Press.

## Graduate Degree Program

### Descriptions

This section describes the admission and degree requirements for the University's graduate programs, which are included within the general requirements set forth previously, and do not reduce those requirements.

The specific program requirements that follow are also minimum requirements; additional course credits may be required for students whose academic background is considered insufficient.

For example, in nonthesis master's degree programs, all students must take at least one course requiring a substantial paper involving significant independent study, and all Ph.D. students who do not hold an earned master's degree in a closely related field are required to take the Ph.D. qualifying examination even if it is not listed in the individual program requirements.

The standardized test scores admission requirement is also specific to each particular program. For programs requiring a standardized test, applications will not be reviewed until scores have been received. In all other cases, scores may be submitted if applicants believe the test results will enhance their application. However, the test results should be submitted as early as possible. If an application is received before test results, the admission decision may be made without the scores.

Successful completion of any course of study at URI does not guarantee that the student will find either a specific kind or level of employment. Graduate students interested in the career opportunities related to their program of study are encouraged to discuss their interests with the appropriate department chair or director of graduate studies, the Graduate School's dean, or Career Services staff. Students uncertain about career choices are also invited to use the services offered by the Counseling Center.

The availability of these programs of study and areas of specialization, administrative locations, requirements, and titles, are subject to change without notice.

For information on the background of your program's faculty, turn to the directory at the end of this catalog or visit the website of the relevant department(s) at uri.edu.

### Accounting

M.S.

401.874.5000

Faculty: Professor Schwarzbach, director of graduate studies. Professors Beckman, Martin, and Matoney; Associate Professors Boyle and Hazera; Assistant Professors Graham, Jervins, and Blanthorne.

#### MASTER OF SCIENCE

The Master of Science in accounting program is appropriate for students with a variety of educational backgrounds and professional interests. The program's objective is to provide an accounting and business foundation for the student with an undergraduate degree in an area other than accounting. These students graduate with a strong theoretical under-

standing of accounting along with the necessary technical background. They are equipped to perform exceedingly well in entry-level positions in accounting. An objective for students with undergraduate degrees in accounting is to provide a fifth year of conceptual, theoretical, and technical education in accounting, finance, management science, and other areas where the student and program director feel the student can gain the most toward achieving his or her educational objectives.

An applicant with a bachelor's degree in accounting from an accredited institution can complete the program of study in one year. Applicants with no prior education in business will need to spend two years in fulltime study or longer if studying part time. The course of study is divided into two parts. Part one is a common body of knowledge in business and accounting that is required for all students without a bachelor's degree in business. The student's undergraduate record is evaluated, and common body of knowledge courses are waived when a student has undergraduate equivalents. The second phase of the program allows the students to build on their accounting foundation and develop a high level of theoretical knowledge and a sound understanding of accounting principles and techniques. During the second part of the program, the student selects an area of specialization. Two areas are available: 1) financial reporting and auditing, or 2) taxation.

Admission requirements: An undergraduate grade point average of approximately B or above and a score at the 50th percentile or above on the GMAT examination are expected. The GMAT score and the undergraduate grade point average are not the sole criteria for admission. However, those with undergraduate grade point averages of less than B or with lower than 50th percentile scores on the GMAT have a reduced probability of admission. The GRE may be used in lieu of the GMAT at the discretion of the director of graduate studies. Applicants for whom English is not the native language will be expected to demonstrate proficiency in written and oral communications (TOEFL score of 91 or above), or they may be required to correct deficiencies by taking selected courses for no program credit. The University minimum must be met on each of the four sections of the TOEFL; see [uri.edu/gsadmis/g\\_s\\_apply\\_int](http://uri.edu/gsadmis/g_s_apply_int).

Program requirements: From 30 to 63 credits, depending on undergraduate program. A course requiring a major paper involving independent study is required in the nonthesis option. All graduate-level courses offered by the College of Business Administration are open to matriculated graduate students only.

### Applied Mathematical Sciences

See applied mathematics track under Mathematics. For a description of the former Ph.D. program in Applied Mathematical Sciences, which is no longer open to incoming students, please refer to the 2010–2011 URI Catalog.

### Audiology

See "SpeechLanguage Pathology".

## Biochemistry

See "Biological and Environmental Sciences".

## Biological and Environmental Sciences

M.S., Ph.D. (Interdepartmental)

401.874.2957

The M.S. and Ph.D. in biological and environmental sciences (BES) are interdisciplinary, interdepartmental graduate degrees that involve faculty from a diverse set of departments in URI's College of the Environment and Life Sciences (CELS), including Biological Sciences; Cell and Molecular Biology; Fisheries, Animal and Veterinary Science; Geosciences; Natural Resources Science; Nutrition and Food Sciences; and Plant Sciences; as well as faculty from the Graduate School of Oceanography. Contact information and a list of faculty in each of these departments are provided below.

Students accepted into the M.S. and Ph.D. degree programs in BES are organized into graduate specialization groups that include Cell and Molecular Biology (CMB), Integrative and Evolutionary Biology (IEB), Ecology and Ecosystem Sciences (EES), Environmental and Earth Sciences (EVES), and Sustainable Agriculture and Food Systems (SAFS). These graduate specialization groups are described in more detail below, along with the admissions and degree requirements for M.S. and Ph.D. students in BES. When applying to the BES graduate program, prospective students should indicate which of the graduate specialization groups listed below represents their primary area of interest. Prospective students are encouraged to contact individual faculty to learn more about graduate research opportunities.

DEPARTMENTS IN CELS THAT TRAIN GRADUATE STUDENTS IN BIOLOGICAL AND ENVIRONMENTAL SCIENCES:

Biological Sciences 401.874.2373, [uri.edu/cels/bio](http://uri.edu/cels/bio)

Faculty: Professor Goldsmith, chair; Associate Professor Wilga, director of graduate studies. Professors Bullock, Fastovsky, KassSimon, Killingbeck, Koske, A. Roberts, and Webb; Associate Professors Irvine, Katz, Norris, Siebel, and Thornber; Assistant Professors Lane, Preisser, and Sartini; Adjunct Professors Carlton, Deacutis, Fogarty, Henry, Lauder, Sanford, and Schneider; Adjunct Associate Professors Bailey, Cromarty, Ewanchuk, Gemma, Orwig, T. Roberts, and Thursby; Adjunct Assistant Professor Raposa; Research Professor Hill.

### **Cell and Molecular Biology 401.874.2201, [cels.uri.edu/cmb](http://cels.uri.edu/cmb)**

Faculty: Professor Sperry, chair; Professor Nelson, director of graduate studies. Professors Chandlee, Cohen, Hufnagel, Kausch, Paquette, and Sun; Associate Professor Martin; Assistant Professors Howlett and Jenkins; Research Professors A. de Groot, L. de Groot, and Spero; Research Assistant Professor Moise; Professors Emeriti Laux and Mottinger.

### **Fisheries, Animal and Veterinary Science 401.874.2477, [uri.edu/cels/favs](http://uri.edu/cels/favs)**

Faculty: Professor Bengtson, chair; Professor GomezChiari, director of graduate studies. Professors Bradley, CostaPierce, DeAlteris, Mallilo, Rhodes, and Rice; Assistant Professors Peterson and Sartini; Adjunct Professors Hoey, KleinMacPhee, Musick, Serra, and Smolowitz; Adjunct Associate Professors

Colwill and Hare; Adjunct Assistant Professors Brumbaugh, Castro, Dudzinski, Gleason, Hancock, Leavitt, Rheault, Petersson, Schwartz, and Wetherbee; Professors Emeriti Chang and Recksiek.

### **Geosciences 401.874.2265, [uri.edu/cels/geo](http://uri.edu/cels/geo)**

Faculty: Associate Professor Veeger, chair; Professor Boving, director of graduate studies. Professor Fastovsky; Assistant Professors Cardace and Savage; Adjunct Professors Burks, Fischer, and Spiegelman.

### **Natural Resources Science 401.874.2495, [nrs.uri.edu](http://nrs.uri.edu)**

Faculty: Professor Paton, chair; Professor Forrester, director of graduate studies. Professors Amador, August, Gold, Husband, McWilliams, Paton, Stolt, and Wang; Assistant Professors F. Meyerson and L. Meyerson; Adjunct Professors Paul and Perez; Adjunct Associate Professors Abedon, Cerrato, Daehler, Gorres, Groffman, Nowicki, O'Connell, Reed, and Rockwell; Adjunct Assistant Professors Augeri, Bergondo, Buffum, Dabek, Eisenbies, Eldridge, Farnsworth, Gayaldo, Hollister, Jarecki, Kellogg, Lashcomb, McKinney, Milstead, Mitchell, Peters, Pierce, Rubenstein, Saltonstall, Steele, and Tefft.

### **Nutrition and Food Sciences 401.874.2253, [cels.uri.edu/nfs](http://cels.uri.edu/nfs)**

Faculty: Professor Greene, chair; Assistant Professor Lofgren, director of graduate studies. Professor English; Associate Professors Gerber and Melanson; Assistant Professor Tovar; Adjunct Professor Sebelia; Adjunct Associate Professor Pivarnik; Professors Emeriti Rand, Lee, Caldwell, FeyYensan and Patnoad.

### **Plant Sciences and Entomology 401.874.2791, [cels.uri.edu/pls](http://cels.uri.edu/pls)**

Faculty: Professor Maynard, chair; Professor Mather, director of graduate studies. Professors Alm, Casagrande, LeBrun, Ruellemele, and Sullivan; Associate Professors Englander and Mitkowski; Assistant Professor Brown; Professor in Residence Ginsberg; Adjunct Assistant Professor Gettman; Professors Emeriti Beckman, Hull, and Jackson.

## GRADUATE SPECIALIZATION GROUPS

**Cell and Molecular Biology (CMB):** This graduate research group focuses on the molecular basis of life, offering solid foundations in biochemistry, microbiology, and molecular genetics, with an emphasis on interdisciplinary training. Faculty research interests are diverse and include the molecular basis of microbial colonization and virulence; the biochemistry of cellular signaling; the molecular origins of cancer; the development of vaccines against infectious disease; the roles of microbial consortia in the marine environment; comparative and evolutionary genomics; the control of gene expression by endogenous and environmental signals; the genetics of marine organisms; the molecular biology and genetic modification of plants; agricultural biotechnology; and developmental gene regulation.

**Integrative and Evolutionary Biology (IEB):** This graduate group focuses on the diversity of form and function of organisms from evolutionary and physiological perspectives, as well as the application of these approaches to health, agriculture, and the environment. Faculty research interests are diverse and include animal science (including reproduction, nutrition, management, and health), aquaculture (including ecology,

physiology, nutrition, and health), cellular and behavioral neurobiology (including sensory biology and neuroethology), evolutionary biology, genomics (comparative, evolutionary, and marine), morphology and development (including functional morphology, biomechanics, and evolutionary developmental biology), paleontology, physiology and pathology (including environmental, stress, reproductive, and comparative physiology, endocrinology, aquatic pathology), plant biology, and human health.

**Ecology and Ecosystem Sciences (EES):** This graduate research group focuses on patterns and processes within and among populations, communities, and ecosystems. Faculty research interests are diverse and include ecological studies across the spectrum of biological organization (molecular, organismal, population, community, ecosystem, and landscapes) that focus on the intra and interspecific interactions of microbes, algae, plants, insects, invertebrates, and vertebrates that inhabit a variety of terrestrial, coastal, freshwater, and marine ecosystems. Much of this research addresses important environmental issues with implications for public policy such as the ecology of endangered species and habitats, the biological control of algal blooms, invertebrate pests, parasites and disease, anthropogenic nutrient enrichment and bioremediation, ecohydrology of coastal wetlands, landscape change, climate change, invasive species, fisheries, and habitat restoration.

**Environmental and Earth Sciences (EVES):** This graduate research group focuses on the history, function, and condition of earth's environments from local to global scales. Faculty research interests encompass all aspects of the natural sciences including geology, biogeochemistry, hydrology, soil science, assessment of biodiversity, microbial ecology, and global change. Most of this research uses combinations of geospatial data technologies, computer modeling, state-of-the-art analytical instruments, and field investigations to advance our knowledge of earth processes and the management of water resources, shorelines, wetlands, and terrestrial landscapes to sustain healthy environments and to rehabilitate and restore damaged environments.

**Sustainable Agriculture and Food Systems (SAFS):** This graduate research group takes a systems-based, interdisciplinary approach to the biological and environmental sciences as applied to agriculture, aquaculture, fisheries, nutrition, and food safety. The diverse group of faculty, with contributors from both the natural and social sciences, uses a broad array of approaches, from molecular to ecosystem-based, to help achieve the economically sustainable production, management, consumption, and utilization of plants and animals for the development of healthy communities. Areas of research include animal science (reproduction, nutrition, management, and health), aquaculture (ecology, physiology, nutrition, and aquatic pathology), horticulture (fruit and vegetable production, environmental horticulture, and turfgrass management), entomology and biocontrol of invasive species, nutrition and food safety, and soil science.

#### **MASTER OF SCIENCE IN BIOLOGICAL AND ENVIRONMENTAL SCIENCES**

Admission requirements: GRE general test and a bachelor's degree in a biological or physical science, natural resources science, math, engineering, or other appropriate discipline. Applicants with course deficiencies may be required to take additional undergraduate courses for no program credit, and

to demonstrate, by their performance in such course work or through a qualifying exam, basic knowledge of the subject matter in the area(s) of deficiency.

Program requirements: a minimum of 30 credits beyond the bachelor's degree. This includes a minimum of six and a maximum of nine thesis credits (599 courses), a minimum of 18 credits of formal course work, and a maximum of six credits in special problems and directed studies courses.

#### **DOCTOR OF PHILOSOPHY IN BIOLOGICAL AND ENVIRONMENTAL SCIENCES**

Admission requirements: GRE general test and a bachelor's degree in a biological or physical science, natural resources science, math, engineering, or other appropriate discipline. Applicants with course deficiencies may be required to take additional undergraduate courses for no program credit.

Program requirements: a minimum of 72 credits of graduate study beyond the bachelor's degree (a master's degree may count for up to 30 credits). At least 42 credits must be taken at the University of Rhode Island. Required course work and dissertation credits depend on the preparation and study plan of the individual student. All degree candidates are required to prepare a Program of Study in consultation with their major professor and doctoral committee. Written and oral comprehensive examinations and a defense of dissertation are required. A qualifying examination will be required for students who are admitted without a master's degree and may be required for students whose prior degrees are outside of the proposed Ph.D. field of study.

#### **Business Administration**

M.B.A., Ph.D.

401.874.4241

Faculty: Professor Higgins, dean; Professors S. Chen and Rosen, associate deans.

Accounting: Professors Beckman, Higgins, Martin, Matoney, and Schwarzbach; Associate Professors Blanthorne, Boyle, Hazera, and Jervis; Assistant Professor Jelinek.

Business Law: Professor Hickox; Associate Professor Dunn.

Decision Science: Professors Budnick, S. Chen, and Jarrett.

Entrepreneurial Management: Professors Beauvais, Comerford, Cooper, Creed, Scholl, and Wheeler; Associate Professors Dorado-Banacloche, and Dugal, Assistant Professor Djurdevic.

Finance: Professor Dash; Associate Professors Lee, Lin, and Oppenheimer; Assistant Professors DaDalt, Xu, and Yu.

Information Systems: Professor Westin; Associate Professors Lloyd and Shin.

Marketing: Professors Della Bitta, N. Dholakia, R. Dholakia, Mazze, and Rosen; Associate Professors Leonard and Sheinin; Assistant Professor Cai.

Supply Chain Management: Associate Professor Hales; Assistant Professors Y. Chen and Ozpolat.

#### **SPECIALIZATIONS**

For the M.B.A.: finance, general business, management, marketing, and supply chain management.



For the Ph.D.: finance and insurance, management, management science, and marketing.

### GENERAL INFORMATION

In addition to the University's Office of Information Services, business students have access to three other computer facilities: the Bruce S. Sherman trading room, the college's general computer facility, and a computer laboratory at the Alan Shawn Feinstein College of Continuing Education (in Providence).

### MASTER OF BUSINESS ADMINISTRATION

The Master of Business Administration (M.B.A.) program prepares students for leadership positions in business, government, and nonprofit organizations. The faculty seeks to develop a global perspective while stressing the ethical and environmental responsibilities inherent in all management activities. Fulltime candidates may begin the program in the fall semester only and will complete the program in one calendar year. Parttime candidates may begin the program in the fall, spring, or summer semester.

Admission requirements: Graduate Management Admissions Test (GMAT) or Graduate Record Exam (GRE), a statement of purpose, application fee, a résumé, two letters of recommendation, and transcripts of all previous undergraduate or postbaccalaureate work are required. Work experience is valued. Applicants for whom English is not the native language are required to score 91 or above on the TOEFL (or 6.5 on the IELTS) and to meet the University minimum on each of the four sections of the TOEFL exam; see [uri.edu/gsadmis/gs\\_apply\\_int](http://uri.edu/gsadmis/gs_apply_int). The GMAT or GRE score and undergraduate grade point average are not the sole criteria for admission. However, those with undergraduate grade point averages of less than B or those with less than 50th percentile scores on the GMAT or GRE have a low probability of admission. Applications from well qualified individuals who can contribute to the cultural and ethnic diversity of the College of Business Administration and the University are welcome. Parttime M.B.A. applications are due June 30 for September admission, October 31 for January admission, and March 31 for summer admission. Fulltime M.B.A. applications are due April 15 for early admission; final deadline of June 30 for September admission.

Program requirements: The M.B.A. program curriculum has been updated to maintain a program that is current and relevant in the workplace.

The parttime M.B.A. program requires a minimum of 30 credits and a maximum of 45 credits. First, students are required to take the following seven courses: ECN 590, MBA 500, 502, 503, 504, 505, 565. Waiver exams are available for MBA 500, 504, and 505. MBA 500, MBA 503, and ECN 590 can be waived with permission of the program director based on successful completion of recent equivalent collegelevel courses at an AACSBaccredited institution. Students then must select five out of the following seven courses: MBA 510, 530, 540, 550, 555, 560, and 562. Finally, students are required to take three electives to complete their program of study.

The oneyear fulltime M.B.A. program is a nonthesis program consisting of a 45credit integrated curriculum. Students take day classes during the fall and spring semesters. During the summer, they complete their program by participating in an internship or elective course work. Completed application

packages must be received by April 15 (early decision) with a final deadline of June 30 for U.S. residents and February 15 for international applicants; applications received after that date are reviewed on a spaceavailable basis.

### DOCTOR OF PHILOSOPHY

The Ph.D. program in Business Administration is a research-based program. In addition to advanced course work, students work closely with faculty to conduct research on business issues of national and global importance. The program prepares students for faculty positions at research colleges and universities. The Ph.D. program is highly selective; only a small number of students are accepted each year. To be admitted you must demonstrate both academic merit and research capabilities.

Admission requirements: GMAT or GRE, a master's degree, original online application, a statement of purpose, a resume, three letters of recommendation, and transcripts of all previous degrees are required. Applicants with diverse academic backgrounds and previous industry experience are encouraged to apply.

Applicants are admitted for the fall semester only. Due to the selectivity of the programs, new admissions to the doctoral program must be limited to a small number each year. Since applicants are evaluated by the doctoral faculty in each of the specialization areas independently, all applicants must specify a single area of specialization on the application form. Completed application packages must be received by February 1.

Applicants for whom English is not the native language will be expected to score 575 (paperbased), 233 (computerbased), or 91 (iBT) or above on the TOEFL and to meet the University minimum on each of the four sections of the exam; see [uri.edu/gsadmis/gs\\_apply\\_int](http://uri.edu/gsadmis/gs_apply_int). Students may substitute the IELTS (minimum score of 6.5) for the TOEFL. The GMAT or GRE scores and master's grade point average are not the sole criteria for admission. However, those with master's grade point averages of less than 3.20 on a 4.00 point scale or those who score lower than 600 on the GMAT or GRE have a low probability of admission. The average master's grade point average for current doctoral candidates is 3.60, and their standardized scores average is 640.

Program requirements: Students must have a broad understanding of the major disciplines that comprise the study of business administration and their application to organizational settings. If you do not have this prerequisite knowledge, you may be required to complete up to 12 credits of prerequisite course work in the following areas: behavioral science applications to business administration (management or marketing), financial economics (economics or finance), statistics, and accounting. These prerequisite courses are not included for program credit. Students with previous course work in these areas are normally exempted. There are other avenues for an exemption. Students should discuss these alternatives with the doctoral program director.

The advanced course work phase entails a minimum of 32 credit hours of advanced course work beyond the master's degree. It consists of 12 credits of doctoral research seminars in your area of specialization, six credits of research methods, and 12 credits of supporting electives. There are also two one-credit courses on teaching and research. As part of this phase, you will write two major papers of publishable quality. These

papers are under the guidance of your professors. This phase culminates in written and oral comprehensive examinations covering your area of specialization, research methods, and other areas deemed appropriate by your doctoral dissertation committee.

After passing the comprehensive examination, doctoral candidates enter the dissertation research phase and engage in significant research under the supervision of their major professor and the doctoral committee. Doctoral dissertation research is expected to make a major contribution to the state of knowledge in the candidate's field. The dissertation defense is a final oral examination administered according to procedures established by the Graduate School.

#### *JOINT DOCTOR OF PHARMACY/MASTER OF BUSINESS ADMINISTRATION PROGRAM*

The University of Rhode Island Colleges of Pharmacy and Business Administration offer a joint program that allows students the opportunity to develop management and administrative skills as they study for the Doctor of Pharmacy (Pharm.D.) degree. See Pharmaceutical Sciences in the graduate section of this catalog.

#### *BUSINESS/OCEANOGRAPHY/M.B.A./M.O. JOINT DEGREE PROGRAM*

The College of Business and the Graduate School of Oceanography offer a joint degree program in which students are simultaneously enrolled in the M.B.A. and the M.O. programs and may complete both degrees within 16 months. Students take courses in business, oceanography, and economics. An internship with a business is also embedded in the curriculum.

## Cell and Molecular Biology

See Biological and Environmental Sciences.

## Chemical Engineering

Chemical Engineering

M.S., Ph.D.

401.874.2655

Faculty: Professor Brown, chair; Professor Greenfield, director of graduate studies. Professors Bose, Brown, Gregory, and Lucia; Associate Professors Bothun, Greenfield, and Rivero-Hudec; Assistant Professors Meenach and Worthen; Research Professor Crisman; Adjunct Professor Nystrom, Adjunct Associate Professor Mehos, Professors Emeriti Barnett, Gray, Knickle, Rockett, and Rose.

### **SPECIALIZATIONS**

Biochemical engineering: reactors, purification methods, degradation, and chemical production.

Bionanotechnology: hybrid bio/nano materials, drug delivery, biomolecular processes, nanocomposite hydrogels and micro-particles, sensors and devices.

Energy engineering: analysis of energy systems, multiphase flow and water conservation.

Environmental engineering: separation methods, heavy metal removal, solvent recovery, hazardous waste minimization, and desalination.

Materials engineering: corrosion and erosion, electronic materials processing, ceramic processing, polymer films, conducting polymers and thin film materials and sensors.

Pharmaceutical engineering: dry powder processing, production of particlebased therapeutics, engineering of therapeutic particles, and treatment of diseases.

Polymer engineering: thermophysical properties of polymers, polymer process modeling and control, and molecular modeling. Process simulation: process design, optimization, and analysis; process control; numerical methods.

Surface, interfacial and colloidal phenomena: soft and hard colloids, nano composites, and imaging techniques.

### **MASTER OF SCIENCE**

Admission requirements: bachelor's degree in chemical engineering; candidates from other engineering fields or from mathematics, biology, chemistry, or physics may be accepted into the program with possible addition of prerequisite courses.

Program requirements: 30 credits including CHE 501, 502, 513, 541, 599 (6-12 credits). For 12 thesis credits, no special problems or graduate seminar credit is permitted, 18–24 credits of course work. Nonthesis option for parttime students, with permission of the chair, requires master's examination and comprehensive report with oral examination. Attendance in CHE 501 or 502 is required every semester for all oncampus students. ACCELERATED B.S./M.S. DEGREE PROGRAM

See Chemical Engineering in the Undergraduate section of this catalog.

### **DOCTOR OF PHILOSOPHY**

Admission requirements: B.S. or M.S. degree in chemical engineering; candidates from other engineering fields or from mathematics, biology, chemistry, or physics may be accepted into the program with possible addition of prerequisite courses.

Program requirements: Candidate's program will be determined in consultation with his or her committee and will be based on his or her background and career goals, and must include at least one course each in CHE thermodynamics (513, 614) and CHE transport (541) at URI. Students with a masters degree require CHE 501, 502, 699 (25 credits) and fifteen credits of course work beyond the MS. Students with a bachelors degree require a qualifying exam, CHE 501, 502, 699 (37 credits), and 33 credits of course work. A comprehensive examination and an acceptable dissertation are required of all students to complete the program. Attendance in CHE 501 or 502 is required every semester for all oncampus students. Offcampus students can replace 501 and 502 with additional 691, 692, or 699 credits.

### **POLYMER CERTIFICATE PROGRAM**

The postbaccalaureate certificate program in polymers is targeted toward students who possess a bachelor's degree in an engineering or science field and are seeking further education in polymers. The program provides opportunities for students

to improve their knowledge of polymers in areas outside of their specific field of expertise, to apply their technical knowledge to problems in polymer engineering and science, and to develop technical skills that can be applied in industrial polymer engineering positions.

Admission requirements: same as for M.S.

Program requirements: successful completion of four courses from CHE 513, 529, 530, 531, and 537.

## Chemistry

M.S., Ph.D.

401.874.2318

Faculty: Professor Euler, chair. Professors Dain, Freeman, Kirschenbaum, Lucht, Oxley, Rosen, Smith, and Yang; Associate Professor DeBoef; Assistant Professors Dwyer, Levine, and Narayanan; Professors Emeriti C. Brown, P. Brown, Cheer, Cruickshank, Fasching, Goodman, Nelson, Traficante, and Vittimberga.

### SPECIALIZATIONS

Analytical chemistry: vibrational spectroscopy, separations science, laser spectroscopy, bioanalyses, surface science, explosives.

Biological chemistry: enzyme inhibition, neurochemistry, oxidative stress, macromolecular recognition.

Inorganic chemistry: metals in high oxidation states, solution kinetics, coordination complexes, electron transport, polymers.

Organic chemistry: reaction mechanisms, synthesis, electron transfer, heterocycles, polymers, organometallics.

Physical chemistry: theoretical chemistry, molecular spectroscopy, polymer arrays, statistical mechanics, smart materials.

### MASTER OF SCIENCE

Admission requirements: Preference is given to candidates with undergraduate majors in chemistry or chemical engineering including mathematics through calculus. GRE only for graduates of nonU.S. universities, with advanced test strongly recommended.

Program requirements: placement examination to determine specific program requirements and successful completion of master's qualifying examinations. For thesis option (31 credits), 12 credits of graduate core courses in at least three of the four areas of chemistry; one additional graduatelevel course in chemistry; CHM 642 or 643; and thesis. For nonthesis option (30 credits), 18 credits of graduate core courses; six additional credits of graduate course work; CHM 642 (1 credit); CHM 551, 552 (minimum 5 credits); and a written comprehensive examination.

The 30credit nonthesis option is also offered onsite at Pfizer, Inc. (Groton, Conn.)—18 credits of graduate core courses; six additional credits of graduate course work; CHM 642 (1 credit, taken in Kingston), CHM 551 (minimum 5 credits); and a written takehome comprehensive exam.

### DOCTOR OF PHILOSOPHY

Admission requirements: same as for master's degree.

Program requirements: successful completion of qualifying examination; 15 credits of graduate core courses; one additional graduatelevel course in chemistry; and CHM 642–644 (3 credits). Comprehensive examination and dissertation.

## Civil and Environmental Engineering

M.S., Ph.D.

401.874.2692

Faculty: Professor Tsiatas, chair; Associate Professor Hunter, director of graduate studies. Professors Baxter, Lee, Veyera, and Wright; Associate Professors Craver, Gindy, Thiem, and Thomas; Assistant Professors Akanda and Bradshaw; Adjunct Professors Harr and O'Neill; Adjunct Assistant Professors Badorek and George; Professors Emeriti Kovacs, Marcus, McEwen, Poon, and Urish.

### SPECIALIZATIONS

Environmental engineering: water supply and treatment facilities, municipal and industrial waste treatment, flocculation and coagulation of wastes, solid waste and hazardous waste management, modeling of environmental systems, groundwater pollution, groundwater exploration, coastal groundwater, nonpoint source pollution, stormwater management, river and estuary hydrology, hydraulics and water quality.

Geotechnical engineering: geoacoustic modeling and properties of marine sediments, sediment sampling, insitu testing, deepsea sedimentary processes, sediment transport, creep processes, environmental geotechnology, dredge material disposal, experimental geomechanics, soilstructure interaction, constitutive modeling of geological materials, particulate mechanics, applications of nonlinear finite element and discrete element methods to geomechanics problems, earthquake engineering, wave propagation in granular media, dynamic soil properties, liquefaction, geosynthetics.

Structural engineering: matrix and finite element analysis, computer and numerical methods, deterministic and stochastic structural dynamics, earthquakes, system identification, fatigue, design of steel and concrete structures, marine structures, structural stability, thinwalled structures, coastal structures, vibration control, soilstructure interaction, condition assessment and rehabilitation of bridges, structural safety and reliability, structural health monitoring, extreme event analysis.

Transportation engineering: properties of pavement materials, pavement theory and design, pavement management system, highway location, geometric design, traffic operation and control, transportation cost, transportation supply and demand analysis, and transportation system analysis.

### MASTER OF SCIENCE

Admission requirements: bachelor's degree in civil or environmental engineering. Candidates in other engineering fields or in mathematics, biology, chemistry, or physics may be accepted with the possibility of additional undergraduate prerequisite courses being required.

Program requirements: thesis or nonthesis option. Thirty credits plus CVE 601, 602 except for parttime students. For the thesis option, the thesis counts as six to nine of the required credits. The nonthesis option requires a comprehensive tech-

nical report and a written comprehensive exam.

### DOCTOR OF PHILOSOPHY

Admission requirements: master's degree in civil or environmental engineering or a related field. Exceptional students with a bachelor's degree will also be considered.

Program requirements: a minimum of 42 credits plus CVE 601 and 602 except for parttime students beyond the M.S. degree. Students take between 18 and 24 dissertation credits, including the twocourse minor outside of the candidate's area of specialization, where required by the candidate's committee; a comprehensive examination; and a dissertation. Although there is no formal departmental language requirement, the committee may require proficiency with a research tool or in a foreign language.

### ACCELERATED FIVEYEAR B.S./M.S. DEGREE PROGRAM

See Civil Engineering in the Undergraduate section of this catalog.

## Communication Studies

M.A.

401.874.2552

Faculty: Professor McClure, chair; Professor Mundorf, director of graduate studies. Professors Brownell, Chen, Ketrow, Logan, Salazar, Swift, and Wood; Associate Professors Dicioccio, Leatham, McClure, Quainoo, and Torrens; Assistant Professors Healey Jamiel, Reyes, Roth, and Ye; Professors Emeritae Anderson, Devlin, and Doody.

### SPECIALIZATIONS

Specializations offered in interpersonal communication, media studies, organizational communication, and public discourse. In consultation with advisors, students prepare for careers in public and private industry, government, or academic areas. Students are encouraged to develop their course plans to foster their evolving academic and career needs. Thus, one might advance specific interests and competencies in areas such as college teaching, communication technology, conflict management, political media, organizational communication training and development, or public relations. Individual specialties can be developed within each of the specialization areas.

For students' convenience, most courses are offered in late afternoon or evening in Providence and Kingston. Full and part time programs of study are available.

### MASTER OF ARTS

Admission requirements: Generally, GRE General Test (current GRE test format with analytical writing, verbal, and quantitative sections is requested), not older than five years, and bachelor's degree with undergraduate credit in communication studies. Applicants should submit a paper with a research focus written for an undergraduate course. Students from other academic backgrounds may be admitted with the permission of the director of graduate studies, although some basic courses may have to be taken for no program credit. Nonnative speakers of English are expected to demonstrate proficiency in written and oral English communication (TOEFL

score of 230 CBT or 88 iBT for admission; minimum of 250 CBT or 100 iBT, including 23 speaking score, for consideration for teaching assistantships. In all cases, the University minimum must be met on each of the four sections of the TOEFL exam; see [uri.edu/gsadmis/g3\\_apply\\_int](http://uri.edu/gsadmis/g3_apply_int). Applications should be completed online ([uri.edu/gsadmis](http://uri.edu/gsadmis)); completed application packets with support materials should be sent directly to Director of Graduate Studies, Department of Communication Studies, 60 Upper College Road, Suite 1, URI, Kingston, RI 02881. Completed applications, including support materials, must be received by February 1 for applicants who wish to be considered for financial aid. Applications received after that deadline but before July 15 will be reviewed on a space-available basis until the program is filled.

Program requirements: an approved program will include a minimum of 30 credits for both the thesis and nonthesis options. COM 501 and 502 are required for all students, and must to be completed prior to seminar or other course work. All students must complete one seminar in each of the four focus areas (12 credits): COM 510interpersonal communication; COM 520 media studies; COM 530organizational communication; and COM 540public discourse. An additional course in research methods, statistics (e.g. STA 409 or PSY/STA 532), or data analysis is strongly recommended.

For the thesis option, the requirements are 24 course credits plus thesis (6 credits) and its oral defense. For the nonthesis option (admission with approval of the director of graduate studies), requirements are 30 credits of course work that includes a course requiring a substantial paper based on significant independent study, plus a comprehensive examination. The comprehensive consists of two sections: the written section, which examines the students proficiency and knowledge in each of the four focus areas; and the oral section, which allows for the student to strengthen written answers, and to address material related to the written questions.

For thesis students, six elective credits beyond their 18 specified credits may be taken. For nonthesis students, up to 12 credits of free electives may be taken. A limited number of 500 and 600level courses in other departments and programs may be used for program credit if approved by the graduate program director as part of the students program of study before the courses are taken.

Students who take six credits per semester, plus one summer, may complete their studies in two years.

### FINANCIAL AID

All requests for assistantships must be sent to the director of graduate studies with the application packet. A limited number of teaching assistantships and an occasional research assistantship are available. In addition, some graduate assistantships outside the department may be available, such as in student life or residential housing. Priority will be given to applications received by February 1; therefore, assistantships will be awarded on a spaceavailable basis.

## Computer Science

M.S., Ph.D.

401.874.2701

Faculty: Professor Peckham, chair; Associate Professor Baudet,

director of graduate studies. Professors DiPippo, FayWolfe and Lamagna; Associate Professors Hamel and Hervé; Adjunct Assistant Professors Dickerman, Encarnação, Henry, and Ravenscroft; Professors Emeriti Carrano and Kowalski.

#### *SPECIALIZATIONS*

Analysis of algorithms, artificial intelligence, bioinformatics, computer algebra, computer graphics, computers in education, cryptography, cyber security, databases, data mining, digital forensics, distributed computing, implementation and semantics of programming languages, logicbased programming, parallel computing, real time systems, simulation, sensor networks, vision, and visualization.

#### *CORE AREAS*

For the purpose of describing graduate degree requirements, core computer science courses are grouped into the following core areas:

#### **MATHEMATICAL FOUNDATIONS: CSC 541, 542, 544, 550**

Programming Languages: CSC 402, 501, 502

Architecture and Systems: CSC 511, 512, 519

#### *MASTER OF SCIENCE*

Admission requirements: bachelor's degree in computer science or a closely related field. Applicants with a bachelor's degree in an unrelated field will be considered provided they have completed course work covering the material in CSC 211, 212, 301, 305, 340 and MTH 141, 142, plus one MTH or STA course for which calculus is a prerequisite. Students may be admitted who have completed only a part of the above course work but they will be required to complete the deficiencies before taking more advanced classes.

The GRE General test is required. A subject test in computer science or a related field is not required but may be considered by the admission committee.

Program requirements: The M.S. curriculum in computer science has three tracks: thesis, nonthesis, and applied nonthesis. Program requirements for thesis option: 1) at least one course from each of the following core areas: mathematical foundations, programming languages, and architecture and systems; 2) at least five other courses chosen with the approval of the major professor (at least two of these must be approved CSC courses or equivalents); 3) eight credits of thesis.

Program requirements for nonthesis option: 1) at least two courses from mathematical foundations, one course from programming languages, and two courses from architecture and systems; 2) at least three more approved CSC courses or equivalents; 3) at least two more courses chosen with the approval of the advisor; 4) at least one of the ten courses listed above should include writing a substantial paper based on significant independent research; 5) passing a written comprehensive examination.

Program requirements for applied nonthesis option: 1) at least two courses from mathematical foundations, one course from programming languages, and two courses from architecture and systems; 2) at least two more approved CSC courses or equivalents; 3) at least one course should include writing a substantial paper based on significant independent research;

4) an approved concentration in another discipline consisting of a minimum of four graduate courses in the area of concentration; 5) passing a written comprehensive examination.

Approved applied nonthesis option concentrations exist for Computers and Business Management, Computers and Operations Research, and Computers and Statistics. Other concentrations are possible. Students should meet with their faculty advisors to discuss requirements. The department encourages other application areas in the physical, biological, mathematical, and social sciences. Students in the applied track will have an advisor in computer science and an advisor in their application area. Together, these advisors will approve the student's program of study.

#### *DOCTOR OF PHILOSOPHY*

Admission requirements: Bachelors degree in computer science or a closely related field. Applicants with a bachelors degree in an unrelated field will be considered provided they have completed course work covering the material in CSC 211, 212, 301, 305, 340 and MTH 141, 142, plus one MTH or STA course for which calculus is a prerequisite. Students may be admitted who have completed only a part of the above course work but they will be required to complete the deficiencies before taking more advanced classes.

The GRE general test is required. A subject test in computer science or a related field is not required, but may be considered by the admission committee.

Program requirements: The student must complete 54 credits of course work beyond the bachelors degree in addition to 18 credits for the doctoral dissertation. A student entering the program with an M.S. degree in computer science or a related area may be granted up to 30 credits toward the Ph.D. in computer science.

Students must complete two courses from mathematical foundations, one course from programming languages, two courses from architecture and systems, plus three more approved CSC courses or equivalents. Other courses must be selected in order to meet the 54credit minimum and will be selected in consultation with the student's advisor or major professor.

Students must take a comprehensive examination, which is composed of a written examination and an oral examination. The written examination, which will be held at least once a year, covers the three core areas listed above. Success in the written examination is conditional upon obtaining passing grades in all areas, and is a prerequisite for taking the oral examination. Typically, a student would be expected to take the comprehensive examination within two years after joining the program. The objective of the oral examination is for the student to present an intended research program and demonstrate satisfactory knowledge and understanding of the scientific literature of the corresponding research domain. A candidate whose comprehensive exam performance is deemed as failing by the Computer Science Graduate Committee may, with the recommendation of the committee and the approval of the Graduate School, be permitted one reexamination, to be taken no sooner than four months and no later than one year after the initial examination.

**DIGITAL FORENSICS GRADUATE CERTIFICATE PROGRAM**

The Graduate Certificate in Digital Forensics is designed for professionals who have a four-year undergraduate degree and wish to pursue a focused program in the field of digital forensics. A student wishing to receive a Graduate Certificate in Digital Forensics must complete the following courses: CSF 410, 512, 516, and one of CSF 414, 524. For more information, including a list of required courses and an application to the program, please visit [dfcsc.uri.edu/academics/digital\\_forensics](http://dfcsc.uri.edu/academics/digital_forensics).

**CYBER SECURITY GRADUATE CERTIFICATE PROGRAM**

The Graduate Certificate in Cyber Security is designed for professionals who have a four-year undergraduate degree and wish to pursue a focused program in the field of cyber security. A student wishing to receive a Graduate Certificate in Cyber Security must complete the following courses: CSF 430, 432, 534, and one of CSF 524, 538, 536. For more information, including a list of required courses and an application to the program, please visit [dfcsc.uri.edu/academics/cyber\\_security](http://dfcsc.uri.edu/academics/cyber_security).

**Dietetic Internship Program**

See Nutrition and Food Sciences.

**Economics**

See Environmental and Natural Resource Economics.

**Education**

*M.A. 401.874.2564*

**PH.D. 401.874.4877**

Professor Seitsinger, coordinator of graduate studies.

Faculty for the M.A.: Professors Boulmetis, S. Brand, S. T. Brand, Byrd, Eichinger, HammadouSullivan, Seitsinger, Willis; Associate Professors Adamy, Ciccomascolo, Deeney, deGroot, Hicks, Kern, Peno, and Shim; Assistant Professors Coiro, and Fogleman; Professors Emeriti Bumpus, Croasdale, Favazza, Heifetz, Kellogg, MacMillan, McKinney, Purnell, Russo, and Young; Associate Professor Emeritus Nelson.

URI Faculty for the Ph.D. in Education Program: Professor Seitsinger, URI CoDirector; Professors Boulmetis, Brady, S. Brand, S.T. Brand, Byrd, Eichinger, HammadouSullivan, Hobbs, Kovarsky, McCurdy, Roush, Seitsinger, George Willis, Grant Willis, and Xiao; Associate Professors Adamy, Branch, Ciccomascolo, Deeney, deGroot, Hicks, and Shim; Assistant Professors Coiro, Fogleman, and Vaccaro; Professors Emeriti Heifetz, McKinney, Purnell, and Young.

RIC Faculty for the Ph.D. in Education Program: Professor Castagno, RIC codirector; Professors Barton, Castagno, Cordeiro, Dufour, Eldridge, Filinson, FluehrLobban, Johnson, Kochanek, Lynch, Panofsky, Ozcan, Ramocki, Rowell, and Stieglitz; Associate Professors Bigler, Brell, Bogad, and Niska; Assistant Professor Horwitz; Assistant Dean E. Sullivan.

**MASTER OF ARTS**

Admission requirements: A faculty interview is required. Individuals seeking to undertake the initial certification options in elementary and secondary education are expected to have a substantial academic background in the field of interest. In addition, applicants should contact the department regarding the required testing, admissions portfolio, interview process, and yearly admission deadline (or visit the website at [uri.edu/hss/education](http://uri.edu/hss/education)). For foreign applicants, a TOEFL score of 600 PBT, 250 CBT, or 100 iBT is required, and the University minimum must be met on each of the four sections of the exam; see [uri.edu/gsadmis/g\\_s\\_apply.html](http://uri.edu/gsadmis/g_s_apply.html).

Program requirements: Individuals may choose the thesis or nonthesis option. Required are 30 credits for the elementary and secondary specialization; 33 credits for the adult education specialization; and a minimum of 34 credits for reading education; including a required core of at least six credits (a foundation and a research methodology course); two electives (six credits), and an academic specialization (18–24 credits). The nonthesis option requires a written comprehensive examination and at least one designated course with a substantial paper involving significant independent research.

Master of Arts Teaching Certificate Program (MATCP): applicants who wish to pursue the initial teacher certification option of the elementary or secondary specializations take 19–34 additional credits. Students may obtain certification prior to completing the requirements for the M.A., as listed above. See Teacher Certification.

Specializations: Applicants seeking the Master of Arts degree must declare an area of specialization. A specialization may be one predefined by the department or designed in accordance with the applicant's background and interest. Defined specializations include:

Elementary education—advanced study for elementary teachers; the MATCP option is available for students seeking initial certification in elementary teaching.

Secondary education—advanced study for secondary teachers of English, history, languages, mathematics, science, and social studies; the MATCP option is available for students seeking initial certification in these areas.

Reading education—program leading to advanced certification as reading specialist/consultant. Applicants must hold initial teaching certification in early childhood, elementary, or secondary education. A résumé of experience must be submitted with an application.

Adult education—administration; adult literacy; education, training, and management (ETMS); gerontology; training and development; and vocational education.

**M.A. IN SPECIAL EDUCATION**

Admission requirements: A faculty interview is required. Applicants seeking special education certification need to have the necessary certification in elementary, or secondary education. Applicants should contact the department or check the School of Education website for complete admission information.

Program requirements: The graduate program in special education enables students to meet the Council for Exceptional Children standards and the requirements for a RI special

education teaching certificate in the area of mild/moderate disabilities either at the elementary school level (grades 1–6) or at the secondary level (grades 7–12). Students complete a total of 36 credits over a threesemester sequence. Students must also achieve a passing score on the comprehensive exams and on all state or University outcome measures.

Applications will continue to be accepted for fall admission after the February 1 deadline until the cohort is full.

### **DOCTOR OF PHILOSOPHY (JOINT WITH RHODE ISLAND COLLEGE)**

Rhode Island College and the University of Rhode Island offer a Ph.D. in education, which prepares scholar practitioners for new professional roles as educational leaders, mentors, and scholars. The program is grounded in the knowledge bases of school teaching and learning. The program's four objectives provide a framework for the preparation of scholar practitioners to: 1) develop and employ collegial relationships through professional collaboration; 2) acquire and apply the skills and processes of scholarly inquiry; 3) demonstrate expertise in an area of specialization that advances the mission of American education; and 4) implement professional practices that promote progress in educational settings.

Designed for professionals involved in prekindergarten through adult education, the doctoral program admits 10 to 15 students per year. This cohortbased research program is for students who previously earned a master's degree in education or an allied field or have earned at least 30 graduate credits from a regionally accredited institution. The graduate-level work must include three credits in each of the following areas: a) educational foundations; b) curriculum; and c) research. A major segment of each student cohort will be made up of teachers and administrators from Rhode Island who are committed to developing advanced teaching, leadership, and research skills.

Admission requirements: Graduate Record Exam (GRE) scores no older than 5 years, official transcripts, curriculum vita, and letters of recommendation are required. Finalists in the application process must participate in a personal interview. Applicants are admitted for the fall semester only. The completed application package must be received by January 31. The program is offered jointly by the two institutions with single admission and administrative processes. Prospective applicants should address inquiries concerning the program to one of the codirectors at either Rhode Island College or URI. All applicants must complete the electronic graduate application for admission, available online at [uri.edu/gsadmis](http://uri.edu/gsadmis).

Program requirements: the program requires a minimum of 56 credits beyond the master's degree or 86 graduate credits. Three yearlong core seminars emphasize different aspects of education from history, culture, and foundations, to curriculum development, teaching, and learning, and finally to administration, leadership, and policy analysis (EDP 610, 611; 620, 621;

630, 631, for a total of 18 credits). Field research seminars (EDP 641, taken four times for a total of four credits) are taken in parallel with the core seminars. Fieldbased research (EDP 622, two credits, taken in the second year) explores community service and service learning in the context of schools. Students gain research expertise to help their development as school leaders through course work (EDP 612, 613, 623 for a

total of ten credits) and the field research seminars. Scholarly expertise in a professional area is acquired through specialization courses (12 credits).

All students must complete a doctoral dissertation (12 credits). To progress through this program, students must 1) receive positive recommendations from core seminar professors; 2) pass a qualifying examination upon completion of the first core seminar (EDP 610, 611) and the first two courses in research methodology (EDP 612 and 613) if they have not previously completed a master's degree in education or a closely related field; 3) pass a comprehensive examination after completion of all core seminars and research courses; and 4) complete a successful dissertation and defense.

## **Electrical Engineering**

### **M.S., Ph.D.**

#### **401.874.2506**

Faculty: Professor Fischer, chair; Associate Professor Vetter, director of graduate studies; Professors BoudreauxBartels, Kay, Kumaresan, Lo, Mardix, Ohley, Ying Sun, Sunak, Swaszek, Vaccaro, and Q. Yang; Associate Professors Besio, He, Huang, Sendag, and Yan Sun; Assistant Professor Wei; Professorin-Residence Uht; Adjunct Professors Banerjee, Chiaramida, Cooley, and Harnett; Adjunct Associate Professor Jennanne; Adjunct Associate Professor Davis; Adjunct Assistant Professors Sarma and Sepe; Professors Emeriti Daly, Haas, Jackson, Lengyel, Lindgren, Mitra, Sadasiv, Spence, and Tufts.

### **SPECIALIZATIONS**

Acoustics and underwater acoustics: communication, detection, classification, and localization for underwater acoustic channels, speech processing.

Biomedical engineering: modeling and control of physiological systems; medical instrumentation and biosignal processing, pattern recognition and image processing (texture analysis, image classification, and segmentation) in medicine; assistive technology to aid persons with disabilities; cardiac anatomy, electrophysiology, and mechanics and resuscitation; neural engineering.

Circuit and devices: mixed signal integrated circuits, VLSI design and simulation, highlevel synthesis and design tools, design automation and optimization, highresolution data converters, lowpower CMOS circuits, device physics and device modeling.

Communication theory: statistical and computer communications; data compression and coding; modulation and demodulation; Monte Carlo simulation; local area networks, reliable and secure communication.

Computer architectures and digital systems: processor architectures, memory structures, I/O systems, reliable data storage systems, RAID/SAN/NAS storages, parallel and distributed systems, FPGA designs, VHDL/Verilog, VLSI designs and layouts, adaptive systems, control and data speculation.

Computer networks: computer network architectures and protocols, TCP/IP, local area networks (LAN), Internet applications, wired and wireless computer communication, network security, distributed computing systems.

Digital signal processing: detection and parameter estimation;

prediction and filtering; spectrum analysis; array processing; digital filter synthesis; adaptive filtering, algorithm design.

Embedded systems and computer applications: embedded system designs, hardware/software designs in embedded applications for networking devices, automobiles, image processing, home appliances, and computer forensics.

Faulttolerant computing: faulttolerant computer systems, hardware/software testing, error control coding, data protection and data recovery technologies, reliability and availability modeling, system simulations for performance and reliability analysis of computer systems.

Materials and optics: electrical and optical properties of materials, laser-matter interaction, photocathodes; crystallographic techniques for submicron X-ray lithography; radiation damage in nonmetallic solids; mode characteristics in optical and infrared fiber waveguides; fiber optic sensors; fiber optical amplifiers; electrooptic modulators.

Systems theory: control and estimation theory, intelligent systems; multivariable systems; nonlinear systems, modeling of deterministic and stochastic systems; model order reduction; optimal smoothing, filtering and prediction; pattern recognition, classification, computer vision; computerized imaging systems and image analysis.

#### GRADUATE CERTIFICATE IN VLSI

The department offers a graduate certificate in Very Large Scale Integrated (VLSI) circuit design and testing. Students are required to complete four courses from a preapproved list, subject to certain distribution requirements. Interested students are encouraged to speak with the department graduate program director to discuss course requirements.

#### MASTER OF SCIENCE

Admission requirements: GRE and B.S. degree in electrical, computer, or biomedical engineering, physics, mathematics, or computer science. GRE may be waived for candidates who earned the B.S. degree from an accredited U.S. program with a GPA of 3.00 or higher. Preparation in related fields such as mechanical engineering or in the life sciences may be acceptable.

Program requirements: thesis or nonthesis option—minimum of 30 credits in science and engineering with a minimum of 16 credits in graduate-level electrical engineering courses. One credit of the departmental seminar (ELE 601 and/or 602) is required of all students. Up to two credits of seminar may be used toward the 30-credit master's requirement. Individual programs are designed in accordance with students' backgrounds and interests, but require departmental and Graduate School approval. For the thesis option, the thesis counts as six to nine credits. For the nonthesis option, a written master's examination and one course involving significant independent research and a substantial paper are required.

#### ACCELERATED FIVEYEAR B.S./M.S. DEGREE PROGRAM

See Biomedical Engineering in the Undergraduate section of this catalog. See Computer Engineering in the Undergraduate section of this catalog. See Electrical Engineering in the Undergraduate section of this catalog.

#### DOCTOR OF PHILOSOPHY

Admission requirements: GRE and M.S. degree or equivalent in electrical, computer, or biomedical engineering, physics, mathematics, or computer science, or a related field. Exceptional candidates may be admitted directly from the B.S. degree.

Program requirements: a minimum of 72 credits beyond the B.S. degree. The M.S. degree may count up to 30 of these credits; the remaining credits are split between course work and dissertation research. Students with an M.S. in an appropriate field complete between 18–24 dissertation credits; students without the M.S. may take between 18 and 30 (in either case additional dissertation credits may be taken for no program credit). A qualifying examination is required. A comprehensive examination is required after all formal course work is completed. Two credits of the departmental seminar (ELE 601 and 602) are required of all students. These credits may not be counted as part of the 42 credits required beyond the master's degree.

#### English

#### ENGLISH

M.A., M.A./M.L.I.S., Ph.D.

**401.874.4663 [www.uri.edu/artsci/eng/Graduate/index.html](http://www.uri.edu/artsci/eng/Graduate/index.html)**

Faculty: Associate Professor Trimm, chair; Professor Davis, director of graduate studies (Literature and Culture); Associate Professor Miles, director of graduate studies (Rhetoric). Professors Cappello, Gititi, Mandel, Reynolds, Schwegler, Stein, and Walton; Associate Professors Barber, Betensky, Covino, Dyehouse, Karno, Rojas, and Williams; Assistant Professors Druschke, Eron, Faflik, Hensley Owens, Jones, Sigler, and Valentino; Professors Emeriti Arakelian, Burke, Campbell, Cuddy, Donnelly, Dvorak, Leo, Neuse, and Shamoan; Associate Professor Emeritus Cane.

#### SPECIALIZATIONS

Literature and culture; rhetoric and composition studies.

#### MASTER OF ARTS

Admission requirements: a B.A. in English or the equivalent, with a grade point average of B (3.00 on a 4.00 scale) or better in all English courses. Applicants will be accepted for September admission only. A writing sample of 20 pages maximum is required. Nonnative speakers of English must have a TOEFL score of 91 or above in order to be considered for admission, and the University minimum must be met on each of the four sections of the exam; see [uri.edu/artsci/eng/Graduate/AdmissionsRequirements.html](http://www.uri.edu/artsci/eng/Graduate/AdmissionsRequirements.html) for more detail regarding admission.

Program requirements: 30 credits, including ENG 595 (master's project) or ENG 599 (master's thesis). The specialization in Literature and Culture requires ENG 510, 511, and 514. The specialization in rhetoric and composition studies requires ENG 514 and WRT 512, 524, 645, and 599.

#### M.A. IN ENGLISH AND M.L.I.S. COOPERATIVE PROGRAM

By proper selection of course work, a student may simultane-



ously earn the degree of Master of Arts in English and Master of Library and Information Studies.

Admission requirements: Requirements listed for English and library science. Applicant must apply and be accepted in both programs. The application for each program must indicate English/library and information studies as the field of specialization.

Program requirements: Students must submit individual programs of study for the 36credit M.L.I.S. program and the 30credit M.A. in English. The integrated pursuit of the two degrees makes it possible for six credits of appropriately selected course work from one program to serve as electives in the other, and for six credits of course work to be applied in the opposite direction. Thus, when planned and taken jointly, the two programs can be completed with a total of 54 credits rather than 66. Students must complete at least 30 credits in librarianship and at least 24 credits in English.

### DOCTOR OF PHILOSOPHY

The Ph.D. program stresses faculty/student mentoring. Admission is competitive and based mainly on academic merit, demonstrated capability to do research, and the match of research interests between the applicant and faculty in indicated or developing areas of specialization.

Admission requirements: M.A. in English or equivalent. Although grades are not the only criterion, applicants having less than a 3.50 grade point average (on a 4.00 scale) have a low probability for admission. Applicants will be accepted for September admission only. The GRE test is required. A writing sample of 20 pages maximum is required. Nonnative speakers of English must have a TOEFL score of 91 or above in order to be considered for admission, and the University minimum must be met on each of the four sections of the exam; see [uri.edu/gsadmis/gs\\_apply\\_int](http://www.uri.edu/gsadmis/gs_apply_int). For more detail regarding admission see: <http://www.uri.edu/artsci/eng/Graduate/Admission-Requirements.html>

Program requirements: 72 credits—30 credits approved for M.A. work; 24 credits of course work plus 18 credits of dissertation research. The specialization in Literature and Culture requires ENG 510, 511, and 514. The specialization in rhetoric and composition studies requires ENG 514 and WRT 512, 524, 645, 646, 647, and 699. Candidates must pass comprehensive exams per area of specialization; a dissertation and an oral defense are required. Core dissertation committee must include faculty in area of specialization. Interdisciplinary study is encouraged, including coursework in other departments. A limited number of 500 and 600level courses in other departments and programs may be used for program credit if approved as part of the student's program of study before the courses are taken. (In some cases, a research tool may be required by a student's doctoral committee in consultation with the director of graduate studies.)

### Financial Aid

All requests for Teaching Assistantships must be expressed in an additional, separate letter included with the application packet.

## Environmental and Natural Resource Economics

### M.S., Ph.D.

401.874.2471

Faculty: Professor J.L. Anderson, chair; Associate Professor C. Anderson, director of graduate studies. Professors Gates, Grigalunas, Opaluch, Roheim, and Swallow; Assistant Professors Schnier, E. Uchida, and H. Uchida; Adjunct Professors Asche, Holland, Mazzotta, and Rubino; Professors Emeriti Gates, Sutinen, and Tyrrell.

### SPECIALIZATIONS

Environmental economics, renewable and nonrenewable natural resource economics, fisheries management, international fisheries development, international trade, fisheries marketing, coastal zone land use and management, quality of the marine environment, aquaculture economics, offshore oil and gas management, and natural resource pricing policies.

### MASTER OF SCIENCE

Admission requirements: the GRE is required. A strong undergraduate record in economics, statistics, and mathematics is highly desirable.

Program requirements: for the thesis option, 24 credits including EEC 501, 502, 528, 534, 535, and 576, in addition to a written comprehensive examination, and at least six EEC 599 M.S. thesis credits. For the nonthesis option, 33 credits

including 501, 502, 528, 534, 535, and 576, in addition to a written comprehensive examination, and one EEC 598 credit given for a substantial paper requiring significant independent research. EEC 501 must be taken each semester by full-time graduate students in residence, but only one credit may count toward the program.

### DOCTOR OF PHILOSOPHY

Admission requirements: GRE, six credits in statistics, and the following courses or their equivalents—ECN 327, 328, and 375.

Program requirements: the Ph.D. qualifying exam is required of students admitted without the master's degree. EEC 501, 502, 528, 534, 535, 576, 602, 624, 628, 630, 634, 676, and 699 are required. EEC 501 must be taken each semester by fulltime graduate students in residence, but only one credit may count toward the program. Students with a master's degree in a closely related field may transfer up to 30 credits toward their Ph.D. Additional courses may be elected from appropriate offerings, such as economics, resource economics, engineering, geography, oceanography, mathematics, natural resources science, political science, statistics, computer science, finance, marine affairs, and management science. The Ph.D. dissertation will be written on a problem involving marine resources, coastal issues, or an associated industry, such as minerals, petroleum, fisheries, water, transportation, recreation, or waste disposal.

## Environmental Science and Management

(Interdepartmental) M.E.S.M.

401.874.4880

Steering committee: Professors P.V. August, and A.J. Gold, co-chairs; Professors Bengtson, Paton, Boving, Gordon and Y.Q.

Wang.

Faculty: Professors Alm, Amador, Atash, August, Bengtson, Boving, Burroughs, Dalton, Fastovsky, Forrester, Ginsberg, A. Gold, GomezChiari, Green, Husband, LeBrun, T. Mather, B. Maynard, McWilliams, Opaluch, Paton, Pollnac, Rhodes, Rice, Sheridan, Simeoni, Stolt, Swift, and Y.Q. Wang; Associate Professors Gordon, Meyerson, E. Uchida, H. Uchida, and Vee-ger; Assistant Professors Becker, R. Brown, Cardace, Karraker, Macinko, Mitkowski, Petersson, Sartini, and Savage; Adjunct Associate Professor Abedon.

The Master of Environmental Science and Management (M.E.S.M.) is an interdisciplinary, interdepartmental, professional degree program designed for students who seek professional environmental positions in areas other than research. The M.E.S.M. degree program serves graduate students from six departments within URI's College of Environment and Life Sciences (CELS): Environmental and Natural Resource Economics; Fisheries, Animal and Veterinary Science; Geosciences; Marine Affairs; Natural Resources Science; and Plant Sciences. It is administered by a steering committee selected from the graduate faculty.

### SPECIALIZATIONS

Conservation biology; earth and hydrologic science; environmental policy and management; remote sensing and spatial analysis; sustainable systems; and wetland, watershed, and ecosystem science.

### MASTER OF ENVIRONMENTAL SCIENCE AND MANAGEMENT

Admission requirements: GRE and bachelor's degree in biological science, physical science, environmental science, natural resources, or engineering. Applicants with course deficiencies may be required to take appropriate undergraduate courses for no program credit and to demonstrate, by their performance in such coursework or through a qualifying exam, basic knowledge of the subject matter in the area(s) of deficiency. Application must be made to one of the six specializations.

Program requirements: A minimum of 36 credits of course work consisting of 21–25 credits of core courses, including at least 9 credits in natural sciences, at least 6 credits in social sciences, and at least 3 credits in numerical methods; 610 credits of electives, up to 3 credits of which might be an internship (EVS 597) with an environmental agency, nongovernmental agency, or private firm; an independent research project (EVS 598) that culminates in a substantial, high-quality, written report; and at least 2 credits of graduate seminar (typically EVS 501, 502), including a terminal oral presentation. Written comprehensive examination on coursework. Course requirements that are unique to each of the specializations are as follows. Conservation biology: 12–16 credits in natural sciences, including at least 3 credits in plant and animal biology, at least 3 credits in ecology, and at least 3 credits in

biodiversity analysis and management; and at least 2 credits of graduate seminar from EEC, EVS, NRS, or PLS. Earth and hydrologic science: 12–16 credits in natural sciences from any or all of the following categories: earth surface processes, hydrology, solid earth materials and processes, or spatial analysis and remote sensing; and at least 2 credits of graduate seminar from EVS, GEO, MAF, or NRS. Environmental planning and design: 13 credits in planning and design including at least 4 credits in design studio and at least 9 credits in planning; 9 credits in natural sciences from any or all of the following categories or from numerical methods: geology, hydrology, and soil science; ecology and management; or remote sensing and spatial analysis. Environmental policy and management: 9 credits in social sciences from policy, planning, economics, and research methods; 9 credits in natural sciences from any or all of the following categories or from numerical methods: geology, hydrology, and soil science; ecology and management; or remote sensing and spatial analysis; and at least 2 credits of graduate seminar from CPL, EEC, EVS, GEO, MAF, or NRS. Remote sensing and spatial analysis:

12–16 credits in natural sciences, including at least 9 credits in remote sensing and spatial analysis, and 0–7 credits in earth and ecosystem science; and at least 2 credits of graduate seminar from EVS, GEO, or NRS. Sustainable systems: 12–16 credits in natural sciences, including at least 3 credits in natural ecosystems and at least 3 credits in managed ecosystems; and at least 2 credits of graduate seminar from AFS, EEC, EVS, NRS, or PLS. Wetland, watershed, and ecosystem science: 12–16 credits in natural sciences, including at least 3 credits in each of the following topics watersheds, wetlands, and ecosystems plus 3 credits in earth science, soils, or spatial analysis; and at least 2 credits of graduate seminar from EEC, EVS, GEO, MAF, or NRS.

### GRADUATE CERTIFICATE IN GIS AND REMOTE SENSING

The URI Graduate Certificate in Geographic Information Systems and Remote Sensing (GIS/RS) provides students advanced training in using geospatial technologies to address analytical problems where location is an essential parameter.

Admission requirements: To apply you will need to provide: (1) college transcripts certifying successful completion of a bachelor's degree, (2) two letters of recommendation from peers, mentors, or colleagues attesting to your ability to complete graduate-level coursework, and (3) a personal written statement explaining why you are seeking a graduate certificate in GIS/RS. GRE's are not required. Applications for Fall semester admission should be completed by 10 August and applications for Spring semester admission should be completed by 1 December.

Program requirements: 15 credits of graduate coursework that consists of: NRS410, NRS509, NRS522, and NRS51 or NRS415. The remaining credits are taken from an approved list of additional courses.

**For more information: see <http://web.uri.edu/cels-gradprograms/certificateingisandremotesensing/>**

## Environmental Sciences

See Biological and Environmental Sciences.

## Fisheries, Animal and Veterinary Science

See Biological and Environmental Sciences.

## Gender and Women's Studies

### POSTBACCALAUREATE CERTIFICATE IN GENDER AND WOMEN'S STUDIES

401.874.5150

The Gender and Women's Studies Program at URI offers an interdisciplinary graduate certificate program informed by advanced feminist scholarship and pedagogical principles, designed to enhance the educational background and career opportunities for matriculated graduate students or nonmatriculated postbaccalaureate students.

The certificate program requires 9 credits of graduate work in any field and 6 credits of Gender and Women's Studies (GWS) courses. (These courses may count toward a graduate degree in a field such as psychology, history, or English. Check with an advisor.)

Matriculated graduate students will take 9 credits of graduate study in their program that focuses on women or gender. The 9 credits may take the form of a course such as Women's History, or A Woman Writer, or Psychology of Women; substantial research focused on women or gender for a course such as Social Psychology, or Special Readings in American History.

Nonmatriculated students may take 9 credits of graduate study in any relevant graduate program or combination of programs (such as communication studies, English, history, human development and family studies, nursing, or psychology), subject to approval by the program director.

Both matriculated and nonmatriculated students will take two graduate level courses to complete the certificate. For further information, contact the director of the Gender and Women's Studies Program, wmsdir@etal.uri.edu

## History

M.A., M.A./M.L.I.S.

401.874.2528

Faculty: Professor George, chair; Associate Professor Sterne, director of graduate studies; Professor Mather, director of Archaeology and Anthropology option. Professors George, Honhart, RolloKoster, Rusnock, and Schwartz; Associate Professors Ferguson and Pegueros; Assistant Professors Buxton, Loomis, Verskin, and Widell; Adjunct Assistant Professor Jenson; Lecturers Reumann and Ward; Professors Emeriti Cohen, Findlay, Kim, Klein, Strom, Thurston, and Weisbord.

### SPECIALIZATIONS

United States, Europe, or archaeology and anthropology option.

United States or European History: Students may complement their work with courses in Latin American or Asian history or with courses taken outside the department, particularly in political science, education, English, and languages. Students might also develop programs of study that emphasize regional studies or themes such as race, gender, or family.

The master's program in history includes both class work and individual instruction in the form of 500level seminars; small 400level courses that include undergraduates; special readings; and directed study courses, as well as master's thesis research for those who qualify for the thesis option. All graduate work stresses independent research and is designed to promote critical reading and writing. The diversified program with its requirement for work in more than one field of history and the opportunity it offers of work in another discipline should be of service both to students who wish to continue their graduate education at the doctoral level and to those who are interested in secondary teaching. Students are required to develop a systematic program of studies with the director of graduate studies during their first semester as a master's degree candidate.

For special readings (HIS 502, 503, 536, 537, and 588), students participate in 300level courses and complete additional projects assigned by the instructors. Arrangements are made with the instructor at the beginning of the semester. To be eligible, a graduate student must not have taken the 300level course or one closely resembling it as an undergraduate.

Students may also take up to six credits from the graduate offerings at Rhode Island College (in Providence), or at the Summer Graduate Program in Maritime History of the Munson Institute, Mystic Seaport, New London. These courses must be approved for program credit prior to registration and are included in the sixcredit maximum for transfer credit and the 12credit maximum for advanced standing.

Archaeology and anthropology: Students study method and theory in history, anthropology, and archaeology and the connections among the disciplines. The option is offered in cooperation with the Department of Sociology and Anthropology, the Department of Philosophy, and the Department of Art (Art History). It includes both class work and individual instruction in the form of 500level seminars, small 400level courses, tutorials, and directed study courses. Students enrolled in this option are encouraged to work on thematic links across the disciplines such as maritime history and underwater archaeology, social history and cultural anthropology, or ancient history and classical archaeology.

The archaeology and anthropology option serves the needs of students looking for interdisciplinary opportunities in history, anthropology, and archaeology. It also provides essential humanistic and social science training for Ph.D. students in geological/archaeological oceanography.

### MASTER OF ARTS

Admission requirements: GRE and bachelor's degree. While 24 credits of history are usually required, majors in related fields may be admitted with permission of the director of graduate studies and the department chair. For the archaeology and anthropology option, credits in anthropology, archaeology, art history, and related fields may be accepted with permission of the director of graduate studies, in consultation with graduate faculty from the Departments of History, Art, and Sociology and Anthropology.

Program requirements: For the United States or Europe specializations, there are thesis and nonthesis options. In both options, the student must declare a primary concentration in European or United States history, and a secondary concentration in another area of history or in a related field outside

the department. Students in the archaeology and anthropology specialization may pursue the thesis option or complete a major research paper in HIS 591. For all specializations, an approved program will require 30 credits.

United States or European History specialization program requirements: Of the 30 required credits, at least three must be from HIS 401, 441, or 481 and at least nine credits from HIS 506, 507, and 508. Three of these nine credits may be filled by a 500 or 600level seminar in another department. The nonthesis option will require completion of a research paper in HIS 495, or, in exceptional circumstances, in HIS 591 with permission of the instructor and the graduate director or department chair. Admission to the thesis option will be granted after evaluation by the director of graduate studies and two faculty members who are familiar with the students first year of graduate work.

In the nonthesis option, the student may earn no more than 12 credits in special readings (502, 503, 536, 537, and 588) and directed studies (591). Nine credits will normally be taken in the secondary concentration. A written comprehensive examination in the student's primary and secondary concentrations and a followup oral examination are required. The examining committee will normally consist of two faculty members from the student's primary concentration and one from the secondary concentration. In the thesis option, the student may earn a maximum of nine credits of HIS 599, a maximum of three credits of Directed Study (HIS 591), and a maximum of nine credits of special readings (HIS 502, 503, 536, 537, 588). Work in the secondary concentration may be limited to six credits.

Archaeology and anthropology specialization program requirements: Of the 30 required credits, students must select at least three from HIS 401, 441, or 481; at least three credits from APG 401, 413, or 427; and at least three credits from HIS/APG 490, APG 417, and ARH 475/575. Students must take an additional six credits of 500level history courses, including at least three credits from HIS 506, 507, or 508. Students must also take ARH/APG 465 or 565. The remaining credits are to be selected from the following approved electives: Any 400 or 500level history course, any anthropology course listed above; any art history course listed above; APG 470; ARH 469, 470, 480; NES 400; TMD 440, 510, 520, 524, 570. Up to six credits of other graduate courses may be substituted for approved electives with approval of the student's major professor and option coordinator. A comprehensive examination and a followup oral examination are required, unless the student is pursuing the thesis option. The examining committee will normally be comprised of at least two faculty members from history, and one each from anthropology and art.

#### **M.A. IN HISTORY AND M.L.I.S. COOPERATIVE PROGRAM**

By proper selection of course work, a student may simultaneously earn the degrees of Master of Arts in history and Master of Library and Information Studies.

Admission requirements: GRE and other requirements listed for history and library science. Applicant must apply and be accepted in both programs. The application for each program must indicate history/library and information studies as the field of specialization.

Program requirements: students must submit individual programs of study for the 36credit M.L.I.S. program and the

30credit program for the M.A. in history. The integrated pursuit of the two degrees makes it possible for six credits of appropriately selected course work from one program to serve as electives in the other, and for six credits of course work to be applied in the opposite direction. Thus, when planned and taken jointly, the two programs can be completed with a total of 54 credits rather than 66 credits.

#### **OCEANOGRAPHY/HISTORY PH.D./M.A. JOINT DEGREE PROGRAM**

The Graduate School of Oceanography and the Department of History in the College of Arts and Sciences offer a joint degree program focused on archaeological oceanography. See Oceanography for more information.

### Human Development and Family Studies

#### **M.S. (specializations listed below)**

##### **401.874.2150**

Faculty: Professor McCurdy, chair.

#### **SPECIALIZATIONS**

Human Development and Family Studies: Professor Newman, director. Professors Gray Anderson, Clark, McCurdy, Newman, and Xiao; Assistant Professors AdamsLaBonte, Dice, and Harper; Adjunct Professors P. Newman and Prochaska; Professor Emerita Rae.

Marriage and Family Therapy: Professor Adams, director. Associate Professors Kisler and Sparks; Professors Emeriti Maynard and Rae.

College Student Personnel: Associate Professor Branch, director. Assistant Professor Vaccaro; Professor Emeritus Schaffran; Associate Professor Emeritus Knott.

#### **MASTER OF SCIENCE SPECIALIZING IN HUMAN DEVELOPMENT AND FAMILY STUDIES**

This M.S. program is designed to immerse students in a specialized area of human development and family studies, while providing a strong emphasis on policy, research, and practical knowledge of the field. Graduates from this program are prepared for leadership positions in human service and education administration, research and policy organizations, and for advanced academic work at the Ph.D. level.

Admission requirements: GRE or MAT, and 18 undergraduate credits from relevant disciplines, including human development and family studies, psychology, and sociology. Majors in related fields (e.g. nursing, political science, education) may be admitted with the permission of the director of graduate studies. Two letters of recommendation are required with at least one from an academic reference. Application deadline for fall admission is March 1. Applications received after this date will be reviewed on a spaceavailable basis.

Program requirements: a minimum of 39 credits of approved graduate courses that include a developmental seminar; a sequence in policy, research, and statistics; and a professional seminar. In addition, students will select a minimum of three credits in a specialization, such as child development, early childhood education, adult development/gerontology, public

policy/administration, family studies, and family financial counseling/education. Students complete a master's thesis. Students will have the option of including up to six credits of a policy, administrative, or research internship as part of the program of study.

#### **MASTER OF SCIENCE SPECIALIZING IN MARRIAGE AND FAMILY THERAPY**

Admission requirements: GRE or MAT; at least 12 credits of relevant preparation, including courses in family relations, developmental theory, abnormal psychology, and introduction to counseling or equivalent courses. Two letters of recommendation should be from supervisors in a related field attesting to observed experience, emotional stability, and maturity. After initial screening, qualified applicants will be required to come to campus for a personal interview. The goal of the personal interview is to determine whether the applicant possesses the full range of academic qualifications, experiential background, clinical competency, and readiness to undertake the rigors of an academically and emotionally demanding clinical preparation program. Program faculty members will conduct the interviews. Selection for admission to this program is competitive and enrollment is limited. Diversity among the students in the program is a major program goal. The program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education. Review of applications begins February 1.

Program requirements: a minimum of 45 credits of approved graduate courses, including 12 credits of practica and internship, a comprehensive examination, and a research project. This program involves intense clinical practice and requires a yearlong clinical placement at approved agencies or the department's Family Therapy Clinic.

#### **MASTER OF SCIENCE SPECIALIZING IN COLLEGE STUDENT PERSONNEL**

The mission of URI's College Student Personnel program is to prepare reflective practitioners for professional careers in student affairs. Graduates seek entrylevel positions such as advisors, coordinators, directors, and deans at institutions of higher education. Our vision is to engage one another in an extended community of colearning relationships that inspire optimal development and promote growth in leadership, all based on creating and sustaining the best practices in college student personnel preparation and professional work. The program is designed in accordance with the guidelines established by the Council for the Advancement of Standards in Higher Education (CAS).

For students' convenience, most courses are offered in the late afternoon or early evening in Kingston. Full and parttime programs of study are available.

Admission requirements: Online submission of an application through the Graduate School website. Supporting materials must include at least two letters of recommendation (one academic and one student affairs professional), official transcripts of all previous college course work, and a current résumé. The completed application package, including supporting materials, is due for fall admission by January 15; materials received after this date and prior to April 1 are reviewed on a space-available basis. After initial screening, selected applicants will be invited to interview either in person or via the telephone

with a faculty representative. Selection for admission to this program is competitive and enrollment is limited; preference is given to applicants with experience in college student affairs. Diversity among students is valued by the program and student affairs profession. If admitted into the program, you will be given information on applying for Graduate Assistantships or other direct links to practice in college student affairs settings.

Program requirements: 42credit program consisting of 26 credits in core HDF courses: 551, 560, 562, 567, 568, 570, 572 [1], 573 [1], 574, 575 [1], 576 [2], six elective credits, a multipart comprehensive examination, plus one of the following capstone options: nonthesis internship (HDF 580 [2], 581 [2], 583, 584), nonthesis action research project (HDF 595 [6], HDF 580 [1], HDF 553), or thesis (HDF 599 [6], HDF 580 [1], HDF 553).

#### **CERTIFICATION PROGRAMS**

Postbaccalaureate Early Childhood Education (ECE): If you wish to pursue a postbaccalaureate early childhood education teacher certification (nursery to grade 2) and do not have a human development and family studies background, you will need to take certain courses from the HDF undergraduate curriculum and should consult an HDF advisor. Students apply to URI's Teacher Certification Program (nondegree status) administered through the Graduate School and must submit a candidate's statement, official transcripts of all previous course work, and two letters of recommendation. Applicants must also complete the same ECE admission process as undergraduate students, including the portfolio, admission tests, and interview coordinated through the University's Office of Teacher Education.

#### **Industrial and Systems Engineering**

See Mechanical, Industrial, and Systems Engineering.

#### **Interdisciplinary Neuroscience Program**

See Neuroscience.

#### **Kinesiology**

M.S.

401.874.2976

Faculty: Associate Professor Delmonico, Director of Graduate Studies. Professors Blissmer, Lamont, and Riebe; Associate Professors Delmonico, Kusz, and Xu; Assistant Professors Beck, Clapham, Fournier, Greaney, and Hatfield; Professor Emeriti Bloomquist, and Manfredi.

#### **SPECIALIZATIONS**

Exercise Science; Cultural Studies of Sport and Physical Culture; Psychosocial /Behavioral Aspects of Physical Activity.

#### **MASTER OF SCIENCE**

Admission requirements: Graduate Record Examination (GRE) with bachelors degree in physical education, exercise science, kinesiology, or related discipline. An applicant with a degree in an unrelated field who possesses a strong emphasis in kinesiology may be considered. Completed application pack-

ages should be completed online, and must be received by April 15 for September admission or October 15 for January admission. Applications received after April 15 but before July 15 will be reviewed on a spaceavailable basis. Students who are interested in a graduate assistantship starting in the fall semester must be admitted by April 1 for consideration.

Program requirements: 32 credits, including 11 credits in core courses and six (nonthesis option) to nine (thesis option) of research requirements. The required core courses are KIN 501 (must be repeated twice), 508, 578, and 515 or 562. The required research courses are KIN 530 and 599 (thesis option) or 591 (nonthesis option). Required courses for exercise science include selecting nine to 12 credits from KIN 559, 563, 564, 565, 524, 531, and 592, plus up to six credits of electives. Required courses for cultural studies of sport and physical culture include KIN 478 and 465, plus six to nine credits of electives. Required courses for psychosocial/behavioral aspects of physical activity include KIN 563 and 581, plus six to nine credits of electives.

## Labor Relations and Human Resources

### **M.S., M.S./J.D.**

#### **401.874.2239**

Faculty: Professor Scholl, director, Schmidt Labor Research Center. Professors Beauvais, Burkett, Cooper, Croasdale, Lardaro, McIntyre, Miller, Molloy, Overton, Poggie, Rothstein; Associate Professor Bodah; Adjunct Professors Keating and Taylor; Professors Emeriti Gersuny, Rayack, and Schmidt.

This program is designed for union, government, neutral, or human resource management, labor, and industrial relations professionals, or for those students who aspire to such positions. Students in other graduate programs may find it rewarding and professionally desirable to enroll in one or more of the labor relations and human resource courses. All courses are offered in the very late afternoon or in the evening in Providence and Kingston so that they are convenient for working students. Fulltime and parttime programs are also available.

### **SPECIALIZATIONS**

Areas of specialization include labor relations and human resources, both with elective and required courses. Substitutions may be made with permission of the director of the Schmidt Labor Research Center and approval of the Graduate School. Exceptional students who come into the program with a welldefined interest, as well as a proposed plan of study, may choose to create their own specializations by choosing four courses in an area that satisfies their professional needs, e.g., computer science or statistics, economics or social policy, law and legal processes, or workplace issues such as alcohol and drug abuse, sexual or age discrimination, or racism.

### **MASTER OF SCIENCE**

Admission requirements: GRE or MAT or GMAT. Undergraduate majors in any field are considered for admission; those with majors in social science, history, management, and labor studies are especially encouraged to apply, as are those with engineering, nursing, education, urban affairs, black studies,

and women's studies backgrounds. Professional experience in labor and industrial relations will carry additional weight in admission decisions.

Program requirements: minimum of 39 credits, including 27 credits in core courses and 12 credits of specialization. The required courses are LRS/HIS 544; LRS/PSC 521; LRS/ECN 526; LRS 531, 541, 542, 500, 551, and 580. For a specialization in labor relations, select two courses from LRS 520, 543, and 545; and two courses from LRS 432, 503, 532, 533, 546, 581, 591, and MBA 577 and 578. For a specialization in human resources, required courses include two courses from LRS 432, 503, 520, 532, 533, 543, 545, 546, 581, 591, and MBA 502, 577, and 578. Students are advised that many of the core required courses and electives in the program assume competence in basic statistics and economics as well as a working knowledge of computers. Students should remedy any deficiencies in these areas either prior to or during enrollment in the program. Please contact the director of the Schmidt Labor Research Center for further advice.

### **JOINT PROGRAM: MASTER OF SCIENCE IN LABOR RELATIONS AND HUMAN RESOURCES (URI) AND JURIS DOCTORATE (ROGER WILLIAMS UNIVERSITY SCHOOL OF LAW)**

A cooperative dual degree program offered at URI and Roger Williams University School of Law permits dual enrollment leading to an M.S. in labor relations and human resources and a J.D. The integrated program of the two degrees allows a student to complete both programs in four years instead of the five required if both degrees are pursued separately.

Admission requirements: Students must apply and be accepted into each program under the separate admission requirements currently in effect at each school. Applicants must indicate the M.S./J.D. on the "Degree Sought" section of the URI application form.

Program requirements: At Roger Williams University, the J.D. program requires 90 credits, which can be completed on a full time basis in three years. The M.S. degree in labor relations and human resources at URI requires 39 credits, which can be completed on a fulltime basis in two years. A student matriculated in the joint program will take some credits in one program that will help satisfy the overall credit requirements of the other degree program as well. Students in the joint program must complete the following core required courses as part of their 30credit requirement at URI in addition to nine credits taken at Roger Williams: LRS 542, 500, 551, and 580; LRS/PSC 521; LRS/ECN 526; and LRS/HIS 544. Students who specialize in human resources must also take MBA 577 and 578, while students specializing in labor relations must take LRS 520 and 545. Students must complete the required law school curriculum at Roger Williams. For students matriculated in the joint program, Roger Williams will accept the following 15 URI credits to satisfy the requirements for the J.D. degree: LRS 542, 500, and 580; LRS/ECN 526; and LRS/PSC 521.

### **GRADUATE CERTIFICATE PROGRAMS IN LABOR RELATIONS AND HUMAN RESOURCES**

Admission requirements: Applicants with undergraduate majors in any field are considered for admission; applicants must submit two official transcripts of all academic work, two letters of recommendation, and a résumé of professional experience.

Program requirements: To earn a graduate certificate in labor relations, students must satisfactorily complete four of the following courses: LRS 432, 500, 520, 521, 526, 531, 532, 533, 541, 542, 543, 545, and 546. To earn a graduate certificate in human resources, students must satisfactorily complete four of the following courses: LRS 500, 503, 526, 531, 532, 533, 541, 542, and 551; MBA 502, 577, and 578.

## Languages

See Spanish.

## Library and Information Studies

### M.L.I.S., Cooperative Programs

#### 401.874.2947

Faculty: Professor Karno, Interim Director, Graduate School of Library and Information Studies, Professors Ma, McCarthy, and Mandel.

### THE GRADUATE SCHOOL OF LIBRARY AND INFORMATION STUDIES IS PART OF

The Harrington School of Communication and Media.

The Master of Library and Information Studies (M.L.I.S.) degree prepares students for professional service and leadership in libraries and other organizations, including information positions in business and government. Specializations include service to children and young adults, reference and bibliography, organization of information, technical services, information literacy instruction, special collections, automation, information science, leadership and community transformation, and others. The program leading to the M.L.I.S. is accredited by the American Library Association (ALA). The School Library Media Specialist certification program leads to both the M.L.I.S. and eligibility for Library Media Specialist K12 certification in Rhode Island and other states participating in the Interstate Compact. This program is approved by the Rhode Island Department of Education (RIDE), accredited by the National Council for the Accreditation of Teacher Education (NCATE), and "nationally recognized" by ALA's American Association of School Librarians (AASL).

#### MASTER OF LIBRARY AND INFORMATION STUDIES

Admission requirements: bachelor's degree (B average); undergraduate GPA of 3.00 or equivalent; GRE or MAT at the 50th percentile or above. GRE or MAT may be waived if undergraduate GPA is above 3.30 or if applicant has successfully completed another postbaccalaureate degree. The completed application package should be received by October 15 for Spring admission, March 15 for Summer admission, and June 15 for Fall admission.

Program requirements: 36 credits, 15 in required core courses (LSC 502, 504, 505, 557, and 595), except for the School Library Media Track which requires 18 credits of core courses: (LSC 502, 504, 557, and 9 credits of 596); LSC 557 includes a major paper requiring significant independent research; all students are required to take a written comprehensive examination.

Up to 6 credits of interdisciplinary study may be taken in courses outside library science when relevant to the student's

specialization; No more than six credits or two courses may be taken in nonmatriculating status for transfer into the degree program.

Requirements for the M.L.I.S. must be met within five calendar years after the date when the student is first enrolled as a graduate student at the University. With the submission of a written request for an extension and a schedule for completion, endorsed by the major professor and the graduate program director, a specific, timelimited extension may be approved by the Dean of the Graduate School. Extensions are generally undesirable because of the rapid change in library and information services. If such extensions are granted, courses completed more than five calendar years prior to graduation will no longer be valid, and must be replaced by new courses or reinstated by examination to ensure that the graduate's knowledge of the field is current.

School Library Media Track: To complete the M.L.I.S. and meet certification requirements, candidates are required to complete LSC 502, 504, 520, 527, 530 or 531, 557, 596, and 9 credits of graduate level free electives. LSC 520, which includes 60 hours of prepracticum field experience, must be taken in the summer or fall prior to LSC 596. LSC 596, a nine credit practicum and seminar, includes 12 weeks of fieldwork and must be taken in the final spring semester. Total: 36 credits.

Teacher Certification Program (TCP): Candidates who already have an accredited M.L.I.S. degree may apply for the TCP program for school library media. Candidates for certification must apply for admission following GSLIS guidelines and complete the same requirements as M.L.I.S. students in the school library media track. Analysis of transcripts will determine the number of courses needed to complete the TCP.

Organization of Digital Media Track: To complete the M.L.I.S. candidates are required to complete LSC 502, 504, 505, 528, 557, 595, and 9 credits of graduate level free electives. Candidates are also required to complete one of the following: LSC 527, 544, 548, or Comm. 520. Candidates are also required to complete one of the following: LSC 503, 510, 516, 518, 545, 547, or 550. Candidates must also complete one of the following: LSC 508 or 515. Total: 36 credits.

Libraries, Leadership & Transforming Communities Track: To complete the M.L.I.S. candidates are required to complete LSC 502, 504, 505, 517, 557, 570, 595, and 9 credits of graduate level free electives. Candidates are also required to complete one of the following: Comm. 510, Comm. 520, LSC 525, LSC 527, or Comm. 530. Candidates are also required to complete one of the following: LSC 503, 515, 516, 521, 522, 523, or 560. Total: 36 credits.

#### CERTIFICATE IN INFORMATION LITERACY INSTRUCTION

A 15credit postbaccalaureate certificate in Information Literacy Instruction (ILIC) is open to current students (who may take it as part of their M.L.I.S. program) and college graduates with or without the M.L.I.S. Completion of the following courses is required: LSC 504, Reference and Information Studies; LSC 525, Multiculturalism in Libraries; LSC 527, Information Literacy Instruction; LSC 528, Instructional Technology in Library and Information Services.

Candidates for the ILIC must apply for admission following GSLIS. guidelines and will be required to earn a grade of B or better in each course. A maximum of three graduate credits

will be accepted from another graduate library school program for transfer of credit.

*M.A. IN HISTORY AND M.L.I.S. COOPERATIVE PROGRAM*

By proper selection of course work, a student may simultaneously earn the degrees of Master of Arts in History and Master of Library and Information Studies.

Admission requirements: GRE and other requirements listed for history and library science. Applicant must apply and be accepted in both programs. The application to each program must indicate history/library and information studies as the field of specialization.

Program requirements: Students must submit individual programs of study for the 36credit M.L.I.S. program and the 30credit program for the M.A. in history. The integrated pursuit of the two degrees makes it possible for six credits of appropriately selected course work from one program to serve as electives in the other, and for six credits of course work to be applied in the opposite direction. Thus, when planned and taken jointly, the two programs can be completed with a total of 54 credits rather than 66 credits.

*M.P.A. AND M.L.I.S. COOPERATIVE PROGRAM*

A cooperative program permits joint enrollment in the Master of Library and Information Studies and Master of Public Administration programs. The integrated pursuit of the two degrees makes it possible for six credits of appropriately selected course work from one program to serve as electives in the other, and for six credits to be applied in the opposite direction. Thus, when planned and taken jointly, the two programs can be completed with a total of 60 credits.

Admission requirements: GRE and other requirements listed for M.L.I.S. and M.P.A. Applicant must apply and be accepted in both programs. The application to each program must indicate M.L.I.S./M.P.A. as the field of specialization.

Program requirements: Each student must complete the required core courses for both programs plus three credits of PSC 590 for the M.P.A. After consultation with, and approval of, both departments, students must file separate programs of study for each degree, indicating the courses to be jointly counted. Each student must pass the separate comprehensive examination for each degree.

*M.A. IN ENGLISH AND M.L.I.S. COOPERATIVE PROGRAM*

By proper selection of course work, a student may simultaneously earn the degree of Master of Library and Information Studies and Master of Arts in English.

Admission requirements: GRE and all other requirements listed for M.L.I.S. and M.A. in English. Applicant must apply to both programs and be accepted by both. The application to each program must indicate English/ library and information studies as the field of specialization.

Program requirements: Students must submit individual programs of study for the 36credit M.L.I.S. program and the 30credit M.A. in English. ENG 510, 511, and 514 are required. The integrated pursuit of the two degrees makes it possible for six credits of appropriately selected course work from one program to serve as electives in the other, and for six credits of course work to be applied in the opposite direction. Thus,

when planned and taken jointly, the two programs can be completed with a total of 54 credits rather than 66. Students must complete at least 30 credits in librarianship and at least 24 credits in English.

*OTHER COOPERATIVE PROGRAMS*

Under existing University policy, students may be able to establish cooperative programs with other master's degree programs within the University. Interested persons should consult with the director.

## Marine Affairs

M.A., M.M.A., Ph.D.

401.874.2596

Faculty: Associate Professor Thompson, chair; Professor Burroughs, director of master's studies; Associate Professor Macinko, director of Ph.D. studies. Professors Hennessey, Juda, Marti, and Nixon; Associate Professors Dalton and Macinko; Professors Emeriti Alexander, Knauss, and West; Associate Professor Emeritus Krausse.

### SPECIALIZATIONS

Ecosystembased management of coastal/ocean areas, coastal zone management, marine transportation and port planning, fisheries law and management, international marine policy and law.

### MASTER OF ARTS (M.A.)

Admission requirements: GRE and bachelor's degree in related science or social science. For international students, minimum TOEFL scores on the iBT as follows: Reading, 20, Writing 22, Listening 17, and Speaking 17 (total of 213 CBT or 550 PBT). Fulltime applicants are admitted for the fall semester only.

Program requirements: thesis or a major paper and MAF 482, 502, 577, 651; MAF 511 or appropriate oceanography substitute; EEC 514 or appropriate resource economics substitute; plus a minimum of 21 elective credits for a total of 45 credits. Students who elect to do a major paper (MAF 589) will also be required to pass a written comprehensive exam.

### MASTER OF MARINE AFFAIRS (M.M.A.)

Admission requirements: (1) Individuals with a prior graduate degree or five years of equivalent experience in marine areas, or (2) law students in good standing who have completed one year of fulltime study at Roger Williams University School of Law, or (3) students who have successfully completed the comprehensive examinations in the oceanography doctoral program may apply through the Graduate School. For international students, minimum paper TOEFL scores on the iBT as follows: Reading 20, Writing 22, Listening 17, and Speaking 17 (total of 213 CBT or 550 PBT). GREs are not required for admission to this program.

Program requirements: nonthesis program; EEC 514; MAF 577, 589, 651, 511 or appropriate oceanography substitute; plus 15 elective credits for a total of 30 credits; written comprehensive examination. Roger Williams School of Law students may transfer in up to six credits from that curriculum to meet the requirements of the M.M.A. degree. Students in the oceanography doctoral program may count up to six credits of courses



taken for that degree toward the M.M.A. degree.

### DOCTOR OF PHILOSOPHY

Admission requirements: the Ph.D. program is small and selective. Admission is based on academic merit, research capability, availability of faculty, and match of interests between applicant and faculty. Applicants must have completed work for the master's degree in some related area. GRE, letters of recommendation, writing samples including master's thesis or major research paper, statement of purpose, and interview are required.

The statement of purpose shall include a description of the intended research topic and the names of the professors most suited to direct the research. Consult the department web pages ([cels.uri.edu/maf](http://cels.uri.edu/maf)) for current research interests of the faculty.

Program requirements: students must complete the following required courses or their equivalents (18 credits): MAF 482, 502, 511, 577, 651; EEC 514. Beyond the courses indicated above, Ph.D. candidates are required to complete a minimum of 48 additional credits, of which no more than 24 will be awarded for dissertation research. The course credits earned to meet this requirement will be selected by the student from among 500 and 600 level courses with the approval of the student's Ph.D. committee. Students will have to demonstrate proficiency in research tools, foreign language(s), and/or statistics as appropriate for the proposed course of study and dissertation. Required capabilities will be determined by the Ph.D. committee.

Upon completion of course work, students will have to pass written and oral comprehensive examinations in major and minor fields of marine affairs. Each student is to write and successfully defend a dissertation of high quality.

## Mathematics

M.S., Ph.D.

401.874.2709

Faculty: Professor Eaton, chair; Associate Professor Kook, director of graduate studies. Professors Finizio, Kulenovic, Ladas, Merino, and Pakula; Associate Professors Baglama, Kook, MedinaBonifant, Thoma, and Wu; Assistant Professors Bella and Comerford; Professors Emeriti Datta, Driver, Fraleigh, Grove, Lewis, Roxin, Schwartzman, Suryanarayan, and Verma.

### SPECIALIZATIONS

Research activities are mainly concentrated in the areas of combinatorics and graph theory, complex dynamical systems, difference equations, numerical analysis, and applied analysis.

### GENERAL INFORMATION

Programs of study can be designed for individuals who are employed on a fulltime basis. However, all Ph.D. candidates must register fulltime for two consecutive semesters prior to taking the doctoral comprehensive examination.

### MASTER OF SCIENCE

Admission requirements: bachelor's degree with strong undergraduate background in mathematics. Applicants with

deficiencies in mathematics may be accepted subject to taking certain undergraduate courses in addition to the graduate program requirements.

Program requirements: 30 credits (or 24 plus thesis), including at least 18 credits in mathematics of which at least 15 must be at the 500 level or above. A course requiring a substantial paper involving significant independent study and a written comprehensive examination are required for the nonthesis option. MTH 435 and 513 must be completed with a grade of A or B. Recommended courses include MTH 515, 525, 535, 536, and 562.

### DOCTOR OF PHILOSOPHY

Admission requirements: same as for master's program.

Program requirements: Two tracks are offered: Pure Mathematics and Applied Mathematics. A total of 72 credits is required. Of these, 18 credits of dissertation work (MTH 699) are required. Within the first year of the Ph.D. program, the student, in conjunction with the Graduate Committee, will select a research advisor (major professor) from the graduate faculty of the Mathematics Department, including persons holding limited joint appointments. At this time, the student's doctoral committee is selected and the program of study is carefully prepared by the student with his or her major professor. The program of study must be approved by the student's doctoral committee, the department chairperson or graduate program director, and the dean of the Graduate School. Soon after that, in a similar manner, the dissertation proposal must be prepared and approved. The candidate shall successfully defend his or her dissertation in an oral defense. This is an oral exam, usually two hours long, administered by the candidates dissertation defense committee composed of the doctoral committee and two additional members approved by the Graduate School. This oral exam is in addition to the oral part of the comprehensive exam (see below).

The Department of Mathematics requires that doctoral candidates have reading proficiency in mathematical French, German, or Russian. The specific requirement to be satisfied is to be determined by the major professor.

For the pure mathematics track, required courses are MTH 515, 516, 525, 535, 536, and 562. For candidates without a master's degree in mathematics, 1) subject to the approval of the department chair and graduate program director, at most 12 credits can be taken outside of the mathematics program (MTH); 2) the M.S. qualifying exam must be passed in MTH 435, 436, and 513. For candidates with a master's degree in mathematics, 1) prerequisites MTH 435, 436, and 513 must be taken;

2) up to 30 credits from a master's degree in mathematics may be applied towards the Ph.D.; and 3) all but at most 6 credits of their remaining credits must be for mathematics courses (MTH) at the 500 level or higher.

For the applied mathematics track, at least 30 of the 54 non-dissertation credits must be in mathematics (MTH). Areas of concentration are determined by and selected from among the research interests of the graduate faculty of the program, which includes members of other departments who are formally designated as graduate faculty in mathematics. Consult the Mathematics Department's webpage for the current research interests of the graduate faculty. Up to 24

credits for courses in the student's selected area of concentration may be applied to this degree. For candidates without a master's degree in mathematics, the M.S. qualifying exam must be passed in MTH 435, 436, and 513. For candidates with a master's degree in mathematics or a closely related area, 1) up to 30 credits from the M.S. in mathematics or an area closely related to mathematics may be applied towards the Ph.D.; and 2) all of their remaining credits must be for courses at the 500 level or higher; permission of the department chair is required if more than 12 of the remaining credits need to be taken outside of the mathematics program (MTH).

Ph.D. Comprehensive Examination. Shortly before the completion of formal course work, each doctoral candidate shall take the Ph.D. comprehensive examinations. These consist of a 10-hour written part to be taken over eight days and, on successful completion of the written part, an oral part (normally within four weeks). The exam is to be taken by the student within the first six semesters of enrollment in the Ph.D. program.

The rules governing the content of the written exam vary depending on which track is being pursued. For both pure and applied tracks, the written exam covers the material corresponding to 10 courses, which are selected by the student's major professor. With the permission of the department chair and graduate program director, the exams for MTH 435 and 436 may be waived, in which case eight courses are required. The preparation, administration, and evaluation of the written comprehensive examination are the responsibility of the student's research advisor, the doctoral committee, and other department members assigned by the doctoral committee. Unanimous approval of all members of the doctoral committee is required for passing.

The oral part of the comprehensive examination is two hours long and is conducted by the oral comprehensive examination committee, which consists of the doctoral committee with two additional members approved by the Graduate School. This oral exam is in addition to the oral defense of the dissertation (see above).

It is the responsibility of the major professor to request the permission of the dean of the Graduate School to schedule both the written and oral exams and to inform the Graduate School about the results. Consult the Graduate Student Manual, Section 7.57, for procedures that must be followed to schedule both parts of the comprehensive examination. In case of failing the whole or a portion of the comprehensive examination, the student may be permitted one re-examination if so recommended by the examining committee and approved by the Graduate School.

## Mechanical Engineering and Applied Mechanics

See Mechanical, Industrial, and Systems Engineering.

## Mechanical, Industrial, and Systems Engineering

M.S. (Mechanical Engineering ; Systems Engineering)

Ph.D. (Mechanical Engineering ; Industrial and Systems Engineering)

401.874.2524

Faculty: Professor Taggart, chair; Professor Chelidze, director of graduate studies. Professors Datseris, Faghri, Ghonem, Jouaneh, Nassersharif, Palm, Shukla, Sodhi, Wang, and Zhang; Associate Professors MaierSperedelozzi, Meyer, and Rousseau; Adjunct Professors Anagnostopoulous, Kadak, P. Miller, Jones, and Spengler; Adjunct Assistant Professors Gauthier, Gomez, Goodwin, LeBlanc, and McKeon; Professors Emeriti Boothroyd, Dewhurst, Kim, Knight, Lessmann, Sadd, and White.

### SPECIALIZATIONS

#### MECHANICAL ENGINEERING

Mechanical Systems/Design—This area encompasses the broad field of computer aided design including design methodology and computer graphics, as well as kinematics and dynamics of machines, vibrations, design of machine elements, controls, automation, and techniques for assessing reliability. Current areas of research include nonlinear dynamics and vibrations, expert systems, machine tool calibration, control of robot vehicles, kinematic design and optimization, computeraided design of control systems, structural health monitoring, damage state estimation and failure prognostics, precision machining, surface roughness analysis, and robot-assisted waterjet machining. Facilities include the Design and Automation Lab, Nonlinear Dynamics and Vibrations Lab, and Waterjet Machining Lab.

Fluid Mechanics—The fluid mechanics program includes advanced studies in laminar and turbulent flows, computational fluid dynamics, experimental methods, flows in microdomains, flows with particulate matter, biological flow. Current areas of research include fluid flow and heat transfer in microdomains, flow in human airways, computational fluid dynamics in irregular geometries, biological flows and lubrication, and numerical direct simulation flow modeling. Facilities include the Tribology and Fluid Mechanics Lab, Biofluids/Heat Transfer Lab, and Sensors and Surface Technology Lab.

Solid Mechanics—Studies in solid mechanics involve strength of materials, elasticity, plasticity, continuum mechanics, composite materials, fracture and fatigue, vibrations, wave propagation, computational methods, and micromechanics. Applications of these studies are applied to the mechanical and thermomechanical behavior of metals, composites, functionally graded materials, ceramics, and geological media under both static and dynamic loading conditions. A significant portion of our studies has been involved with micromechanical material behavior. Areas of current research include: behavior of materials under shock loading, dynamic fracture mechanics and material behavior, finite element modeling of biological materials, computational simulation of particulate composites, cellular and granular materials, fatigue crack growth, micromechanical behavior of composites, material erosion from abrasive waterjet processes. Facilities include the Dynamic Photomechanics Lab, Mechanics of Solids Lab, Optics and Lasers Laboratory, Waterjet Machining Lab.

Thermal Sciences—The area of thermal science includes studies of thermodynamics, conduction, convection and radiation heat transfer, pollution, and energy processes. Recent research has been involved with experimental and numerical modeling of cooling of circuit boards, micro/nanoscale energy transport, micro/nanoscale detection, imaging, and spectroscopy, nanoscale manufacturing, nanoscale energy conversion

and storage, heat transfer and fluid flow in melting and solidification, micro heat transfer, aerosol transport in human respiratory flows, direct control heat transfer with phase change, computation of natural and forced convection in complex enclosures, energy system analysis including heating, ventilating, air conditioning, refrigeration, and electrical power systems. Facilities include the Fluid Mechanics/ Filtration Lab, Biofluid/Heat Transfer Lab, Energy Research Lab, Micro/Nano Engineering Lab, and Sensors and Surface Technology Lab.

### INDUSTRIAL AND SYSTEMS ENGINEERING

Service and enterprise systems—project planning and management in systems engineering; systems simulation; quality systems; lean systems; design and analysis of experiments; nonlinear systems optimization.

Manufacturing systems—computeraided manufacturing systems; manufacturing systems: analysis, design, and simulation; product design for manufacture; quality systems; design and analysis of experiments; production control and inventory systems; lean systems.

### GENERAL INFORMATION AND FINANCIAL AID

Programs of study can be designed for individuals who are employed fulltime. However, all Ph.D. candidates must register fulltime for two consecutive semesters prior to taking the comprehensive exam. Some applicants may be required to take courses that are prerequisites to specific graduate courses for completion of the program. Prerequisite course credits might not be counted as program credits. GRE required for graduates of nonU.S. universities except under specific university partnership agreement.

A number of graduate and research assistantships are also available for qualified M.S. and Ph.D. students.

### MASTER OF SCIENCE

Admission requirements: Mechanical Engineering —B.S. degree in mechanical engineering, applied mechanics, aerospace engineering, or a related field such as engineering science, civil engineering, applied mathematics, or applied physics. Students admitted to the program will be expected to have the equivalent of MCE 372. Systems Engineering —B.S. degree in engineering, mathematics, physics, chemistry, computer science, or management science.

Program requirements: Mechanical Engineering —for thesis option, 30 credits exclusive of seminar, including six to nine credits of thesis (required of all fulltime students) and 21–24 credits of course work; one distinct course in each of the three department core areas from the following selections: fluid mechanics/thermal sciences—EGR 515, MCE 541, 545, 546, 550, 551, 552, 562, 580, 653; solid mechanics—MCE 550, 552, 561, 565, 568, 571, 576, 671, 678, 679, 680; mechanical systems —MCE 503, 504, 523, 530, 534, 538, 549, 563, 564, 566, 567, 663; and MCE 501, 502, graduate seminar (required of all on campus students). For nonthesis option for parttime students only, 30 credits, one course in each of the department core areas; one special problems course requiring a substantial paper involving significant independent study; and a comprehensive examination. Systems Engineering —thesis or nonthesis option—minimum of 30 credits with at least 15 credits in graduatelevel industrial and systems engineering courses including ISE 533, 555. For the thesis option, the thesis

counts as six to nine credits. The nonthesis option is available to parttime students, or in exceptional circumstances, to students with permission from the graduate studies committee. For the nonthesis option, a comprehensive examination, and one course involving significant independent research and a term paper are required.

### ACCELERATED B.S./M.S. DEGREE PROGRAM

See Mechanical Engineering in the Undergraduate section of this catalog. See Industrial and Systems Engineering in the Undergraduate section of this catalog.

### DOCTOR OF PHILOSOPHY

Admission requirements: Mechanical Engineering Track —master's degree. Exceptional students with a bachelor's degree and superior master's candidates will also be considered. Industrial Systems Engineering Track—M.S. degree in engineering, mathematics, physics, chemistry, computer science, or management science. Although a person with a bachelor's degree may be admitted, this program is designed principally for people who have master's degrees.

Program requirements: Completion of a minimum of 24 credits of course work beyond the master's degree (exclusive of graduate seminar for mechanical engineering students) is required. All fulltime mechanical engineering students are required to register and attend the graduate seminar courses, MCE 501/502 each semester of residency. Additional course work may also be required depending on the background. A minimum of 18 credits of doctoral dissertation is to be taken under MCE/ISE 699. Comprehensive examination and dissertation.

For students admitted to the direct Ph.D. program, the requirements are essentially the same as for a regular Ph.D., except that the master's thesis is waived and they need to pass a qualifying examination. A minimum of 72 credits is required that would include 45 – 48 credits of course work. Nine of these course work credits may be at the 400 level. The remaining 24 –

27 credits would then be taken as doctoral dissertation under MCE/ISE 699. Students will be required to satisfy the master's core requirements of their respective tracks. Comprehensive examination and dissertation.

Additional program information can be found at [egr.uri.edu/mcise/graduate/](http://egr.uri.edu/mcise/graduate/).

## Medical Laboratory Science

### M.S.

#### 401.874.2315

Faculty: Professor Sperry, chair; Clinical Professor Paquette, director of graduate studies. Professors Boulmetis and Goldsmith; Associate Professors Norris and RiveroHudec; Research Professors A. DeGroot, L. DeGroot, and Rothman; Assistant Research Professor Moise; Clinical Associate Professors Bozzi, Klitz, and Uhnak; Adjunct Professors Mehta, Mello, Pisharodi, and Vezza; Adjunct Associate Professors Balkovic, Opal, and Tantravahi; Adjunct Assistant Professors Aucoin, Cadenazzi, Gamble, Heelan, Kenney, LaFazia, Mayer, Meglio, and Zielinski;

Professors Emeriti Campbell, and Laux.

### **SPECIALIZATIONS**

Major specializations in biotechnology, cytopathology, medical laboratory sciences, and public health laboratory sciences; minor specializations in adult education and management.

### **MASTER OF SCIENCE**

Admission requirements: GRE recommended; bachelor's degree in medical laboratory sciences, life sciences, physical sciences, or health sciences (for cytopathology, must include 20 semester hours of biological science [anatomy and physiology] are recommended) and eight semester hours of chemistry; certification, or certification eligibility, by a nationally recognized certifying agency, or a minimum of one year's postbaccalaureate laboratory experience. One course in statistics is required. Applicants with deficiencies in background courses may be required to complete appropriate course work without graduate credit. Acceptance into the cytopathology specialization is contingent upon acceptance into the Rhode Island School of Cytotechnology.

Program requirements: MLS 510, 512, 513, and 551 (or BIO 437, MIC 534 and 538, MLS 520, 590, 591, and 594 for cytopathology), and nine to 24 credits in the area of specialization (for biotechnology: nine credits from BIO 437, MIC 422 and 534, and MLS 501, 541, 571, and 594; for cytopathology: MLS 561 through 566; for medical laboratory sciences: nine credits from BIO 437, MIC 534 and 538, MLS 501, 502, 520, 530, 541, 543, and 591; for public health laboratory sciences: nine credits from MIC 534 and 538, MLS 501, 541, 591, and 594). The remainder of courses are to be selected from education, management, or other specializations for a total of 33 credits (39 credits for cytopathology). Comprehensive written examination. Major research paper (MLS 512).

The following are recommended for a minor specialization in management: PHP 680 and two graduate MBA courses selected in consultation with your major professor. The following are recommended for a minor specialization in adult education: four courses selected from EDC 505, 529, 582, 583, and 584.

## **Microbiology**

See Biological and Environmental Sciences.

## **Music**

### **M.M.**

#### **401.874.2431**

Students selecting the Master of Music degree program choose from two specializations: music performance or music education.

Faculty: Professor Parillo, chair; Assistant Professor Takasawa, director of graduate studies. Professors Conley, Danis, Kent, Ladewig, and Pollart; Assistant Professors Aberdam, A. Cardany; Lecturers B. Cardany, de la Garza, Frazier, Murray, and Thomas; Professors Emeriti Abusamra, Burns, Ceo, Dempsey, Fuchs, Gibbs, Lee, Livingston and Rankin.

### **SPECIALIZATIONS**

M.M. in Music Performance: 12 credits of performance in MUS 510 (minimum of three in a semester) appropriate to the music performance option selected and the principal applied music area, plus MUS 548 (3), 550 or 552 appropriate to the option selected (0), 567 (2), 580 (0), 581 (1), and three credits distributed according to the music performance option selected.

Voice or Instrument option: For vocalists, two credits in MUS 598 and one credit music elective. All twelve performance credits must be in MUS 510A, concluding with MUS 550 Graduate Performance Recital in the last semester of applied music study. Vocalists must be proficient in English, German, French, Italian, and Latin diction, and have general phonetic knowledge and skills that can be applied to other languages. Such proficiency includes language competency sufficient to understand texts in the repertory. The proficiency examination includes written and sung portions, and is given by the instructor of vocal diction. Vocalists may wish to take MUS 583 Vocal Diction to meet the proficiency levels required. For pianists, two credits in MUS 590 or 598 and one credit music elective. All twelve performance credits must be in MUS 510B, concluding with MUS 550 Graduate Performance Recital in the last semester of applied music study. For organists, guitarists, and other instrumentalists, two credits in MUS 598 and one credit music elective. All twelve performance credits must be in the principal applied music area (MUS 510C, EU, or W), concluding with MUS 550 Graduate Performance Recital in the last semester of applied music study.

Conducting option: Three credits of electives appropriate to conducting. All twelve performance credits must be in MUS 510Y and/or 510Z, concluding with MUS 550 Graduate Performance Recital in the last semester of applied music study.

Composition option: Three credits of electives appropriate to composition. All twelve performance credits must be in MUS 510V, concluding with MUS 552 Graduate Composition Recital in the last semester of applied music study.

All performance candidates must also take nine credits of electives in music history, music theory, or applied areas other than in the student's music performance option (9), and pass a written comprehensive examination in music history, music theory, and the performance option after 15 hours have been completed. A minimum of 30 credits is required for graduation.

M.M. in Music Education: MUS 548 (3), 579 (2), 580 (0), 581 (1), six credits in graduate music education courses (6), and nine credits in one of the following music education options (9):

Performance/essay option: Six credits of MUS 510 (three semesters at two credits each, or two semesters at three credits each), concluding with 550 (0) in the last semester of applied music study, and 570 (3).

Conducting option: Four credits of MUS 510Y (two semesters at two credits each, or one semester at four credits) and four credits of MUS 510Z (two semesters at two credits each, or one semester at four credits) concluding with MUS 551 (1) in the last semester of applied music study.

Composition (classical or studio) option: Six credits of MUS 510V (three semesters at two credits each, or two semesters at three credits each) concluding with 552 (0) in the last semester of applied music study and MUS 510Y or MUS 510Z (3).

Credits recommended for studio composition are MUS 510V in jazz arranging and composition, MUS 579 in the jazz/studio area (e.g., a professional recording studio), 596, or 598J.

Thesis option: at least six credits in MUS 599 and three elective credits.

All music education candidates must also take a minimum of nine credits of electives in music history, music theory, or applied areas other than in the student's music education option (9). Students in a thesis option must pass a written qualifying examination before thesis work is begun and defend the thesis in a final oral examination. All other music education candidates must pass a written comprehensive examination in music history, theory, and music education after 15 or more graduate credits have been completed. A minimum of 30 credits is required for graduation.

**Graduate Teacher Certification Program:** The graduate teacher certification program is taken at the graduate level, in conjunction with the music education specialization in Master of Music degree. It presumes that a candidate has completed the equivalent of the URI Bachelor of Music degree program with courses in music theory, music history, performance, and vocal and instrumental ensembles. Additional requirements include the MUS 169–179 Performance Classes; MUS 311 and 312 Conducting; MUS 416 Form or MUS 417 Instrumentation and Choral Arranging; MUS 238, 339, 340 Methods; PSY 113; EDC 250; MUS 341; and EDC 484 Student Teaching; MUS 480 Graduate Portfolio in Music; and the piano proficiency examination. Advanced standing by examination in the above areas is possible. Certain 500level music education courses may be used as substitutes with permission of the department.

Students pursuing the graduate teacher certification must also apply for admission to the Office of Teacher Education in the School of Education; see Teacher Certification and Education in the undergraduate section of this catalog for admission requirements. The piano proficiency examination, the Praxis II: Principles of Learning and Praxis II: Music Content Knowledge, and all courses required for the graduate teacher certification program, with the exception of MUS 480 [capstone], must be successfully completed before supervised student teaching (EDC 484). The passing score for Praxis II: Principles of Learning is 167, and for Praxis II: Music Content Knowledge is 153. Students may wish to enroll in EDC 312 (3) in order to prepare the Praxis II: Principles of Learning.

Completion of the teacher certification program can require as many as 36 credits (or more, if remedial studies in music are needed) in addition to what is required for the M.M. degree alone.

### MASTER OF MUSIC

Admission requirements: undergraduate major, or the equivalent, in music with a grade point average of 2.50 or above. M.M. in Music Performance. Voice or instrument option: Audition or an audition tape. Deficiencies may be made up by study at the MUS 410 level. Conducting option: Audition or an audition tape. Deficiencies may be made up by study at the MUS 311 or 312 levels. Composition option: A portfolio of original compositions. Deficiencies may be made up by study at the MUS 410V level. M.M. in Music Education. Performance/essay option: Audition or an audition tape. Deficiencies may be made up by study at the MUS 410 level. Conducting option: Evidence of baton technique must be demonstrated

through an audition or videotape. Composition option: Scores and tapes of original compositions. Deficiencies may be made up by study at the MUS 410V level. Thesis option: Writing sample of a major paper from undergraduate work or the equivalent.

Program requirements: postadmission placement examinations in appropriate areas (music history, theory, composition, and/or music education) determine whether background deficiencies must be made up with no program credit. A minimum of 30 credits is required for graduation. Onehalf of the program credits must be at the 500 level. (The graduate teacher certification program requires additional courses in education at the undergraduate level.)

## Neuroscience

### M.S., Ph.D.

#### 401.874.4233, [uri.edu/gsadmis/inp](http://uri.edu/gsadmis/inp)

The Interdisciplinary Neuroscience Program involves faculty from the departments of Biological Sciences; Biomedical and Pharmaceutical Sciences; Chemistry; Cell and Molecular Biology; Communicative Disorders; Electrical, Biomedical, and Computer Engineering; Mechanical, Industrial, and Systems Engineering; Psychology; and Physical Therapy. It is administered by the Graduate School and an executive committee appointed by the dean of each participating college.

Executive Committee: Professor Zawia, chair, Professors Gabriele KassSimon, Lisa Weyandt, Associate Professor Besio, Assistant Professors Mahler and Worthen, Adjunct Professor Mosley Austin.

Faculty: Professors Faghri, Hufnagel, KassSimon, Kay, Kumaresan, Ohley, Sun, Webb, Weyandt, Willis, and Zawia; Associate Professors Agostinucci, Besio, DeBoef, Goren, Kim, Kovoor, Mahler, Martin, Seeram, and Sun; Assistant Professors He, and Worthen; Adjunct Professors Anagnostopoulos, DiCecco and Mosley Austin.

### SPECIALIZATIONS

Dementia and aging; central nervous system disorders; cellular, molecular, and behavioral neurobiology imaging; and computational intelligence.

### MASTER OF SCIENCE

Admission requirements: GRE general test, a bachelor's degree in the sciences (or related disciplines), two letters of recommendation, a statement of purpose, and transcripts of all previous degrees are required. Applicants are encouraged to specify in their statement of purpose one or more faculty members with whom they are interested in working, and to explain why. Students with deficiencies in undergraduate courses relevant to their Program of Study may be required to take additional courses without program credit.

In general, students will be admitted if they meet the minimum GRE requirements (a combined verbal and quantitative score of 300 in the new system and 1,100 in the old system), a minimum GPA of 3.00, good letters of recommendation, and an acceptable statement of purpose. In exceptional circumstances, the student who falls short may still be considered for admission with further evaluation.

Program requirements: The program requires a minimum of 30 credits: 18–20 in coursework, 6–9 in research, and 1–6 in electives. Required courses include: NEU 502, 503, 504; PSY 532; as well as at least one credit NEU 581/582. A thesis proposal and successful defense of thesis are required. In the final semester, a formal presentation of thesis research is required in 581/582.

### DOCTOR OF PHILOSOPHY

Admission requirements: Same as for master's degree.

Program requirements: Successful passage of a qualifying examination or an earned M.S. with thesis in an appropriate discipline, a comprehensive examination, and dissertation defense. As the qualifying exam is meant to be equivalent to the M.S. degree, the examination must be taken no later than the first semester following the completion of eighteen credits of coursework. This examination is intended to assess a student's potential to perform satisfactorily at the doctoral level. A minimum of 72 credits is required, 18 to 28 of which may be earned through dissertation research (NEU 699). Up to 30 transfer credits will be accepted for students who have already earned an M.S. degree. Registration in NEU 581 and 582 is required for one year, and successful completion of NEU 502, 503, and 504 are required. Depending on a student's previous training and experience, certain requirements may be waived at the discretion of the student's dissertation committee and the Graduate School. Students may also be required to take PSY 532 to remedy deficiencies in background. In the final semester, a formal presentation of thesis research is required in 581/582.

### POSTBACCALAUREATE CERTIFICATE IN INTERDISCIPLINARY NEUROSCIENCE

A student who does not seek a neuroscience degree, but instead wants official recognition that he/she has specific training and instruction in neuroscience, can receive a Post-baccalaureate Certificate in Interdisciplinary Neuroscience.

Admission requirements: A bachelor's degree in any field with a 3.00 GPA or higher. Students already enrolled in a master's or doctoral degree at URI are eligible to apply. Students not in a graduate degree program may also apply.

Program requirements: Students will be required to successfully complete 12 credits of neuroscience coursework including NEU 503.

## Nursing

### M.S., D.N.P., Ph.D.

401.874.2766

Faculty: Professors Burbank, Dufault, Ferszt, and Schwartz-Barcott; Associate Professors Coppa, Curtin, and Martins; Assistant Professors EricksonOwens and Hawes; Clinical Assistant Professors Carley and Kenna; Associate Clinical Professor Lavin.

### SPECIALIZATIONS

For the M.S.: administration, education, and advanced practice nursing (including family and acute care nurse practitioner concentrations and an adult – gerontological nurse practitioner/ clinical nurse specialist concentration).

For the D.N.P.: advanced practice concentration.

For the Ph.D.: clinical nursing research in the domains of client, clientnurse interactions, and nursing practice.

### Master of Science

Admission requirements: MAT or GRE; a bachelor's degree from a CCNE or NLNaccredited program with an upperdivision major in nursing and an undergraduate course in statistics. For specialization in nurse practitioner areas, students are required to pass an elementary pathophysiology course with a grade of C or better and have two years of professional nursing practice prior to enrollment in nurse practitioner clinical courses. Completed application package with three letters of reference (academic and professional) and a curriculum vita must be received by October 15 for spring admission and February 15 for summer and fall admission. Acceptance is based on a full review of the applicant's record and not on any one single component.

Program requirements: 41 credits for administration, 42 credits for education, and 43–46 credits for the nurse practitioner concentrations. Required courses include 14 credits in core courses (NUR 500, 505, 507, 510, and 520) for all students; 9 to 32 credits in the area of specialization (NUR 551, 552 for administration; NUR 503, 535, 538, 539, 541, 542, 582 for education; NUR 511, 512, 515, 516, 517 for clinical nurse specialist concentration in psychiatric mental health; NUR 555, 556, 557, and 558 for clinical nurse specialist concentration in gerontology; NUR 503, 504, 531, 532, 533, 534, 535, 582, and 590 for nurse practitioner concentration in family; NUR 503, 508, 535, 561, 562, 563, 564, 582, and 590 for nurse practitioner/clinical nurse specialist concentration in adult/gerontology; and NUR 503, 509, 535, 565, 566, 567, 568, 582, and 590 for acute care nurse practitioner concentration); 18 credits of restricted electives for administration, 3 elective credits for education; a major paper involving significant independent study; and a written comprehensive examination.

### DOCTOR OF NURSING PRACTICE

Admission requirements: For PostBS entry into the Doctor of Nursing Practice (DNP) program, the admission requirements are the same as those listed above for the MS program. A minimum GPA of 3.30 is required for continuation in the DNP program for students taking this option. For the postMS entry into the DNP, master's degree in nursing or its equivalent (GPA minimum 3.30); R.N. licensure; national certification as an Advanced Practice Nurse; two scholarly papers (one theoretical, one empirical) or a master's thesis or equivalent; evidence of graduate course work in concept development and theory (e.g. NUR 500, NUR 507) or equivalent; three letters of reference attesting to the applicant's capability for doctoral study, one of which should be by a doctorally prepared nurse; a statement of purpose indicating goals congruent with those of the program and institution; a curriculum vitae. Acceptance is based on a full review of the applicant's record and not any single component.

Program requirements: A minimum of 70–73 credits for the post – BS entry to the DNP and 42 credits for the post – MS entry including 500 clinical practicum hours. DNP course work includes nursing courses in scientific thinking, research methods (qualitative and quantitative), informatics, administration/ leadership, and evidencebased strategies in health care (21 credits). Practicum courses are continuous throughout the

program (6 total credits; 240 hours). Interdisciplinary courses include epidemiology, social and health care policy, and organizational design and decisionmaking in the Colleges of Pharmacy, Human Science and Services, and Business Administration (9 credits). The program culminates with a capstone practicum (6 credits, 260 hours).

#### DOCTOR OF PHILOSOPHY

Admission requirements: GRE (scores at 60th percentile or above are desirable); a bachelor's degree in nursing from a CCNE or NLN accredited program or its equivalent in nursing and a master's degree or its equivalent (cumulative averages of 3.00 and 3.30, respectively, desired); two scholarly papers (one theoretical and one empirical) or a master's thesis or equivalent; three professional recommendations for doctoral study, including one by a doctorally prepared person; a statement of purpose indicating goals congruent with those of the program and institution; a curriculum vitae; and a course in statistics, including inferential statistics. Acceptance is based on a full review of the applicant's record and not on any one single component. Program requirements: a minimum of 37 credits of course work, including core courses in nursing (13 credits) and cognates (6 credits); electives in nursing (9 credits) and in research methods (6 credits); free electives (3 credits); and 18 credits of doctoral dissertation research, plus written and oral comprehensive examinations in nursing theory, research methods, and one substantive area.

### Nutrition and Food Sciences

#### M.S., Combined M.S. Dietetic Internship Program, Ph.D. (Biological and Environmental Sciences)

401.874.2253, [cels.uri.edu/nfs](http://cels.uri.edu/nfs)

Faculty: Professor Greene, chair; Assistant Professor Lofgren, director of graduate studies; Professor English; Associate Professors Gerber and Melanson; Assistant Professor Tovar; Adjunct Professor Sebelia; Adjunct Associate Professor Pivarnik; Professors Emeriti Caldwell, Constantinides, FeyYensan, Lee, Patnoad, and Rand.

#### NUTRITION SPECIALIZATIONS

Nutritional status and food behavior of high risk population groups; dietary behavior change to reduce chronic disease risk; nutrition issues related to aging and weight management; diet and exercise; energy and macronutrient metabolism; metabolic regulation and energy balance and lipid metabolism.

#### MASTER OF SCIENCE

Admission requirements: GRE and bachelor's degree. All applicants must have completed a minimum of two semesters of chemistry, and one each of biochemistry, anatomy or biology, human physiology, nutrition, and statistics. In addition, students must have completed an advanced nutrition course with a biochemistry prerequisite and an intermediate level statistics course. Students from other academic areas are encouraged to apply but must have physiology, biochemistry, nutrition, and statistics prior to admission.

Program requirements (30 credits): Thesis (6 credits), two credits of NFS 511; a minimum of three credits in 400 or

500 level science courses; NFS 505, 551, and 552; three credits in a 400 or 500 level statistics course. All resident students are required to be continuously registered in NFS 511 or 512, but no more than two credits of NFS 511 or NFS 512 can be used for program credit. Applicants without undergraduate training in nutrition may be required to make up background courses without graduate credit.

#### COMBINED MASTER OF SCIENCE DIETETIC INTERNSHIP PROGRAM

This program is designed for students who want to become Registered Dietitians by including an accredited Dietetic Internship (DI) program with the M.S. degree requirements. The DI has a specialization area in applied nutrition science. The DI is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND), 120 South Riverside Plaza, Suite 2000, Chicago, IL 60606, 312.899.0040, ext. 5400, website: [eatright.org](http://eatright.org).

Admission requirements: students wishing to complete URI's Combined Master of Science Dietetic Internship (MSDI) must have an earned bachelor's degree with completion of the Academy of Nutrition and Dietetics ("Academy") Didactic Program in Dietetics (DPD) requirements including coursework requirements listed above for the M.S. as well as a GRE within 5 years. Applicants must submit an ADA verification form or declaration of intent form signed by their DPD director. Enrollment is expected to be limited to eight students. Program information and application deadlines can be obtained at [cels.uri.edu/nfs](http://cels.uri.edu/nfs).

Program requirements (33 credits): Thesis (6 credits); NFS 505; NFS 506, 528, 551, and 552; two credits of NFS 511; one credit apiece of NFS 507, 508, 581, 582, 583, and 584; three credits in a 400 or 500 level statistics course. In addition to the program requirements for other M.S. students, MSDI students must complete 1,436 hours of supervised practice experience in health care and applied nutrition research facilities. Students must satisfactorily complete the experiential rotations as well as M.S. degree requirements including defense of their thesis in order to receive an Academy Verification Statement qualifying them to take the Dietetic Registration Examination as well as to apply for licensure to practice dietetics in Rhode Island.

#### DOCTOR OF PHILOSOPHY

Students interested in a doctoral degree will complete the Ph.D. program in Biological and Environmental Sciences.

### Ocean Engineering

#### M.S., Ph.D.

401.874.6139

Faculty: Professor Baxter, chair. Professors Ballard, S. Grilli, Hu, J. Miller, and Tyce; Associate Professor Roman; Associate Research Professors Vincent, A. Grilli and Potty; Adjunct Professors Corriveau, Muench, Sharpe, and Shonting; Adjunct Assistant Professors Barton, Cousins, Crocker, Dossot, and Newman; Professors Emeriti Kowalski, Silva, and Spaulding, Stepanishen.

#### SPECIALIZATIONS

Ocean instrumentation and seafloor mapping, underwater acoustics and data analysis, marine hydrodynamics and water

wave mechanics, coastal and nearshore processes, marine geomechanics, coastal and offshore structures, and offshore wind, wave, and current energy systems.

#### GENERAL INFORMATION AND FINANCIAL AID

Programs of study can be designed for individuals employed fulltime. Graduate and research assistantships are available for highly qualified students; some industrial and other fellowships are also available.

#### MASTER OF SCIENCE

Admission requirements: B.S. degree in engineering, physics, applied mathematics, or other technical disciplines. Students with a nonengineering background may be required to take undergraduate courses in thermodynamics, fluid mechanics, strength of materials, electrical circuits, and applied mathematics.

Program requirements: the thesis option requires 30 credits with a minimum of 12 credits of course work in ocean engineering and nine credits for thesis research. The nonthesis option requires permission of the chair and a total of 30 credits with a minimum of 18 credits of course work in ocean engineering, with one course requiring a paper involving significant independent study and a written comprehensive examination. OCE 605 and 606 are required of all fulltime students.

#### ACCELERATED B.S./M.S. DEGREE PROGRAM

See Ocean Engineering in the Undergraduate section of this catalog.

#### DOCTOR OF PHILOSOPHY

Admission requirements: M.S. degree in engineering or equivalent; exceptional students with a Bachelor of Science in engineering will also be considered. All students will be required to complete courses equivalent to those for the M.S. degree in ocean engineering if not included in their master's degree.

Program requirements: a total of 42 credits beyond the M.S. degree (or 72 credits beyond the B.S. degree), composed of at least 18 credits of course work and 24 credits of dissertation research. Courses must include one in advanced applied mathematics, one in engineering or oceanography, and a minimum of two in ocean engineering. Qualifying, written, and oral comprehensive examinations are required for all doctoral students. OCE 605 and 606 are required for all full-time students.

## Oceanography

### M.O., M.S., Ph.D.

#### 401.874.6246

Faculty: Professor Corliss, dean; Professor Smith, associate dean. Professors Ballard, Carey, Collie, Cornillon, D'Hondt, Durbin, Ginis, Hara, Heikes, Kincaid, King, Lohmann, Merrill, Moran, Oviatt, Rossby, Rothstein, Shen, Specker, Spivack, and Wishner; Associate Professors Donohue, Kelley, MendenDeuer, Robinson, Roman, and Rynearson; Assistant Professor Loose; Professors in Residence Donaghay, Rines, Sheremet, and Sutyrin; Research Professors Smayda and Watts; Professors Emeriti

Hargraves, Jeffries, Knauss, Leinen, Pilson, Quinn, Rahn, Saila, Schilling, Sigurdsson, Swift, Wimbush, and Yoder; Associate Professor Emeritus Napora.

#### SPECIALIZATIONS

Biological, chemical, geological, and physical oceanography. Also archaeological oceanography (see below).

#### FINANCIAL SUPPORT

A variety of assistantships are available for M.S. and Ph.D. candidates.

#### MASTER OF OCEANOGRAPHY

Admission requirements: GRE (aptitude required) and bachelor's degree in natural sciences or engineering. Most international students at GSO have a paper TOEFL score above 600 or a computer TOEFL score above 250, corresponding to 100 on the new Internetbased test (iBT). The University minimum must be met on each of the four sections of the TOEFL; see [uri.edu/gsadmis/gs\\_apply\\_int](http://uri.edu/gsadmis/gs_apply_int). Most applicants are admitted for the fall semester, but admission for the start of the spring semester is possible. No application will be considered that shows an undergraduate average of less than B unless there is post baccalaureate work indicating outstanding ability. To ensure full consideration for admission, the complete application packet should be received by January 15.

Program requirements (total of 30 credits): written comprehensive examination; OCG 695 (two credits); major paper (three credits); OCG 501, 521, 540, 561; six credits in oceanography or other science departments; three credits in policy, management, economics, or a related field; three credits in statistics, data analysis, or scientific writing.

#### MASTER OF SCIENCE

Admission requirements: GRE (aptitude required, advanced in the applicant's undergraduate major recommended) and bachelor's degree in natural sciences, engineering, or mathematics. Most international students at GSO have a paper TOEFL score above 600 or a computer TOEFL score above 250, corresponding to 100 on the new Internetbased test (iBT). The University minimum must be met on each of the four sections of the TOEFL; see [uri.edu/gsadmis/gs\\_apply\\_int](http://uri.edu/gsadmis/gs_apply_int). Most applicants are admitted for the fall semester, but admission for the start of the spring semester is possible. Due to the limited number of students who can be accepted as degree candidates, no application will be considered that shows an undergraduate average of less than B unless there is postbaccalaureate work indicating outstanding ability. To ensure full consideration for admission and financial support, the completed application packet should be received by February 1.

Program requirements: thesis, OCG 695, and participation in a regular ocean research cruise. For specialization in biological or chemical oceanography, OCG 501, 521, 540, and 561; for specialization in geological oceanography, six credits of 500 and 600level OCG courses outside the geological oceanography discipline (not including OCG 695); for specialization in physical oceanography, OCG 501, 510, and any two of OCG 605, 610, and 613.



## DOCTOR OF PHILOSOPHY

Admission requirements: GRE (aptitude required, advanced in the applicant's undergraduate major recommended); and bachelor's degree in natural sciences, engineering, or mathematics. Most international students at GSO have a paper TOEFL score above 600 or a computer TOEFL score above 250, corresponding to 100 on the new Internetbased test (iBT). The University minimum must be met on each of the four sections of the TOEFL; see [uri.edu/gsadmis/gs\\_apply\\_int](http://uri.edu/gsadmis/gs_apply_int). Most applicants are admitted for the fall semester, but admission for the start of the spring semester is possible. Due to the limited number of students who can be accepted as degree candidates, no application will be considered that shows an undergraduate average of less than B unless there is postbaccalaureate work indicating outstanding ability. To ensure full consideration for admission and financial support, the completed application packet should be received by January 15.

Program requirements: comprehensive examination, dissertation, OCG 695, participation in a regular ocean research cruise, six credits of 600level OCG courses (excluding problems and research courses and OCG 695). For specialization in biological or chemical oceanography, OCG 501, 521, 540, and 561; for specialization in geological oceanography, OCG 540 and any two of OCG 501, 521, and 561; for specialization in physical oceanography, OCG 501, 510, 605, and 613 and any six credits of 500 and 600level OCG courses outside the physical oceanography discipline. A Ph.D. qualifying examination is required of all doctoral students. This requirement is satisfied by completing, with a grade of B or better, the courses specified for the appropriate discipline.

The Doctor of Philosophy degree in oceanography offers an option in marine policy. Ph.D. students who have successfully completed their comprehensive examinations and obtained approval from cognizant major professor may apply to the Master of Marine Affairs program (see Marine Affairs) to expand their skills in ocean/coastal policy, management, and law relevant to professional positions both inside and outside of government. Students who successfully complete the M.M.A. degree may transfer up to six credits from that program into the oceanography Ph.D. at the discretion of their major professor in oceanography.

## BUSINESS/OCEANOGRAPHY/M.B.A./M.O. JOINT DEGREE PROGRAM

The College of Business and the Graduate School of Oceanography offer a joint degree program in which students are simultaneously enrolled in the M.B.A. and the M.O. programs and may complete both degrees within 16 months. Students take courses in business, oceanography, and economics. An internship with a business is also embedded in the curriculum.

## OCEANOGRAPHY/HISTORY PH.D./M.A. JOINT DEGREE PROGRAM

The Graduate School of Oceanography and the Department of History in the College of Arts and Sciences offer a joint degree program focused on archaeological oceanography. Students in this program are simultaneously enrolled for the oceanography Doctor of Philosophy degree and the history (anthropology and archaeology option) Master of Arts degree. A twelvecredit reduction (six in each degree) is allowed for students in this program.

## FIFTHYEAR MASTER OF OCEANOGRAPHY PROGRAM

The 5thYear Master of Oceanography program is designed for students who want to enter the program while still undergraduates and earn the degree in the year following completion of their BS. In general, students will take three of the core courses required for the MO degree during their fourth year, leaving 20–21 credits to be completed during the fifth year. Interested students should visit: [gso.uri.edu/5thyearmo](http://gso.uri.edu/5thyearmo) for further information.

## MO GRADUATION REQUIREMENTS

30 credits including the following, Core Classes: OCG 501, Physical Oceanography; OCG 521, Chemical Oceanography; OCG 540, Geological Oceanography; and OCG 561, Biological Oceanography 3 credits in statistics, data analysis or scientific writing at the graduate level; 6 additional credits in oceanography or in related courses from other science departments

Participation in the GSOWide student seminar series (2 credits) OCG 695

3 credits of individual study resulting in a major paper

Successful completion of a written Master's examination

Students in the fifthyear program are required to maintain a minimum GPA of 3.2 in their undergraduate classes and a

3.0 in graduate courses.

## Pharmaceutical Sciences

### M.S., Ph.D. (Pharmaceutical Sciences)

401.874.2789

#### Faculty

Medicinal Chemistry and Pharmacognosy: Professors Cho and Parang; Associate Professors King, LaPlante, and Rowley; Assistant Professors Seeram and Udwaray; Professor Emeritus Shimizu.

Pharmaceutics and Pharmacokinetics: Professors Kislalioglu, Lausier, and Rosenbaum; Associate Professor Akhlaghi; Assistant Professors Lu, Wang, and Worthen; Professors Emeriti Needham and Zia.

Pharmacoepidemiology and Pharmacoeconomics: Professors Larrat, Rosenbaum, and Temkin; Associate Professors Kogut, LaPlante, and Quilliam; Assistant Professor Caffrey; Clinical AssociateProfessor Marcoux.

Pharmacology and Toxicology: Professor Chichester, chair; Professors Parang, Rodgers, Shaikh, Yan, and Zawia; Associate Professors King and Deng; Assistant Professors Kooror and Slitt; Assistant Research Professor Ahmed; Professor Emeritus Swonger.

Other Graduate Faculty: Professor Barbour, chair; Professors Dufresne, Hume, and Owens; Associate Professors Goren and Tavieria; Clinical Associate Professors Bratberg and MacDonnell; Assistant Professor Cohen.

## SPECIALIZATIONS

Medicinal Chemistry and Pharmacognosy: Molecular mechanisms of chemical carcinogenesis; mutation and repair; combinatorial chemistry; solidphase peptide synthesis; screening, isolation, and structure elucidation of physiologicallyactive

natural products; biosynthesis of microbial and plant natural products; herbal medicine; bioinformatics.

Pharmaceutics and Pharmacokinetics: Design, development, production, evaluation, and regulatory approval of pharmaceutical and selfcare products as well as pharmacokinetic and pharmacodynamic studies using virtual, clinical, and preclinical data, often with an emphasis on population approaches.

Pharmacoepidemiology and Pharmacoconomics: Health and economic outcomes research pertaining to pharmacotherapy as used in human populations. Specializations include medication adherence, decision and costeffectiveness analyses, post marketing surveillance, epidemiologic methods, and quality improvement and measurement.

Pharmacology and Toxicology: Mechanisms involved in disease states and their pharmacological intervention, and mechanisms of toxicity of environmental agents. Ongoing topics include the effects of hormonal imbalances on cardiac function and metabolism in hypertension, biomarkers and treatment of arthritis, developmental neurotoxicity of environmental agents, hepatotoxicity and nephrotoxicity of heavy metals, pharmacogenomics, drug interactions, drug metabolism and drug transporters, and the development of inhibitors to cell signaling events.

#### **MASTER OF SCIENCE**

Admission requirements: GRE and Pharm.D. or bachelor's degree in pharmacy, chemistry, biological sciences, or allied sciences; TOEFL (waived for applicants from countries where English is the primary language).

Program requirements: Successful completion of 30 credits of graduate study, including PHC 502, 2 seminar credits, 69 thesis research credits, thesis.

For specialization in medicinal chemistry and pharmacognosy: ACS placement exam (organic) to determine specific program requirements; either BPS 530 or BPS 535; nine credits selected from CHM 427, 521, 522; BCH 581; BPS 525 and 551, and BPS 691A in consultation with students major professor.

For specialization in pharmaceutics and pharmacokinetics: STA 409 or 411 or equivalent; 69 credits of 500 or 600level BPS courses; 36 credits of elective in consultation with students major professor.

For specialization in pharmacoepidemiology and pharmacoconomics: PHP 540, and 550 or 580; six credits of STA 409, 411, or 412; six to nine credits of PHC 599; four to nine elective credits in consultation with student's major professor.

For specialization in pharmacology and toxicology: BCH 581; one course of either BPS 530, 535, or 587; and three courses from BPS 525, 544, 546, 572, 587, 641, 644, and BCH 582, in consultation with student's major professor.

#### **DOCTOR OF PHILOSOPHY**

Admission requirements: GRE and master's degree in pharmacy, chemistry, biological sciences, or allied sciences, or bachelor's degree in one of these areas with evidence of superior ability. Qualifying examination is required for candidates accepted without the master's degree. Qualified students may be admitted directly to the Ph.D. program.

Program requirements: Successful completion of 72 credits of graduate study, including up to 24 research credits, PHC

502, written and oral comprehensive examination, dissertation. Students are expected to attend and participate in the departmental seminars during their entire tenure in the Ph.D. program, for a maximum of three credits assigned to the core credit requirement.

For specialization in medicinal chemistry and pharmacognosy: ACS placement exam (organic) to determine specific program requirements; courses required for master's degree, plus one additional credit from BPS 523 or 524, in consultation with students major professor.

For specialization in pharmaceutics and pharmacokinetics: M.S. core requirements, plus one additional credit from BPS 523 or 524, 12 credits of 500 or 600level BPS or PHP courses, and 12 credits of concentration courses. Suggested courses include analytical chemistry, immunology, human genetics, and statistics of clinical trials, microbiology, and BPS 525, in consultation with student's major professor.

For specialization in pharmacoepidemiology and pharmacoconomics: PHP 540, 550, and 580 or 640; six credits of STA 409, 411, or 412; six credits of PSY 533, STA 502, 535, 536, 541, or 542; 36 credits from either PHC 697, 698 or 699, or additional 500/600 level elective courses determined in consultation with the major professor; elective credits in consultation with student's major professor. Tutorials may be arranged in areas of special interest to the student, in consultation with student's major professor.

For specialization in pharmacology and toxicology: courses required for master's degree plus one additional credit from BPS 523 or 524; BPS 530, 535; two additional graduatelevel courses from BPS or BCH /582, in consultation with student's major professor.

#### **JOINT DOCTOR OF PHARMACY/MASTER OF BUSINESS ADMINISTRATION PROGRAM**

The University of Rhode Island Colleges of Pharmacy and Business Administration offer a joint program that allows students the opportunity to develop management and administrative skills as they study for the Doctor of Pharmacy (Pharm.D.) degree. This program qualifies individuals to assume leadership and management roles in the health care industry. A unique combination of management and pharmacy coursework, coupled with innovative practicum experiences, provides students with a knowledge base of theoretical and applied information. The joint program requires the student to complete a total of 224 credits.

Students enrolled in the Doctor of Pharmacy program are eligible to apply for admission to the joint program after their second professional year (by July 15). The following are required at that time: GMAT, statement of purpose, résumé, two letters of recommendation, and TOEFL (waived for applicants from countries where English is the primary language).

#### **JOINT DOCTOR OF PHARMACY/MASTER OF SCIENCE DEGREE PROGRAM**

The University of Rhode Island College of Pharmacy offers a joint program that allows students the opportunity to pursue the Master of Science degree while studying for the Doctor of Pharmacy degree. Students may elect to study in any one of the four specialization areas described in the graduate program: medicinal chemistry and pharmacognosy, pharmaceutics and pharmacokinetics, pharmacoepidemiology and

pharmacoeconomics, or pharmacology and toxicology.

This program is designed for highly qualified and motivated students who are interested in simultaneously pursuing the Pharm.D. and M.S. degrees. Students are expected to complete the Pharm.D. program as described in this catalog. In addition, students must complete all additional credits required for the M.S. degree, complete a research project, and write and defend a thesis. It is expected that the motivated student will be enrolled during the summer sessions after the fourth, fifth, and sixth years with the objective of completing both degrees at the same time or in one additional semester.

Students enrolled in the Doctor of Pharmacy program are eligible to apply for admission to this joint degree program in the second semester of their first professional year (by May 1). The following are required at that time: statement of purpose, résumé, and two letters of recommendation.

## Physical Therapy

### PHYSICAL THERAPY D.P.T.

#### 401.874.5001

Faculty: Professor Konin, Chair. Professors Blanpied and Roush; Associate Professor Agostinucci; Assistant Professor Audette, Clinical Assistant Professors Brown, Dupre, Hulme, and McLinden.

URI's Physical Therapy Program is an entrylevel Doctor of Physical Therapy program that prepares students for the professional licensure examination. There is an emphasis on the development of clinical skill and research capability through the threeyear graduate study plan.

The physical Therapy Program is located in the Independence Square II facility and has a clinical service and research unit that includes a computerized anatomical study center, BIODEX and KINCOM muscle performance dynamometry, postural analysis, electromyography, Gait Rite computerized gait analysis system and kinetic and kinematic analysis systems. SwimEx is available for therapeutic and research activities. Research is currently conducted in the treatment and prevention of spine problems, muscular stiffness, neuromuscular control mechanisms, international physical therapy practice, professional issues, body composition analysis, and neuromotor treatment.

#### SPECIALIZATIONS

Research activities are focused on biomechanics, neuromuscular control, muscle performance, neuromuscular rehabilitation, disability, musculoskeletal injury prevention, and patient satisfaction. Clinical specialty skills are enhanced through faculty clinical practice and internships.

#### DOCTOR OF PHYSICAL THERAPY

Admission requirements: GRE (aptitude test scores at the 50th percentile or above are desired) and a bachelor's degree with 12 credits of biological sciences (including a minimum of eight credits of human anatomy and human physiology courses, which must include a lab); physical sciences (16 credits, eight in chemistry and eight in physics, both of which must include a lab); six credits of social science, including general psychology and a second level content psychology

course, e.g. development, child adolescent, abnormal, etc.; three credits in mathematics (precalculus or higher); three credits in communications (preferably writing or speech). An introductory statistics course is required, preferably through ANOVA. At URI, this means PSY 300 or STA 308. Courses in abnormal psychology, computer science, exercise physiology, and research design are strongly recommended but not required.

A clinical experience with a physical therapist is required. The experience should include observing and aiding a physical therapist in treatment or evaluation procedures. The minimum number of hours recommended for the clinical experience is

30–40 hours of voluntary or paid time. Most successful applicants demonstrate a diversity of clinical experience and a number of hours exceeding the minimum required in physical therapy setting. The experience may be part of fieldwork study for credit in a healthrelated discipline. Evidence of such experience should be documented by a recommendation from the physical therapist addressing the nature and duration of the experience, which should be submitted as part of the application process. Special recommendation forms and a form for the listing of completed prerequisites are available online through the Physical Therapy Department website at [uri.edu/hss/pt/](http://uri.edu/hss/pt/). Baccalaureate requirements must be completed prior to final acceptance

into the D.P.T. program. The completed application package must be received by the October 1st of each year for a May matriculation.

Program requirements: a minimum of 109 credits of specified physical therapy course work, including 12 credits of internship. This program is a threeyear plan of required course work, with semesters at the 500 and 600 levels including internships at affiliated institutions. For internships, the student may have to pay travel and living expenses. A criminal background check and immunizations are required.

Though this is essentially a nonthesis program, a substantial paper involving significant independent research is required. All courses involving clinical skill development require skill competency testing via practical examination. All clinical competencies determined necessary by the faculty of the respective course must be demonstrated as adequately learned by the student in these courses for achievement of an adequate scholastic course grade. (See "Scholastic Standing" in Graduate School Requirements and Policies.) A comprehensive examination is required. In addition to academic requirements, all students must meet professional behavior indicators described in the PT Student Handbook.

## Physics

### M.S., Ph.D.

#### 401.874.2633

Faculty: Associate Professor Andreev, chair. Professors Heskett, Kahn, Kaufman, Malik, Meyerovich, Muller, Nightingale, and Steyerl; Associate Professors Andreev and Reshetnyak; Adjunct Professor McCorkle; Adjunct Associate Professors Bozyan, Karbach, and Ruffa; Professors Emeriti Desjardins, Hartt, Letcher, Nunes, and Pickart.

**SPECIALIZATIONS**

**Astronomy:** lowfrequency radio sources and optical counterparts.

**Biological physics:** membrane biophysics, molecular motors, fluorescence spectroscopy and microscopy.

**Computational physics:** classical and quantum Monte Carlo methods, largescale parallel computations, optimization, many body interactions and invariants, finitesize scaling, recursion method.

**Experimental condensed matter physics:** electronic and structural properties of surfaces and thin films studied via low-energy electron diffraction, Auger electron spectroscopy, Xray standing wave and photoemission techniques (inhouse and at the Brookhaven National Laboratory synchrotron facility); surfaces and interfaces in thin films and multilayers studied via Xray and neutron reflection and diffraction (inhouse and at the National Institute of Standards and Technology reactor facility); epitaxial growth, magnetism in nanoparticles and on surfaces via neutron and Xray scattering; characterization of electromigration by electrical and optical techniques, Rutherford backscattering, and scanning tunneling microscopy.

**Experimental neutron physics:** ultracold neutrons used to study betadecay, neutron optics (at the Institut LaueLangevin, Grenoble).

**Medical physics and nanotechnology:** drug delivery, whole-body fluorescence imaging, cancer nanotechnology.

**Nonlinear dynamics and chaos:** turbulence, Hamiltonian chaos, integrability in quantum mechanics.

**Theoretical condensed matter physics:** surface physics, phase transitions and critical phenomena, critical dynamics, superconductivity, quantum transport, nanoscale films and clusters, disordered systems, lowdimensional systems, spin dynamics, Bethe ansatz.

**Theoretical lowtemperature physics:** Fermi and Bose quantum liquids, solids and gases; spinpolarized quantum systems.

**MASTER OF SCIENCE**

Admission requirements: GRE and advanced test recommended; bachelor's degree with major in physics preferred.

Program requirements: PHY 510, 520, 525, 530, 560, 570, and 580 are required of all students. For both the thesis and the nonthesis options, the student will complete 30 credits, of which no more than six may be below the 500 level. For the nonthesis option, at least one course will require a substantial paper involving significant independent study, and the student must pass a final written and oral examination.

**DOCTOR OF PHILOSOPHY**

Admission requirements: GRE and advanced test recommended; bachelor's degree with major in physics preferred. Master's degree is not required.

Program requirements: PHY 510, 520, 525, 530, 570, 580, 610, 625 (or 626), 630, 670, and 680. There is no formal departmental language requirement, although the candidate's committee may require demonstration of language proficiency. Successful completion of a qualifying examination is required of all students. This examination is normally expected to be taken in the summer preceding the second year of studies.

**FIVEYEAR PROGRAM IN MEDICAL PHYSICS**

The Physics Departments also offers a fiveyear program of studies leading to a B.S. in physics and a M.S. in medical physics. The M.S. degree part of the program requires that the student take PHY 540, 545, 550, 552, 555, 560, 565, 691, 610; SOC 224; ELE 562 + lab, ELE 564 + lab. The rest of the courses are those indicated on the schedule in the undergraduate section of this catalog (see "Medical Physics" under Physics in Arts and Sciences).

**Political Science****M.A., M.P.A., M.P.A./M.L.I.S.**

**401.874.2183; 401.277.5200**

Faculty: Professor Kruger, chair. Professors Hennessey, Killilea, Petro, and Rothstein; Assistant Professors Hutchison, Johnson, PearsonMerkowitz, and Xu; Adjunct Professors Leazes and Profughi.

**SPECIALIZATIONS**

International relations, comparative politics, American politics, public policy, and public administration.

**MASTER OF ARTS**

Admission requirements: generally, GRE, GMAT, or MAT, and undergraduate credit in basic political science and political theory.

Program requirements: a minimum of 30 credits, including PSC 553 and either 580 or 583 for both thesis and nonthesis options, depending on area of specialization; nonthesis option requires one course including a substantial paper requiring significant independent research and an oral examination in addition to the comprehensive examination.

**MASTER OF PUBLIC ADMINISTRATION (M.P.A.)**

The Rhode Island Master of Public Administration Program (RIMPA) leads to the M.P.A. degree conferred by the University of Rhode Island. It is a collaborative undertaking, governed and offered by a committee of University faculty that includes adjunct faculty from Rhode Island College. The RIMPA is offered at URI's Providence campus and provides federal, state, city, and nonprofit officials and agencies easy access to its instructional programs and research expertise. In addition to delivering its degree and certificate programs, internships, and workshops, the RIMPA faculty conducts research into the formation and implementation of public policy and the administration of public and nonprofit agencies. Current research areas include public professional ethics, the training of public managers, water resource management, the governance and financing of nonprofits, state prison administration, the public administration of technology, industrial policy at the state and national levels, and case management in mental health agencies.

Admission requirements: generally, based on the applicant's undergraduate academic record, current scores for one of the following exams: GRE, MAT, GMAT. Exam requirement waived for applicants holding an advanced degree from an accredited institution of higher education.

Program requirements: This is a nonthesis program. Re-

quirements include one course with a substantial paper and significant independent research; comprehensive examination; internship (may be waived); minimum total of 36 credits including PSC

501, 503, 504, 505, 506, 524, and 573. Competency in computer science and statistics is required and may be demonstrated by completion of a basic course at the undergraduate level. Competence in basic computing skills may be demonstrated by completion of a basic course at the undergraduate level, or, after review by the M.P.A. program director, by professional, worksite training completed by the candidate, or by virtue of the professional responsibilities of an M.P.A. candidate.

Students in the RIMPA program taking elective courses at the participating institutions will be governed by the same regulations effective for courses taken at URI. Under this rule, grades (including failures) for all graduate courses taken at a participating institution will be included in the grade point average and will become part of the student's record.

#### **M.P.A. AND M.L.I.S. COOPERATIVE PROGRAM**

A cooperative program permits joint enrollment in URI's Master of Public Administration and Master of Library and Information Studies programs. The integrated pursuit of the two degrees makes it possible for six credits of appropriately selected course work from one program to serve as electives in the other, and for six credits of such course work to be applied in the opposite direction. Thus, when planned and taken jointly, the two programs can be completed with a total of 60 credits.

Admission requirements: GRE and other requirements listed for M.P.A. and M.L.I.S. Applicant must apply and be accepted in both programs. Applications to both programs must indicate M.P.A./M.L.I.S. as the field of specialization.

Program requirements: each student must complete the required core courses for both programs plus three credits of PSC 590 for the M.P.A. After consultation with, and approval of, both departments, students must file separate programs of study for each degree, indicating the courses to be jointly counted. Each student must pass the separate comprehensive examination for each degree. A student who fails to complete one of the programs may, of course, complete the other in accordance with the separate program of study.

## Psychology

### **M.S., Ph.D.**

#### **401.874.2193**

Faculty: Professor Morokoff, chair. Professors Biller, Boatright-Horowitz, Brady, Bueno de Mesquita, J.L. Cohen, Collyer, Faust, Florin, Gorman, Harlow, Laforge, Prochaska, Quina, Rogers, Rossi, L. Stein, Stevenson, Stoner, Velicer, Weyandt, Willis, and Wood; Associate Professors FlannerySchroeder, S. Harris, Robbins, and Walls; Assistant Professors Loftus and Mena; Adjunct Professors T. Malloy and Redding; Adjunct Associate Professors D. Miller and VarnaGaris; Adjunct Assistant Professors Anatchkova, Boekamp, Clair, Correia, Evers, Frenzel, Golembeski, Goodwin, Kollman, Little, Machan, Marrs Garcia, Paiva, Plante, Reiter, and Silver; Professors Emeriti Grebstein, Gross, A. Lott, B. Lott, Merenda, Silverstein, N. Smith, Valentino, and Vosburgh.

### **SPECIALIZATIONS**

Programs are offered in behavioral science, clinical, and school psychology. Within each program students can adopt one of the following focus areas: health psychology, research methodology, child/developmental/family; multicultural psychology; or neuropsychology. Students in the school psychology program may also focus their interests in one or more of the roles and functions of school psychologists emphasized in the program such as assessment, intervention, consultation, prevention, reading and literacy, decisionmaking, early intervention and school readiness, crosscultural development, and multicultural competence. Students in the behavioral science program are expected to be engaged in research for a substantial portion of their program, and tailor their own program. Additional individual specialties can be developed within each of the program areas. For more information, go to [uri.edu/artsci/psy](http://uri.edu/artsci/psy).

#### **MASTER OF SCIENCE (SCHOOL PSYCHOLOGY ONLY)**

Admission requirements: GRE (verbal and quantitative), advanced test recommended. Undergraduate major in psychology or education recommended. Applicants are admitted for the fall semester only. The completed application package must be postmarked by December 15.

Program requirements: Nonthesis: internship; total of 60 credits with a minimum of 30 for the master's degree plus additional credits for certification as a school psychologist; one course with a major paper involving significant independent research; and a written comprehensive examination consisting of the ETS Praxis II exam in school psychology, and completion of a comprehensive case study.

This program is recognized by NASP as a 60credit "specialist-level" program and is approved by NCATE/NASP and the Rhode Island Department of Education.

#### **DOCTOR OF PHILOSOPHY (CLINICAL, BEHAVIORAL SCIENCE, AND SCHOOL PSYCHOLOGY)**

Admission requirements: GRE (verbal and quantitative); evidence of research experience; personal statement addressing research and professional experience, interests, and goals; and curriculum vita. All graduate students in the Department of Psychology are expected to be full time students. Applicants are admitted for the fall semester only. The completed application and all supporting materials must be postmarked or electronically submitted by December 1 for clinical, December

15 for School, and January 6 for behavioral science. See program websites for details. The formal application materials can be obtained from the Graduate School website, and the completed application package must be submitted online. Applicants are evaluated on the basis of previous academic achievement, GRE scores, previous research and professional experience, letters of recommendation (three required), and match between applicant and program goals. For more information, go to [uri.edu/artsci/psy](http://uri.edu/artsci/psy). Finalists in the school and clinical programs must participate in a personal interview to complete the evaluation process.

Program requirements: Completion of a minimum of 90 credits (66 course work, 6 thesis, 18 dissertation). Students entering with an approved master's degree may transfer 30 credits. Research course requirements: a minimum of two courses in statistics (STA/PSY 532, PSY 533) and a research methods

course (PSY 611). In addition, all students must complete a multicultural competency requirement, and four courses from among those numbered 600–609. Each of the three program areas (i.e., clinical, behavioral science, and school) also include specific research, content, and application requirements that are specified on their individual Web pages. The research competency requirement may be met by successfully defending a master's thesis or by successfully completing a research competency project under the direction of the major professor. The research competency project option is limited to those who have nonthesis master's degrees in psychology. Students who successfully complete the thesis option will earn a Master of Arts degree in psychology. A Ph.D. qualifying examination is required of all doctoral students entering without the master's degree. This requirement is met by completing, with a grade of B or better, four courses from STA/PSY 532, PSY 533, 611, and those numbered 600–609. These courses are usually completed prior to earning 24–30 credits. For students in the applied areas (clinical and school), course work must be completed in each of the following content areas of psychology: biological bases of behavior; cognitive and affective bases; social bases; individual differences; and history and systems of psychology; as well as psychological assessments, interventions, human development/personality, multicultural psychology, and psychological ethics.

Both the clinical and the school psychology programs are accredited by the American Psychological Association. (Commission on Accreditation, American Psychological Association, 750 First Street NE, Washington, D.C. 20002-4242; phone 202.336.5979). Both programs ascribe to the scientist-practitioner model of training. Program requirements generally include courses in foundations of psychological science, professional practices, research, and completion of an approved supervised internship. Practicum and individual research projects can be specifically tailored to help the student prepare for the professional role of his or her choice. These programs also have a strong experiential base, including field activity in each year. Students are expected to be involved in research for a substantial portion of their program.

## Spanish

### M.A.

**401.874.5911**

Faculty: Professor Hedderich, Chair; Professor White, Director of Graduate Studies. Professors de los Heros, Morin, and

Trubiano; Associate Professor Echevarria; Professor Emeritus Gitlitz.

### SPECIALIZATIONS

The Master of Arts in Spanish helps students advance to a professional level in the general area of Hispanic studies, including Spanish language mastery, and an understanding of Hispanic linguistics and literature as an expression of civilization and culture. The curriculum includes linguistics as well as the literary production of Spain, Spanish America, and the Spanish speaking peoples of the United States, any of which could provide a field for specialization.

### MASTER OF ARTS

Admission requirements: undergraduate major in Spanish or equivalent, including 12 credits in Spanish or Hispanic-American literature, linguistics, and/or pedagogy. Promising applicants with fewer than 12 credits in these areas may be asked to make them up without graduate credit.

Program requirements (30 credits): Students electing the thesis option may include six thesis research credits. All course work must be carried out in Spanish unless otherwise approved by the Spanish Section. Course work in URI approved graduate study abroad programs will be counted toward the degree. Candidates must pass a comprehensive examination with both a written and an oral component.

## Speech-Language Pathology

### M.S.

**401.874.5969**

Faculty: Professor Kovarsky, chair. Professors Kovarsky, Singer, and Weiss; Associate Professor Kim; Assistant Professor Mahler.

The speechlanguage pathology program is accredited by the American SpeechLanguageHearing Association.

### MASTER OF SCIENCE

Admission requirements: Students who are interested in applying to the graduate program in speechlanguage pathology, and who have not taken the undergraduate requirements, may wish to enroll as postbaccalaureate (nonmatriculating) students to fulfill or begin to fulfill these requirements. The undergraduate requirements—courses needed prior to taking graduate courses

- include CMD 272, 273, 274, 276, 278, 375, 377, and 465. Completion of these courses does not, however, assure admission into the graduate program, nor is completion of all the requirements essential for application to the program. Any required undergraduate courses not completed prior to graduate admission will be added to the graduate program. GRE or MAT scores are required for admission. Strong consideration will be given to the cumulative GPA. In addition, performance within a communicative disorders major or prerequisite courses will be viewed as a particularly important criterion for admission. The completed application package must be received by October 15 for spring admission and March 1 for fall admission.

Program requirements (54 credits): Required courses consist of the following: CMD 493, 504, 550 (A, B, C), 560, 561, 564, 569, 570, 581, 582, 583, 584, 585, and 592. Nonthesis option: required courses as noted above; written comprehensive examination. Thesis option: 6 credits of CMD 599 (thesis); required courses as noted above; electives chosen from CMD 492, 494, 563, 571, 580, 594, 595, and 598.

### ACCELERATED BACHELOR'S/MASTER'S DEGREE IN SPEECH-LANGUAGE PATHOLOGY

Admission requirements: GRE or MAT for speechlanguage pathology; URI sixthsemester standing in communicative disorders with all major requirements completed and 24 elective credits remaining; a 3.00 cumulative grade point average and 3.20 in the major through the fifth semester; and two letters of recommendation from URI communicative disorders faculty.

URI undergraduate communicative disorders majors who have met requirements for early acceptance in the graduate program in speechlanguage pathology, which includes successful application to the program, may follow a special sequence of graduatelevel course work and clinical practicum during their senior year (see "Communicative Disorders" in the undergraduate section of this catalog for more information). If eligible, following the award of the Bachelor of Science degree in communicative disorders, students may complete a 30credit master's degree (rather than the usual 54credit master's degree) in speechlanguage pathology in one year plus a summer of fulltime graduate study.

Program requirements: Speechlanguage pathology students must take 24 specified graduate credits (at the 400 or 500 level) of communicative disorders course work in the senior year to complete the bachelor's degree in communicative disorders; 30 credits of course work in the fifth year (postbaccalaureate) at the 400 or 500 level. Specific course requirements are as stated in the regular twoyear master's program (see above).

## Statistics

### M.S.

#### 401.874.2701

Faculty: Professor Peckham, chair. Associate Professor Gonzales, section head. Assistant Professors Katenka and Puggioni; Adjunct Professors Kajiji and Ordonez; Professors Emeriti Hanumara and Heltshe.

### SPECIALIZATIONS

Experimental design, sampling, ecological statistics and biostatistics, statistical computation, simulation, multivariate analysis, nonparametric methods, classification and discrimination, analysis of variance, bootstrap and jackknife estimation, sequential methods, spatial statistics.

### MASTER OF SCIENCE

Admission requirements: bachelor's degree including the equivalent of MTH 141, 142; MTH 243; MTH 215; CSC 201; STA 409, 412. GRE; advanced test in mathematics or undergraduate field is desirable. Programs of study can be designed for individuals who are employed fulltime.

Thesis option program requirements: a minimum of 24 credits (exclusive of thesis) including MTH 451, 452, either STA 501 or 502, and at least nine additional credits selected from STA 501, 502, 520, 535, 541, 542, 550, 592, 611.

Nonthesis option program requirements: 33 credits distributed as follows: 1) MTH 451, 452, and either STA 501 or 502; 2) at least nine credits selected from STA 501, 502, 520, 535, 541, 542, 550, 592, 611; 3) at least six of the remaining credits must be at the 500 level or above (exclusive of STA 591); 4) the above course work must include at least one course that requires a substantial paper involving significant independent study; and 5) written comprehensive examination.

## Teacher Certification

401.874.5930

Students who did not obtain Rhode Island teacher certification as part of their undergraduate studies may do so by being admitted to a certification program or a master's degree program with a certification option and satisfactorily completing a prescribed set of courses in the appropriate fields. Applicants for elementary or one of the secondary fields described below must apply as master's degree students. Applicants for early childhood education, music education, or school library media certification may indicate the specific TCP program code on the application forms and submit two official transcripts of all prior academic work, showing receipt of the bachelor's degree, plus a personal statement of objectives and two letters of recommendation.

Applications for the School of Education programs are reviewed by each individual specialization (see below). Admission is competitive, and admission into the elementary and secondary education programs occurs once a year. Typically, the deadline for admission is late January. Interested students should contact the Office of Teacher Education, or the contact person (listed at the end of this section) in their area, for admission information; they may also visit the School of Education's website at [uri.edu/hss/education](http://uri.edu/hss/education). Graduate applicants with an undergraduate cumulative GPA of 3.00 or above are exempt from admission testing requirements. Applicants whose undergraduate GPA is 2.50 or above may be admitted to degree candidacy upon the submission of other evidence of academic potential. In this case, admission test scores.

Graduate applicants with an undergraduate cumulative GPA of 3.00 or above are exempt from admission testing requirements. Applicants whose undergraduate GPA is 2.50 or above may be admitted to degree candidacy upon the submission of other evidence of academic potential. In this case, admission test scores are required. Visit [uri.edu/hss/education/applicants/](http://uri.edu/hss/education/applicants/) for current test scores information.

An interview and admission portfolio are required of all applicants. Students admitted to the TCP program are governed by the same academic standards as matriculated graduate students. Students in the School of Education, graduate and undergraduate certification and licensure programs, will be required to take and pass a content area exam(s) in their area of certification and any other exam required for state licensure prior to student teaching or final internship. Contact the Office of Teacher Education for the "passing" scores required for each discipline.

Further information can be obtained from the Office of Teacher Education at 401.874.5930 or from the following areas of specialization:

Early Childhood Education: Professor Susan Brand, School of Education, 401.874.2426

Elementary Education: Associate Professor Sandy Jean Hicks, School of Education, 401.874.5976

Secondary Education

English: Associate Professor Diane Kern, 401.874.9490

Mathematics: Associate Professor Cornelius deGroot, School of Education, 401.874.4149

Science: Associate Professor Jay Fogleman, School of Education, 401.874.4161

Social Studies: School of Education, 401.874.7418

Languages: Professor JoAnn HammadouSullivan, Department of Modern and Classical Languages and Literatures, 401.874.4712

Music Education: Assistant Professor Valerie Baker, Department of Music, 401.874.2765

Reading Specialist Program: Associate Professors Theresa Deeney, and Julie Coiro, School of Education, 401.874.2682.

School Library Media: Professor Cheryl McCarthy, Graduate School of Library and Information Studies, 401.874.2878

School Psychology: Professor Gary Stoner, Department of Psychology, 401.874.4234

Special Education: Professor Joanne Eichinger, School of Education, 401.874.7420

## Textiles, Fashion Merchandising, and Design

### M.S.

#### 401.874.4574

Faculty: Professors Bide and Welters, cochairs. Professor Ordoñez; Associate Professors Hannel and HarpsLogan; Assistant Professors Aspelund, Gagnon, and Lu; Adjunct Associate Professor Warner; Adjunct Assistant Professor Warburton; Professors Emeriti Emery and Higa; Associate Professor Emerita Helms.

The department offers a wide variety of individualized programs in close association with other departments (Art, Chemistry, Education, History, Business) and with various social science fields.

### SPECIALIZATIONS

Textile science, historic textiles and costume, textile conservation, cultural analysis, and fashion merchandising.

### MASTER OF SCIENCE

Admission requirements: GRE and a bachelor's degree with adequate preparation for the proposed area of study.

Program requirements: for thesis option, completion of a minimum of 30 credits, including six credits of thesis research. For nonthesis option, completion of a minimum of 33 credits, half of which must be TMD courses numbered 500 or above, including at least one course that requires a substantial paper or practicum involving significant independent study, and written comprehensive examinations. TMD 510 is a requirement for all students. For the textile science specialization, TMD 510; a statistics course. For the specializations focusing on historic textiles and costume, textile conservation, and cultural analysis, TMD 510, 518, 500 or 524, and a supervised internship (TMD 530, 24 credits); half of the remaining elective credits must be from TMD courses numbered 500 or above. A minimum of nine credits is required to achieve a competency level in an allied field such as art history, history, or anthropology; this may result in a program of more than 30 credits. The committee may elect to waive this requirement if the candidate has adequate preparation in the allied field as an undergraduate. Candidates lacking undergraduate courses in textile science and fashion history may be required to make up deficiencies without graduate credit. For the fashion merchandising specialization, TMD 510 and 524; six credits

to be selected from TMD 432, 442, or 452; a statistics course. Candidates lacking undergraduate courses in textile science and fashion history may be required to make up deficiencies without graduate credit.

### POSTBACCALAUREATE CERTIFICATE IN FASHION MERCHANDISING

This program is designed for students with a bachelor's degree who wish to further their education to gain a fundamental understanding of fashion merchandising. Students may apply 400level course work from the certificate program to the master's degree program.

Admission requirements: A bachelor's degree with a 3.00 GPA or higher. Applicants who do not meet the GPA requirement may enter by earning a combined score of 900 or above on the verbal and quantitative sections of the GRE.

Program requirements: Prerequisites for the 400level courses include TMD 232, 303, 313, and 332 (10 credits). Students will be required to successfully complete 12 credits to be selected from TMD 402, 424, 432, 433, 442, and 452.

## Thanatology

### POSTBACCALAUREATE CERTIFICATE IN THANATOLOGY

URI offers an interdisciplinary postbaccalaureate certificate program in thanatology, the study of loss, death, and grief. For more information, including a list of required courses and an application to the program, please visit [uri.edu/nursing](http://uri.edu/nursing) and choose "Graduate Programs" and then "Thanatology."

## Women's Studies

See Gender and Women's Studies.



## Course Descriptions

The following explanations pertain to the ways courses are represented throughout this catalog, especially in the sections entitled Undergraduate Programs, Graduate Programs, and Course Descriptions.

To see courses listed by semester, meeting time, or instructor, please log on to eCampus and choose "Class Search." Registration for classes also takes place through eCampus.

## Course Numbering

Courses numbered 001–099 are prefreshman and special undergraduate courses, and do not carry bachelor's degree credit. Those numbered 100–299 are lower-division undergraduate courses, and those numbered 300–399 are upper-division undergraduate courses. The 400–level courses are generally limited to juniors and seniors majoring in that field, but are open to other advanced undergraduates and graduate students with permission.

Please note that enrollment in 200–level College of Engineering courses is restricted to engineering majors only. Exceptions can be made by permission of the department chair. Enrollment in 300–level and above College of Engineering courses is restricted to students who have been admitted to a degree granting college.

The 500–level courses are graduate courses for which a bachelor's degree is usually a prerequisite, but qualified seniors and honors students are admitted with permission. These courses should make up the majority of course work for students working toward a master's degree. Courses at the 600–level are advanced graduate courses. The 900–level courses are special types of graduate courses for which no degree credit is given. They include courses offered to remedy deficiencies as well as workshops, institutes, and courses offered one time only by visiting faculty.

Course numbers separated with a slash indicate either a sequence or two courses that are required to be taken concurrently. For full clarification, check the listings for those courses in the eCampus Course Schedule and speak with an academic advisor.

The number in parentheses after the course name or code indicates the number of credits (e.g. the Art History course "Introduction to Art (3 crs.\*)" may also be abbreviated as "ARH 120 (3)").

## Course Codes

AAF | Africana Studies  
 AFS | Aquaculture and Fisheries Science  
 AMS | Applied Mathematical Sciences  
 APG | Anthropology  
 ARB | Arabic  
 ARH | Art History  
 ART | Art  
 AST | Astronomy  
 AVS | Animal and Veterinary Science

BCH | Biochemistry  
 BES | Biological and Environmental Studies  
 BIO | Biological Sciences  
 BIS | Bachelor of Interdisciplinary Studies  
 BME | Biomedical Engineering  
 BPS | Biomedical and Pharmaceutical Sciences  
 BUS | Business

CHE | Chemical Engineering  
 CHM | Chemistry  
 CHN | Chinese  
 CLA | Classics  
 CLS | Comparative Literature Studies  
 CMD | Communicative Disorders  
 COM | Communication Studies  
 CPL | Community Planning  
 CSC | Computer Science  
 CSF | Digital Forensics and Cyber Security  
 CSV | Community Service  
 CVE | Civil and Environmental Engineering

ECN | Economics  
 EDC | Education  
 EDP | Ph.D. in Education  
 EDS | Special Education  
 EEC | Environmental Economics  
 EGR | Engineering  
 ELE | Electrical Engineering  
 ELS | English Language Studies  
 ENG | English  
 ENT | Entomology  
 EVS | Environmental Sciences

FLM | Film Media  
 FOS | Forensic Science  
 FRN | French

GCH | Grand Challenges  
 GEG | Geography  
 GEO | Geosciences  
 GER | German  
 GRK | Greek  
 GWS | Gender and Women's Studies

HBW   Hebrew	OCE   Ocean Engineering
HDF   Human Development and Family Studies	OCG   Oceanography
HIS   History	OCS   Off Campus Study - Undergraduate
HLT   Health	OCSG   Off Campus Study - Graduate
HPR   Honors Program	
HSA   Health Services Administration	PHC   Pharmacy
HSS   Human Science and Services	PHL   Philosophy
	PHP   Pharmacy Practice
ISE   Industrial and Systems Engineering	PHT   Physical Therapy
ITL   Italian	PHY   Physics
ITR   Internships and Experiential Education	PLA   Prior Learning Assessment
	PLS   Plant Sciences
JOR   Journalism	POR   Portuguese
JPN   Japanese	PRS   Public Relations
	PSC   Political Science
KIN   Kinesiology	PSY   Psychology
LAN   Languages	RDE   Resource Development Education
LAR   Landscape Architecture	RIC   Joint PhD Program
LAS   Latin American Studies	RLS   Religious Studies
LAT   Latin	RUS   Russian
LET   Letters	
LIB   Library	SCM   School of Communications and Media
LIN   Linguistics	SOC   Sociology
LRS   Labor Relations and Human Resources	SPA   Spanish
LSC   Library and Information Studies	STA   Statistics
	SUS   Sustainability
MAC   Master of Science in Accounting	
MAF   Marine Affairs	THE   Theatre
MBA   Master's in Business Administration	THN   Thanatology
MCE   Mechanical Engineering	TMD   Textiles, Fashion Merchandising, and Design
MIC   Microbiology	
MLS   Medical Laboratory Science	URB   Urban Affairs
MSL   Military Science and Leadership	URI   University of Rhode Island Freshman Seminar
MTH   Mathematics	
MUS   Music	WRT   Writing
NES   New England Studies	
NEU   Neuroscience	
NFS   Nutrition and Food Sciences	
NRS   Natural Resources Science	
NUE   Nuclear Engineering	
NUR   Nursing	
NVP   Nonviolence and Peace Studies	

Course descriptions including "Crosslisted as" indicate multiple departments or programs that offer the same course (e.g. "Crosslisted as (AAF), HIS 150" course is offered by both Africana Studies and History).

In the Course Descriptions, the information in parentheses after the full text of the course description tells the format and number of hours per week (e.g. "Lec. 3" means three hours of lecture). "Pre:" refers to a prerequisite. "S/U credit" signifies a course in which only grades of satisfactory or unsatisfactory are given.

Courses that meet general education requirements are designated with a letter in parentheses indicating the appropriate group, as follows:

(A) | Fine Arts and Literature

(FC) | Foreign Language/CrossCultural Competence

(L) | Letters

(EC) | English Communication (General)

(ECw) | English Communication (Written)

(MQ) | Mathematical and Quantitative Reasoning

(N) | Natural Sciences

Courses that meet the general education diversity requirement are designated with a [D].

## AAF | Africana Studies

**AAF 150 Introduction to Afro-American History** (3 crs.) Cross-listed as (HIS), AAF 150. Survey of Afro-American history from African origins to the current racial confrontation. (Lec. 3) (L) [D]

**AAF 201 Introduction to African-American Studies** (3 crs.) Interdisciplinary exploration of some of the pivotal themes and issues in the study of peoples of African descent. (Lec. 3) (L) [D]

**AAF 202 Introduction to Afro-American Culture** (3 crs.) Interdisciplinary survey of the social origins of Afro-American culture. (Lec. 3/Online)

**AAF 240 Race and Ethnic Relations** (3 crs.) Cross-listed as (SOC), AAF 240. Relations among the various ethnic, religious, racial, and political minorities and majorities, with special reference to the United States. (Lec. 3) Professor Cunnigen's section is writing intensive [WI]. (S) [D]

**AAF 247 Introduction to Literature of the African Diaspora** (4 crs.) Cross-listed as (ENG), AAF 247. Major themes, genres, and motifs of the literatures of Africa and the Americas. Focus on one or more of these regions. Study of black oral and written literatures with emphasis on cultural, historical, political, and socioeconomic contexts. (Lec. 3, Project 3) (A) [D]

**AAF 248 African-American Literature from 1900 to the Present** (4 crs.) Cross-listed as (ENG), AAF 248. Twentieth-century African-American literature, with emphasis on major issues, movements, and trends, including the study of W.E.B. DuBois, the Harlem Renaissance, the civil rights movement, and the black arts movement. (Lec. 3, Project 3) (A) [D]

**AAF 290 African-American Women: Service, Community, and Self** (3 crs.) Introductory course on African-American women. Focuses on the idea of African-American women's service which has been a constant theme and necessity for the African-American community in North America. (Lec. 3)

**AAF 300 Special Topics in African and Afro-American Studies** (3 crs.) Selected contemporary topics, problems, issues, and individuals from the field of African and Afro-American studies. The topical format allows in-depth analysis of some significant aspect of the African and Afro-American experience. (Lec. 3/Online) Topic: Conditions for Community Service is service learning. Pre: AAF 201 or 202 or permission of instructor. Some topics may be offered online. May be repeated with different topic.

**AAF 330 African-American Art in Context: A Cultural and Historical Survey I** (3 crs.) Cross-listed as (AAF), ARH 330. Examines African-American art and artifacts of the 17th, 18th, and 19th centuries, highlighting the dominant attitudes as well as the political and social realities of the times. (Lec. 3)

**AAF 331 The African-American Artist in Context: A Cultural and Historical Survey II** (3 crs.) Cross-listed as (AAF), ARH 331. Examines art and artists, the trends, philosophical attitudes, political realities, social influences, and artistic styles of 20th century African-American artists. (Lec. 3)

**AAF 333 Oral Interpretation of Black Literature** (3 crs.) Cross-listed as (COM), AAF 333. Study and oral presentation of literature by black American authors. Class performances, discussion, reports, and analysis of the literature. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor. COM 231 recommended.

**AAF 336 Social Inequality** (3 crs.) Cross-listed as (SOC), AAF 336. Dimensions and dynamics of inequality in society; concepts of class and status; processes of social mobility. (Lec. 3) Pre: one 100- or 200-level sociology course. Professor Cunnigen's section is writing intensive [WI]

**AAF 352 Black Images in Film** (3 crs.) Cross-listed as (AAF), ENG 352. Exploration of the cultural, economic, political, and ideological motivations behind the standard representation of people of the African diaspora in cinema in the U.S. and other areas of the world, while examining film as a genre with a vocabulary and idiom of its own. (Lec. 3)

**AAF 355 Black Women in the U.S.: Colonial Times to the Present** (3 crs.) Cross-listed as (HIS), AAF 355. Women's experiences in the study of African-American history. Assigned readings familiarize students with the state of scholarship and examine the intersection of race, class, and gender in that experience. (Lec. 3) Pre: sophomore standing. (L) [D]

**AAF 356 Black Urban History: Late 19th and 20th Centuries** (3 crs.) Cross-listed as (HIS), AAF 356. Examines the historical black experience in urban environments in the U.S. Assigned readings, research, and group discussions examine the issues of migration, community, politics, class, and gender. (Lec. 3) Pre: sophomore standing. (L) [D]

**AAF 359 History of Slavery in America** (3 crs.) Cross-listed as (HIS), AAF 359. Origins, development, and demise of slavery, with emphasis on the area that currently constitutes the United States. (Lec. 3) Pre: sophomore standing or permission of instructor.

**AAF 360 Africana Folk Life** (3 crs.) Examination of the process of creativity, context, and form in the oral literary tradition of peoples of African descent throughout the world. (Lec. 3) In alternate years.

**AAF 362 African-American Literary Genres** (4 crs.) Cross-listed as (ENG), AAF 362. Study of drama and poetry in the continued oral and written heritage of Africa and America, excepting short story and the novel. Focus on Baraka, Bullins, Dunbar, Giovanni, Hughes, and Walker. (Lec. 3, Project 3)

**AAF 363 African-American Fiction** (4 crs.) Cross-listed as (ENG), AAF 363. Study

of formal and thematic developments in the African-American novel and short story. Focus on Baldwin, Chesnut, Ellison, Gaines, Hurston, Jacobs, Marshall, Morrison, Naylor, Reed, Walker, Wideman, Wilson, and Wright. (Lec. 3, Project 3)

**AAF 364 Contemporary African Literature** (4 crs.) Cross-listed as (ENG), AAF 364. Study of contemporary African literature by genre, region, or theme, with emphasis on literary traditions, issues, and socio-cultural contexts. (Lec. 3, Project 3)

**AAF 366 Twentieth-Century Black Politics and Protest** (3 crs.) Cross-listed as (HIS), AAF 366. Explores the development and evolution of black politics and protest in the twentieth century including the Civil Rights and Black Power Movements and their legacies. (Lec. 3) Pre: HIS 150 or AAF 150 or HIS 142 and sophomore standing or permission of instructor.

**AAF 372 African-Americans and the Legal System** (3 crs.) Focus on constitutional changes designed to influence the political status of African-Americans in the United States. (Lec. 3)

**AAF 380 Civil Rights Movement** (3 crs.) Cross-listed as (AAF), PSC 380. Major transformations in American life brought about by the civil rights movement in law, in social relations, in the role of government. Focus on the period between 1954 and 1968 in an effort to identify and evaluate the changes in government and civil society that occurred during this period. (Lec. 3)

**AAF 388 History of Sub-Saharan Africa** (3 crs.) Cross-listed as (HIS), AAF 388. Ancient and medieval Africa, and the impact of Islam; the Glorious Age of the Sudanic empires; the slave trade and the age of exploration; the period of European partition and the rise of African nationalism. (Lec. 3) Pre: sophomore standing or permission of instructor.

**AAF 390 Directed Study or Research** (3 crs.) Directed study arranged to meet the needs of individual students who desire independent work and to promote collective research efforts in African and Afro-American Studies. (Independent Study) Pre: permission of director.

**AAF 399 Introduction to Multicultural Psychology** (3 crs.) Cross-listed as (PSY), AAF 399. Introductory course focusing on multiculturalism as a major paradigm. Emphasizes the meaning of multiculturalism and associated principles, concepts, and sociocultural factors as related to assessment, intervention, and research. (Lec. 3/Online) Pre: PSY 113 or 103.

**AAF 408 African Governments and Politics** (4 crs.) Cross-listed as (PSC), AAF 408. Political developments in the nations of Africa. Main stress is thematic: challenges to democracy, ethnicity, and identity politics, African political thought, civil conflict, resources, and common developmental problems. (Lec. 4, Practicum) Pre: PSC 113 or 210, and PSC 116 or 211.

**AAF 408H Honors Section of PSC/AAF 408 - African Governments and Politics** (4 crs.) Cross-listed as (PSC), AAF 408. Honors Section of PSC/AAF 408 - African Government and Politics. (Lec. 4, Practicum) Pre: PSC 113 or 210, and PSC 116 or 211, and 3.30 or better overall GPA.

**AAF 410 Issues in African Development** (3 crs.) Cross-listed as (AAF), PSC 410. A seminar focusing on the dynamics of African development, including political and social change, economic development, education, urbanization, rural development, environmental management, labor and business, industrialization, and technology transfer. (Seminar) Pre: APG 313 or PSC 201 or HIS 388 or permission of instructor.

**AAF 415 Dynamics of Social Change in the Caribbean** (3 crs.) Cross-listed as (AAF), PSC 415. Exploration of the slave trade and the origins of Africans and people of African descent in the Caribbean. Emphasis on political and economic relations with the U.S. and the impact of modernization. (Lec. 3) Not for graduate credit.

**AAF 428 Institutional Racism** (3 crs.) Cross-listed as (SOC), AAF 428. Consideration of varying models of race and ethnic relations; examination of recent research on issues such as residential segregation, school desegregation, affirmative action, and racial disorders; comparisons of United States with other societies. (Seminar) Pre: one 300-level sociology course or permission of instructor. In alternate years.

**AAF 466 Urban Problems** (3 crs.) Cross-listed as (PSC), AAF 466. Contemporary and emerging problems of urban affairs. Discussion, reading, and assignments on the interaction among urban change, development of social institutions, and formation of public policy. (Lec. 3/Online) Pre: PSC 113 or 210.

**AAF 466H Honors Section of AAF/PSC 466: Urban Problems** (3 crs.) Cross-listed as (PSC), AAF 466H. Honors Section of AAF/PSC 466: Urban Problems. (Lec. 3) Pre: PSC 113 or 210, and 3.30 overall GPA.

**AAF 498 Senior Seminar in African and Afro-American Studies** (3 crs.) Study of a particular issue of the experience of Blacks in the diaspora from an interdisciplinary perspective. Subject or theme will change yearly. Pre: AAF 150, 201, 202, senior standing, or permission of instructor. Not for graduate credit.

## AFS | Aquaculture and Fisheries Science

**AFS 101 Freshman Inquiry into Fisheries and Aquaculture** (1 cr.) Introduction for freshmen to the opportunities, careers, research activities, applied outreach, and educational programs in fisheries and aquaculture. Interact weekly with faculty. Explore hands-on modules. (Lec. 1) S/U credit.

**AFS 102 Introductory Aquaculture** (3 crs.) Aquaculture and its historical development worldwide, its contribution to food supply, non-food species, methods of production, environmental and ecological considerations, culture practices employed for selected species, selective breeding, feeding, disease, processing and marketing. (Lec. 3)

**AFS 104 Introductory Aquaculture Laboratory** (1 cr.) Field trips to local trout hatcheries, shellfish wholesalers, commercial aquaculture operations, aquaculture gear suppliers, and government research aquaculture facilities. Introduction to water quality monitoring. (Lab. 3) For Aquaculture and Fisheries Science majors. Must be taken concurrently with AFS 102.

**AFS 120 Introduction to Fisheries** (2 crs.) Introduction to international fishery issues, practices, patterns, and public policy based on readings and discussion in a tutorial setting. Concurrent registration in 121 required. (Lec. 2)

**AFS 121 Introduction to Fisheries Laboratory** (1 cr.) Introduction to local fisheries and selected nearshore fishery ecosystems; exposure to use and operation of exemplary fishing and sampling gears in local fresh waters and estuaries. Concurrent registration in 120 required. (Lab. 3)

**AFS 132 Animal Agriculture, Food Policy, and Society** (3 crs.) Cross-listed as (AFS), AVS 132. The impact of animal agriculture on the natural environment and on human society (arts and literature) is explored, as is the prospect for animal agriculture to alleviate human hunger and poverty here and abroad. (Lec. 3) (S)

**AFS 132H Honors Section of AFS/AVS 132: Animal Agriculture, Food Policy, and Society** (3 crs.) Cross-listed as (AFS), AVS 132H. Honors Section of AFS/AVS 132: Animal Agriculture, Food Policy, and Society. (Lec. 3) Pre: 3.30 overall GPA. (S)

**AFS 190 Issues in Biotechnology** (3 crs.) Cross-listed as (AFS), BCH, MIC, NRS, PLS 190. Introduction to modern biotechnology in medical, pharmaceutical, forensic, agricultural, marine, and environmental applications. Consideration of ethical, environmental, health, and social issues. (Lec. 3/Online) (N)

**AFS 201 Shellfish Aquaculture** (3 crs.) Culture of marine and freshwater mollusks. Emphasis on life history, biological requirements, culture practices, and economic importance of major species used for human food or shell products. (Lec. 2, Lab. 3) Pre: AFS 102 and one semester of general chemistry.

**AFS 202 Finfish Aquaculture** (3 crs.) Introduction to the culture of finfish, emphasizing general principles and hands-on experience. Topics include water quality, spawning, care and maintenance, and growth of selected freshwater and marine species. (Lec. 1, Lab. 6) Pre: AFS 102 or equivalent.

**AFS 210 Introduction to the Marine Environment** (3 crs.) Introduction to estuarine, coastal, and oceanic environments; physical and biological processes affecting basins, bottoms, water properties, marine life, and the atmosphere. (Lec. 3) (N)

**AFS 211 Introduction to the Marine Environment Laboratory** (1 cr.) Laboratory exercises on the marine environment. Unit conversions, measuring physical features and times, chart work and positioning problems, measuring and processing physical marine parameters, beach and submerged landscape profiling. (Lab. 2) (N)

**AFS 270 Basic Scuba Diving in Science and Technology** (3 crs.) Rigorous introduction to scuba diving including equipment, diving physics, no-decompression and decompression diving, basic skills, and safety. Emphasis on development of basic knowledge and skills appropriate for a diving scientist or technician. Open Water Diver Certification by the National Association of Underwater Instructors is provided. (Lec. 2, Lab. 3) Pre: scuba diving physical examination and demonstration of strong swimming skills.

**AFS 290 Small Boats: Their Equipment and Operation** (3 crs.) Principles and practices of vessel operation, from outboard skiffs to small trawlers. Basic nomenclature, navigation, and shiphandling. Rigging and working gear used in marine resource development. (Lec. 2, Lab. 3)

**AFS 300 Aquaculture Health Management** (4 crs.) Causes and mechanisms of diseases in cultured marine and freshwater organisms, with emphasis on diagnosis, prevention, and treatment, as well as environmental and regulatory issues. (Lec. 3, Lab. 2)

**AFS 311 Exploration of Marine Biore-sources** (3 crs.) Explores marine biore-sources for pharmaceuticals, nutraceuticals, and novel biomaterials. Distribution and biodiversity of marine organisms important to industrial utilization. Culture and recovery technologies and assessment of bioactivity. (Lec. 3)

**AFS 312 Fish Habitat** (3 crs.) An introduction to fish habitat including conservation legislation, identification and mapping, fishing and non-fishing impacts, rehabilitation and socio-economic considerations. (Lec. 3) Pre: AFS 120. Offered in spring of even-numbered years.

**AFS 315 Living Aquatic Resources** (3 crs.) Survey of major aquatic resource groups; life histories, distribution, and exploitation of representative finfishes, mollusks, and crustacea in major fisheries ecosystems; management practices and patterns of fisheries development. (Lec. 3) Pre: AFS 210 and BIO 113 or 101 or at least one semester of general animal biology.

**AFS 316 Living Aquatic Resources Laboratory** (1 cr.) Study of representative organisms of major resource groups; finfish

taxonomy, anatomy, and osteology; exemplary mollusks and crustacea; introduction to larval fishes and fish age estimation; character analysis. (Lab. 3) Pre: concurrent registration in AFS 315. Offered in fall of odd-numbered years.

**AFS 321 World Fishing Methods** (3 crs.) A survey of fish catching methods of the world and the electronic enhancements to fishing that have increased fishing power. Application of these methods to scientific sampling, commercial harvesting, recreational and subsistence fishing. (Lec. 3) Pre: AFS 120 is recommended. Concurrent enrollment in AFS 322 required. Offered in spring of odd-numbered years.

**AFS 322 Laboratory for World Fishing Methods** (1 cr.) An introduction to the basic techniques used in fishing gear construction, maintenance, and operation. (Lab. 3) Pre: AFS 120 is recommended. Concurrent enrollment in 321 required. Offered in spring of odd-numbered years.

**AFS 332 Interactions between Fisheries and Protected Species** (3 crs.) An introduction to the issues associated with interactions between fisheries and protected species including legislation, and methods of assessing stock abundance and number of interactions. Case studies of specific interactions will be reviewed. (Lec. 3) Pre: AFS 120. Offered in spring of odd-numbered years.

**AFS 362 Crustacean Aquaculture** (3 crs.) Reproductive biology, breeding, culture systems, nutrition, genetics, and ecology of selected species of cultured crustaceans. Representative species of penaeid shrimp, freshwater prawns, crayfish, crabs, lobsters, and brine shrimp will be discussed. (Lec. 3) Pre: AFS 201 and 202. Offered in spring of odd-numbered years.

**AFS 391 Special Problems and Independent Study** (1-3 crs.) Special work to meet individual needs of students in various fields of fisheries and marine technology. (Independent Study)

**AFS 392 Special Problems and Independent Study** (1-3 crs.) Special work to meet individual needs of students in various fields of fisheries and marine technology. (Independent Study)

**AFS 415 Fishery Science** (3 crs.) Biology of aquatic resource animals, fisheries mensuration and assessment, fisheries ecology, fishing methods, aquatic resource management and conservation, fish and shellfish farming. (Lec. 3) Pre: AFS 315 and college mathematics; concurrent registration in 416.

**AFS 416 Fishery Science Laboratory** (1 cr.) Practices and techniques of fisheries science. Field exercises in local model estuary and lake ecosystems; sampling methods; enumerating and documenting collections; measuring and reporting environmental attributes; estimating population parameters. (Lab. 2) Pre: concurrent registration in AFS 415.

**AFS 421 Design of Fish Capture Systems** (3 crs.) Detailed study of the design considerations and methods of construction of specific representative commercial and scientific sampling fish capture gear. Full-scale and model nets are designed, constructed, and tested. (Lec. 2, Lab. 3) Pre: AFS 321 or permission of instructor.

**AFS 425 Aquaculture and the Environment** (3 crs.) Impacts of aquaculture practices on the environment, including habitat alteration, release of drugs and chemicals, and interaction of cultured and wild organisms. Methods to reduce or eliminate those impacts: modeling, siting and monitoring of aquaculture facilities; use of polyculture and water reuse systems. (Lec. 3) Pre: AFS 102.

**AFS 426 Ecological Aquaculture** (3 crs.) Study of the natural and social ecology of aquaculture ecosystems by applying principles of the systems ecology to the management of the world's aquaculture ecosystems. (Lec. 3) Pre: AFS 102. Not for graduate credit.

**AFS 432 Marine Finfish Aquaculture** (3 crs.) Culture of non-salmonid marine fish worldwide, with emphasis on the hatchery phase. Broodstock, larval rearing, live and formulated feeds, grow-out systems, stock enhancement. Requires student project on facility design. Pre: AFS 102.

**AFS 433 Research Diving Methods** (3 crs.) Underwater methods used to assess biological, physical, chemical, and geological characteristics of estuarine and coastal environments are presented and used to investigate seasonal changes in these parameters in the Narragansett Bay environment. (Lec. 2, Lab. 3) Pre: scuba certification and permission of instructor.

**AFS 434 Aquatic Food Quality and Processing** (4 crs.) Cross-listed as (NFS), AFS 434. Physicochemical and nutritional characteristics of aquatic fish and shellfish; quality assessment and control; principles and applications in handling and processing fish from harvesting to production; and discussion of current issues. (Lec. 3, Lab. 3)

**AFS 481 Shellfish Aquaculture Laboratory** (2 crs.) Detailed study of hatchery, nursery, and grow-out techniques for the production of bivalve mollusks. Culture of phytoplankton, conditioning of broodstock, spawning, larviculture, settlement, metamorphosis, nursery and grow-out methods. (Lab. 6) Pre: AFS 201 or permission of instructor. Offered in fall of odd-numbered years.

**AFS 483 Salmonid Aquaculture** (3 crs.) Principles of salmonid aquaculture, including culturing, spawning, incubation, feed formulation and feeding, disease control, genetics, systems management, harvesting, and transport. (Lec. 2, Lab. 2) Pre: AFS 102 or equivalent.

**AFS 486 Fish Physiology** (3 crs.) Study of how fish function in the changing aquatic environment from the molecular to the organismal level. The major organ systems,

regulation of physiological and biochemical functions, and interactions will be explored. (Lec. 3) Pre: BIO 201 or 242, or AVS 331, or permission of instructor.

**AFS 491 Special Projects** (1-3 crs.) Work that meets the individual needs of students in aquaculture. (Independent Study)

**AFS 492 Special Projects** (1-3 crs.) Work that meets the individual needs of students in aquaculture. (Independent Study)

**AFS 500 Diseases of Aquatic Organisms** (3 crs.) Nature, causes, diagnosis, and spread of diseases limiting piscine freshwater and marine aquaculture projects. Emphasis on prevention, control, and treatment of more common diseases affecting hatchery management. (Lec. 3) Pre: AFS 102; BIO 201 or AVS 331.

**AFS 501 Seminar** (1 cr.) Preparation and presentation of scientific papers on selected subjects in animal pathology and virology. (Seminar)

**AFS 502 Seminar** (1 cr.) Preparation and presentation of scientific papers on selected subjects in animal pathology and virology. (Seminar)

**AFS 503 Pathobiology** (3 crs.) Cross-listed as (AFS), AVS 503. Mechanisms and causes of disease in homeothermic and poikilothermic vertebrates. Cell death, inflammation, infection, metabolic disorders, and neoplasia in relation to fish, reptiles, birds, and mammals. Effects of disease at the cellular, tissue, organ, and organismal levels with a medical orientation. (Lec. 3) Pre: BIO 201 or AVS 331.

**AFS 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

**AFS 516 Early Life History of Aquatic Resource Animals** (3 crs.) Biology and ecology of juvenile and planktonic commercially important species; dynamics of reproduction, fecundity, growth, distribution, and behavior as modulated by the physical environment; identification, enumeration, and sampling. (Lec. 2, Lab. 3) Pre: AFS 415 and STA 308.

**AFS 531 Fisheries Stock Assessment** (3 crs.) A quantitative approach to describing the processes of fish growth and mortality, the estimation of stock size, the prediction of stock yield, and management practices. Spreadsheets and other microcomputer applications will be used for analysis and modeling. (Lec. 2, Lab. 3) Pre: AFS 415, STA 409 or permission of instructor.

**AFS 532 Experimental Design** (3 crs.) Cross-listed as (STA), PSY, AFS 532. Application of statistical methods to biological and psychological research and experimentation. Experimental situations for which various

ANOVA and ANCOVA designs are most suitable. (Lec. 3) Pre: STA 409 or equivalent.

**AFS 534 Animal Virology** (3 crs.) Cross-listed as (AFS), MIC 534. Basic properties, classification, and evolution of animal viruses. Individual agents are studied in detail. (Lec. 3) Pre: MIC 432, 533, or permission of chairperson.

**AFS 576 Seminar in Genetics of Aquatic Organisms** (3 crs.) Modes of inheritance found in fish including chromosome number, polyploidy, sex determination, and hybridization. Heritabilities, methods of selection, and mating systems used in the development of fish suited for intensive culture. (Seminar) Pre: BIO 352.

**AFS 584 Advanced Aquaculture Systems** (3 crs.) Development of design criteria, operational analysis, and management of selected species in water reuse systems. (Lec. 2, Lab. 2) In alternate years.

**AFS 586 Fish Nutrition** (3 crs.) Digestion and metabolism of carbohydrate, protein, and lipids by fish. Role of vitamins and minerals in metabolism and associative nutritional diseases resulting from deficiencies. Inadvertent toxic factors in fish feeds. (Lec. 3) Pre: CHM 228 or equivalent. In alternate years.

**AFS 591 Special Projects** (1-3 crs.) Research projects in animal pathology, virology, and aquaculture. (Independent Study) Pre: graduate standing or permission of chairperson.

**AFS 592 Special Projects** (1-3 crs.) Research projects in animal pathology, virology, and aquaculture. (Independent Study) Pre: graduate standing or permission of chairperson.

**AFS 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## AMS | Applied Mathematical Sciences

**AMS 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## APG | Anthropology

**APG 200 Language and Culture** (3 crs.) Cross-listed as (APG), LIN 200. Cross-cultural survey of the interaction of culture and language. Introduction to various fields of linguistic research emphasizing descriptive and semantic investigations. Linguistic studies used as illustrative material. (Lec. 3) (S) [D]

**APG 201 Human Origins** (3 crs.) The biocultural evolution of humans; review of the fossil record. (Lec. 3) (N) [D]

**APG 202 Introduction to Archaeology** (3 crs.) Archaeological perspectives on the major developments in humanity's past, from the evolution of the earliest humans to the emergence of agriculture and the earliest urban civilizations. (Lec. 3) (S)

**APG 203 Cultural Anthropology** (3 crs.) Anthropological approaches to the study of peoples and cultures around the world. (Lec. 3) (S) [D]

**APG 220 Introduction to the Study of Language** (3 crs.) Cross-listed as (LIN), APG 220. Introduction to the analysis and description of a language's sounds, forms, syntax, and meaning; the relationship of linguistics to other disciplines; and a survey of major schools of linguistic thought. (Lec. 3)

**APG 300 Human Fossil Record** (3 crs.) Investigation into the biocultural evolution of hominids over the last 15 million years; course based on evidence from fossil bones, teeth, and paleoecological reconstruction. (Lec. 2, Lab. 2) Pre: APG 201 or 202 or permission of instructor.

**APG 301 The Anthropology of Nutrition** (3 crs.) Exploration of the cultural and biological relationships of food, diet, and nutrition among human populations. The evolutionary history of food production, distribution, preparation, and selection will be considered. (Lec. 3) Pre: sophomore standing. (S) [D]

**APG 301H Honors Section of APG 301: The Anthropology of Nutrition** (3 crs.) Honors Section of APG 301: The Anthropology of Nutrition. (Lec. 3) Pre: 3.30 overall gpa and sophomore standing. (S) [D]

**APG 302 Methods of Anthropological Inquiry** (3 crs.) Logic, techniques, and problems in obtaining true information in anthropological inquiry. Problems from anthropological field work and use of cross-cultural data. (Lec. 3) Pre: APG 203 or permission of instructor. Restricted to juniors and seniors.

**APG 303 New World Prehistory** (3 crs.) Reconstruction of American Indian cultural history from earliest times to the period of European discovery and colonization, using archaeological evidence and perspectives. (Lec. 3)

**APG 309 Anthropology of Religion** (3 crs.) Religious systems of selected peoples around the world; examination of theories concerning the origins, functions, and natures of these religions. (Lec. 3)

**APG 310 Topics in Anthropology** (3 crs.) Analytical study of selected topics in anthropology. Subjects will vary according to the expertise and availability of instructors. (Lec. 3) Pre: one anthropology course or permission of instructor. May be repeated with different topic.

**APG 310H Honors Section of APG 310: Topics in Anthropology** (3 crs.) Honors section of APG 310: Topics in Anthropology. (Lec. 3) Pre: 3.30 overall gpa and one anthropology

course, or permission of instructor. May be repeated with different topic.

**APG 311 Native North Americans** (3 crs.) Survey of selected North American Indian groups from before European contact to the present. Modern reservation life; influence of the federal government on Indian life. (Lec. 3)

**APG 315 Cultures and Societies of Latin America** (3 crs.) Contemporary cultures and societies; emphasis on adjustment of the people to modern social and economic changes. (Lec. 3) Pre: APG 203 or permission of instructor.

**APG 319 Cultural Behavior and Environment** (3 crs.) Cultural adaptations made by traditional and industrial societies to natural and human environments using examples from prehistory and ethnography. (Lec. 3)

**APG 320 Sociolinguistics** (3 crs.) Cross-listed as (LIN), APG 320. Presentation of the major areas of micro- and macro-sociolinguistics: speech acts, registers, repertoires, language attitudes, social correlates of phonological and syntactic features and changes. (Lec. 3) Pre: APG/LIN 200 or 220.

**APG 322 Anthropology of Modernization** (3 crs.) Patterns and processes of contemporary social and cultural change among traditional people. (Lec. 3) Pre: APG 203 or permission of instructor.

**APG 327 History of Physical Anthropology** (3 crs.) An examination of some classic works in human evolution and physical anthropology. Designed to provide an understanding of the philosophical and historical development of biological anthropology. (Lec. 3) (L)

**APG 328 Gender and Culture** (3 crs.) Analytical study of gender in a cross-cultural context, discussion of the possible origins of gender and subsistence modes, and an examination of societies with flexible or unusual gender systems. (Lec. 3) Pre: one APG course or permission of instructor.

**APG 329 Contemporary Mexican Society** (3 crs.) Cross-listed as (SOC), APG 329. Examines the social, political, economic, and cultural dimensions of contemporary Mexico. Demographic composition, economic and political development, civil society and women's political participation, indigenous issues and rights, U.S.-Mexico relations and bilateral issues, and human rights. (Lec. 3) Pre: SOC course at the 200-level or APG 203.

**APG 350 Human Variation** (3 crs.) Anthropological investigation into the nature and causes of human biological diversity with emphasis on living populations. Students enrolled in this course will serve as a sample for measuring human variation. (Lec. 3) Pre: any 200-level anthropology course or permission of instructor.

**APG 400 Evolution, Culture, and Human Disease** (3 crs.) Investigation of the dynamic interrelationships among culture, human disease, and evolution. Encompasses study

of living peoples as well as our fossil and prehistoric ancestors, and includes infectious and chronic diseases. (Lec. 3) Pre: introductory physical anthropology, biology, or zoology, or permission of instructor.

**APG 401 History of Anthropological Theory** (3 crs.) Theory from the sixteenth century to the present; readings from Tylor, Morgan, Boas, Sapir, Kroeber, Benedict, Malinowski, and Radcliffe-Brown. (Seminar) Pre: APG 203 or permission of instructor.

**APG 405 Psychological Anthropology** (3 crs.) Cross-listed as (APG), PSY 405. Study of human behavior in different cultures employing psychological concepts and theories. (Lec. 3) Pre: APG 203 or permission of instructor.

**APG 412 Primate Behavior and Organization** (3 crs.) Investigation of the naturalistic behavior and organization of nonhuman primates, and the relationship of primate data to anthropology. (Lec. 3) Pre: APG 201 or permission of instructor.

**APG 413 Peoples of the Sea** (3 crs.) Cross-listed as (APG), MAF 413. Examination of human sociocultural adaptation to the seas. (Lec. 3) Pre: APG 203 or MAF 100 or graduate status. Open only to juniors, seniors, and graduate students.

**APG 415 Migration in the Americas** (3 crs.) Cross-listed as (APG), SOC 415. Contemporary trends in migration in the Americas with a focus on migratory flows from Latin America to the United States. Migration theories, unauthorized migration, anti-immigration discourses, inter-migration in Latin America, gender dynamics, transnationalism, refugees and the internally displaced, and immigration policies in the Americas. (Lec. 3) Pre: open only to juniors, seniors, and graduate students.

**APG 417 Archaeological Method and Theory** (3 crs.) Problems of collection and interpretation of data, emphasizing nature of archaeological investigation, classification, dating, reconstruction of social contexts. Laboratory demonstrations. (Lec. 3) Pre: permission of instructor.

**APG 427 Unity of Anthropology** (3 crs.) Survey of recent advances in the subfields of anthropology. Designed to help majors appreciate the unity of anthropology in an age of specialization. (Seminar) Pre: junior or senior standing.

**APG 465 Seminar in Cultural Heritage** (3 crs.) Cross-listed as (ARH), APG 465. Investigates how global development, commercialization, and conflicts affect humankind's cultural heritage. Examines some ethical issues and legal strategies for protecting cultural sites, artifacts, and traditional folkways. (Lec. 3) Pre: at least 3 credits at the 300-level in anthropology, art history, or history; or permission of the instructor.

**APG 470 Problems in Anthropology** (3 crs.) Self-guided study and research, seminar, or individual program. (Independent Study)

Pre: permission of chairperson.

**APG 490 Underwater Historical Archaeology** (3 crs.) Cross-listed as (HIS), APG 490. Methodological and theoretical foundations of underwater historical archaeology. Examines the contribution of shipwrecks and other inundated sites to our understanding of the global nature of modern life. (Seminar) Pre: at least 3 credits of course work at the 300-level in history, anthropology or art history, or permission of instructor.

**APG 565 Seminar in Cultural Heritage** (3 crs.) Cross-listed as (ARH), APG 565. Investigates how global development, commercialization, and conflicts affect humankind's cultural heritage. Examines some ethical issues and legal strategies for protecting cultural sites, artifacts, and traditional folkways. (Lec.) Pre: 300-level coursework in anthropology, art history, or history; or permission of instructor.

## ARB | Arabic

**ARB 100 Accelerated Beginning Arabic** (6 crs.) Equivalent to ARB 101 and 102. Builds communicative skills in formal and colloquial Arabic as well as Arab culture. (Lec. 6) (FC) [D]

**ARB 101 Beginning Arabic I** (3 crs.) Fundamentals of grammar and pronunciation of Arabic; exercises in reading, writing, and conversation. (Lec. 3) Students enrolling in this course should have had no more than one year of previous Arabic study. (FC) [D]

**ARB 102 Beginning Arabic II** (3 crs.) Continuation of ARB 101. (Lec. 3) Students enrolling in this course should have taken ARB 101 or equivalent. (FC) [D]

**ARB 103 Intermediate Arabic I** (3 crs.) Development of facility in reading; exercises in grammar, writing, and conversation. (Lec. 3) Students enrolling in this course should have taken ARB 102 or equivalent. (FC) [D]

**ARB 104 Intermediate Arabic II** (3 crs.) Continuation of ARB 103. (Lec. 3) Students enrolling in this course should have taken ARB 103 or equivalent. (FC) [D]

**ARB 111 Intensive Beginning Arabic I** (4 crs.) Introduction to Arabic letters, sounds and basic conversational language in colloquial and standard Arabic. (Lec. 3, Rec. 1) (FC) [D]

**ARB 112 Intensive Beginning Arabic II** (4 crs.) Beginning course in colloquial and standard Arabic, basic conversational and reading skills. (Lec. 3, Rec. 1) Pre: ARB 111 or instructor consent. (FC) [D]

**ARB 211 Intensive Intermediate Arabic I** (4 crs.) Intermediate colloquial and Standard Arabic, developing reading, writing, speaking, listening skills. (Lec. 3, Rec. 1) Pre: ARB 102, 112 or instructor consent. (FC) [D]

**ARB 212 Intensive Intermediate Arabic II** (4 crs.) Intermediate colloquial and Standard Arabic, developing reading, writing,

speaking, listening skills. (Lec. 3, Rec. 1) Pre: ARB 211 or instructor consent. (FC) [D]

**ARB 311 Intensive Advanced Arabic I** (4 crs.) Advanced colloquial and Standard Arabic, developing reading, writing, speaking, listening skills. (Lec. 3, Rec. 1) Pre: ARB 212 or instructor consent.

**ARB 312 Intensive Advanced Arabic II** (4 crs.) Advanced colloquial and Standard Arabic, developing reading, writing, speaking, listening skills. (Lec. 3, Rec. 1) Pre: ARB 311 or instructor consent.

**ARB 325 Topics in Arabic Studies in Translation** (3 crs.) Topics in Arabic literature, culture, and language taught in English using texts in translation. May be repeated with different topic. (Lec. 3)

**ARB 497 Directed Study** (1-3 crs.) Directed Study in Arabic Language. (Independent Study 1-3) Pre: instructor consent.

## ARH | Art History

**ARH 120 Introduction to Art** (3 crs.) Fundamental principles of the visual arts, evolution of styles and conceptions through the ages in different forms of creative expression. (Lec. 3) (A) [D]

**ARH 251 Introduction to Art History: Ancient-Medieval** (3 crs.) The development of architecture, sculpture, and painting from prehistory through the Middle Ages. (Lec. 3) (A) [D]

**ARH 251H Honors Sections of ARH 251: Introduction to Art History: Ancient-Medieval** (3 crs.) Honors Sections of ARH 251: Introduction to Art History: Ancient-Medieval. (Lec. 3) Pre: overall 3.30 GPA or better. (A) [D]

**ARH 252 Introduction to Art History: Renaissance-Modern** (3 crs.) The development of architecture, sculpture, and painting from the early Renaissance to the present. (Lec. 3) (A) [D]

**ARH 252H Honors Section of ARH 252 - Introduction to Art History: Renaissance to Modern** (3 crs.) Honors Section of ARH 252: Introduction to Art History: Renaissance to Modern. (Lec. 3) Pre: Must have 3.30 overall GPA. (A) [D]

**ARH 284 Introductory Topics in Architectural History** (3 crs.) Consideration of the history of architecture and city planning through surveys of selected periods and themes. (Lec. 3) May be repeated for a maximum of 6 credits with permission of instructor.

**ARH 300 Art History Internship PRA** (3-6 crs.) Internship in an approved professional organization (such as museum, gallery, preservation society, auction house). Specific details determined in consultation with faculty supervisor and off-campus liaison, and approved by chairperson. (Practicum) May be taken in one semester or repeated for a maximum of 6 credits. S/U only.



**ARH 330 African-American Art in Context: A Cultural and Historical Survey I** (3 crs.) Cross-listed as (AAF), ARH 330. Examines African-American art and artifacts of the 17th, 18th, and 19th centuries, highlighting the dominant attitudes as well as the political and social realities of the times. (Lec. 3)

**ARH 331 The African-American Artist in Context: A Cultural and Historical Survey II** (3 crs.) Cross-listed as (AAF), ARH 331. Examines art and artists, the trends, philosophical attitudes, political realities, social influences, and artistic styles of 20th century African-American artists. (Lec. 3)

**ARH 354 Art of the Ancient Mediterranean** (3 crs.) Developments in architecture, painting, and sculpture in Greece and Rome from 800 B.C. to 400 A.D. Brief analysis of the art of the Aegean from 2500 to 1500 B.C. (Lec. 3) Pre: ARH 251 or 252 or permission of instructor. May be repeated once with permission of instructor.

**ARH 356 Medieval Art** (3 crs.) Painting, sculpture, architecture, and minor arts of the Middle Ages from 500 to 1400 in Western Europe. (Lec. 3) Pre: ARH 251 or permission of chairperson.

**ARH 359 Baroque Art** (3 crs.) Developments in painting, sculpture, and architecture in Italy and northern Europe from 1600 to 1750. (Lec. 3) Pre: ARH 251 or 252 or permission of instructor.

**ARH 361 Nineteenth-Century Art** (3 crs.) Investigates major movements of European and American painting, sculpture, photography, and architecture from 1780-1900. (Lec. 3) Pre: ARH 251 or 252, or permission of instructor.

**ARH 362 Twentieth-Century Art** (3 crs.) Investigates major movements of European and American painting, sculpture, photography, and architecture from 1900-2000. (Lec. 3) Pre: ARH 251 or 252, or permission of instructor.

**ARH 364 American Art** (3 crs.) Painting, sculpture, and architecture from their origins in the 17th century to the present; emphasis on the 19th century. (Lec. 3) Pre: ARH 251 or 252.

**ARH 365 Renaissance Art** (3 crs.) Painting, sculpture, and architecture of Italy and northern Europe from 1400 to 1600. (Lec. 3) Pre: ARH 251 or 252 or permission of instructor.

**ARH 371 Projects in Art History I** (3 crs.) Directed study in art history under guidance of instructor selected by student. (Independent Study) Pre: permission of chairperson and instructor.

**ARH 374 Topics in Film** (3 crs.) Explores the social, historical, and aesthetic development of the cinema from 1895 to the present. Lectures (3 hours) and required film screenings. (Lec. 3) May be repeated for a maximum of 6 credits with permission of instructor.

**ARH 375 Topics in the History of Photography** (3 crs.) Explores the social, historical,

and aesthetic development of photography from 1826 to the present. (Lec. 3) May be repeated for a maximum of 6 credits with permission of instructor.

**ARH 376 History of Animation** (3 crs.) Traces the development of animation from the pre-history of animation to the present. (Lec. 3) Pre: ARH 251 or ARH 252, or permission of instructor.

**ARH 377 The History of Experimental Film** (3 crs.) Traces the development of experimental cinema in the context of modern art. (Lec. 3) Pre: ARH 251 or ARH 252, or permission of instructor.

**ARH 380 Topics in Art and Architectural History** (3 crs.) Selected topics, themes, and issues in the history of the visual arts. (Lec. 3) Pre: ARH 251 or 252 or permission of instructor. May be repeated with a different topic for maximum of 6 credits.

**ARH 385 Women in Art** (3 crs.) Examination of women artists and their work in the history of western art; analysis of representations of women and gender in works of art and art historical texts. (Lec. 3) Pre: ARH 252 or WMS 150 or permission of instructor.

**ARH 465 Seminar in Cultural Heritage** (3 crs.) Cross-listed as (ARH), APG 465. Investigates how global development, commercialization, and conflicts affect humankind's cultural heritage. Examines some ethical issues and legal strategies for protecting cultural sites, artifacts, and traditional folkways. (Lec. 3) Pre: at least 3 credits at the 300-level in anthropology, art history, or history; or permission of the instructor.

**ARH 469 Art History: Senior Projects** (3-6 crs.) Intensive, independent work on a project determined by consultation with the student's project advisor. (Independent Study) Pre: senior standing, art history major, permission of chairperson.

**ARH 470 Art History: Senior Projects TUT** (3-6 crs.) Intensive, independent work on a project determined by consultation with the student's project advisor. (Tutorial) Pre: senior standing, art history major, permission of chairperson.

**ARH 475 Classical Archaeology: Critical Approaches to the Greek and Roman Past** (3 crs.) Study of material remains of ancient Greek and Roman (and related) cultures. Critical analysis of art, artifacts, and architecture with attention to changing approaches to interpreting antiquity. (Seminar) Pre: at least 3 credits at the 300-level in art history, history, or anthropology; or permission of instructor.

**ARH 480 Advanced Topics in European and American Art** (3 crs.) Consideration of the history of European and American art through analysis of selected periods or themes. (Seminar) Pre: permission of instructor. May be repeated for credit with a different topic.

**ARH 565 Seminar in Cultural Heritage** (3

crs.) Cross-listed as (ARH), APG 565. Investigates how global development, commercialization, and conflicts affect humankind's cultural heritage. Examines some ethical issues and legal strategies for protecting cultural sites, artifacts, and traditional folkways. (Lec.) Pre: 300-level coursework in anthropology, art history, or history; or permission of instructor.

**ARH 575 Classical Archaeology: Critical Approaches to the Greek and Roman Past** (3 crs.) Study of material remains of ancient Greek and Roman (and related) cultures. Critical analysis of art, artifacts and architecture with attention to changing approaches to interpreting antiquity. (Seminar) Pre: coursework at the 300-level in art history, history, or anthropology, or permission of instructor.

## ART | Art

**ART 002 Sophomore Review** (0 crs.) Presentation by majors of a broad selection of their previous college-level work for review by faculty. (Studio) Pre: ART 101, 103, and 207.

**ART 101 Two-Dimensional Studio** (3 crs.) Exploration of principles of visual organization relating primarily to formulations on the two-dimensional surface by means of fundamental studies and assignments in studio techniques. (Studio 6) (A)

**ART 103 Three-Dimensional Studio** (3 crs.) Introduction to problems in three-dimensional organization. Observations from objects with discussion and application to simple mold and casting techniques. Introduction to the use of basic materials, clay, plaster, and wood. (Studio 6) (A)

**ART 203 Color** (3 crs.) Visual perception of color and manipulation of light as they pertain to two- or three-dimensional formulations. (Studio 6)

**ART 204 Digital Art and Design I** (3 crs.) Introduction to various digital technologies used in the production of fine art and applied design. Students gain the basic technical skills and theoretical knowledge of digital still imaging, animation, and interactivity information design. (Studio 6)

**ART 207 Drawing I** (3 crs.) Visual perception and observation, using nature structures, drawing from models, still life, and landscape; exercises in basic drawing techniques and principles. (Studio 6) (A)

**ART 208 Drawing II** (3 crs.) Advanced practice in graphic conceptions; exercises in spatial problems, organizing relationships of abstract forms and structures; advanced drawing media. (Studio 6) Pre: ART 207.

**ART 213 Photography I: B/W Photography** (3 crs.) Introduction to basic black and white photography and exploration of related techniques using light-sensitive materials. Emphasis on photography as an artistic media. Required projects and readings.

(Studio 6)

**ART 215 Video and Filmmaking I** (3 crs.) Introduction to basic filmmaking and video techniques and theories of moving images. Emphasis on film and video as artistic media. Required projects and readings. (Studio 6) May be repeated for a maximum of 6 credits with permission of instructor.

**ART 221 Painting I** (3 crs.) Techniques of painting, utilizing as reference the natural and human-made environments. Traditional and contemporary materials. (Studio 6) Pre: ART 101 and 207.

**ART 231 Printmaking I** (3 crs.) Introduction to the intaglio process and monotype, with an emphasis on image development and workshop procedures. (Studio 6) Pre: ART 101 or 207 or permission of instructor.

**ART 233 Relief Printing and Typography I** (3 crs.) Introduction to basic elements of graphic design; letter forms, their relationship to the page and to the image. Various traditional and modern reproduction techniques, workshop practice in typesetting and layout. (Studio 6) Pre: ART 101 or permission of chairperson.

**ART 243 Sculpture I** (3 crs.) Formation of three-dimensional forms employing basic sculptural materials and techniques. Basic media, emphasis on form, material, and structural means in studio practice. (Studio 6) Pre: ART 103 or permission of instructor.

**ART 301 Projects in Studio** (3 crs.) Studio projects under guidance of instructor selected by student. (Independent Study) Pre: permission of chairperson and instructor.

**ART 303 Topics In Studio** (3 crs.) Selected topics based on particular materials, techniques, or thematic premises. Topics and semesters to be announced. (Studio 6) Pre: art major status, or permission of instructor or chairperson. May be repeated for credit with permission of instructor and chairperson.

**ART 304 Digital Art and Design II** (3 crs.) Continuation of 204 with an emphasis on the development of professional quality resources, content, and output. Assignments cover the fundamental elements of graphic design in the digital environment and the cross influences among fine art, mass media, and new media. (Studio 6) May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work. Pre: ART 204.

**ART 306 Digital Art and Design III** (3 crs.) Continuation of 304 with an emphasis on contemporary issues related to art, information technology, and social influence. Students are required to develop Web-based projects. (Studio 6) May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work. Pre: ART 304.

**ART 307 Art Studio Internship PRA** (3 or 6 crs.) Work in an institution, agency, or organization supervised by an art profession-

al and a studio faculty member. Activities, expectations, performance assessments, hours, and credits determined through prior consultation. (Practicum) Limit of 6 credits toward graduation. Pre: junior standing in the B.A. or B.F.A. studio program and permission of chairperson. S/U only.

**ART 309 Drawing III** (3 crs.) Further problems in drawing with emphasis on independent work. (Studio 6) May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work. Pre: ART 208 or permission of instructor.

**ART 312 Introduction to Video Games: Design and Development** (4 crs.) Cross-listed as (SCM), ART, COM, FLM 312. Introduces video game development through the perspective of artistic design and production. Projects include pitches, storyboards and mock-ups, narratives and scripts, and prototypes. Entails substantial collaborative work. (Lec. 3, Studio 2) Pre: sophomore standing.

**ART 313 Introduction to Video Games: Users and Contexts** (4 crs.) Cross-listed as (SCM), ART, COM, FLM, WRT 313. Introduces video game development through the perspective of different users' experiences and contexts. Projects include critical analyses, observations, multi-media pitch presentations. Requires substantial game playing outside of class. (Sem. 3, Prac. 2) Pre: sophomore standing.

**ART 314 Photography II: B/W Darkroom** (3 crs.) Continuation of 213 with emphasis on expanding skills in creative photographic expression, technique and communication. Discussions/papers on contemporary photography. (Studio 6) Pre: ART 213. May be repeated once for credit with permission of instructor.

**ART 315 Photography II: The Digital Darkroom** (3 crs.) Introduction to the Digital Darkroom with an emphasis on digital workflow, printing, and the use of digital as a form of artistic expression. Required projects and readings. (Studio 6) May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work. Pre: ART 214 or Art 213 and 204 or permission of instructor.

**ART 316 Video and Filmmaking II** (3 crs.) Continuation of ART 215 with added emphasis on sound. Required projects and reading. (Studio 6) May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work. Pre: ART 215. May be repeated once for credit with permission of instructor.

**ART 322 Painting II** (3 crs.) Continuation of ART 221. (Studio 6) May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work. Pre: ART 221.

**ART 324 Figure Drawing and Painting** (3 crs.) Introduction, exploration, and integration of materials, principles, and techniques related to the human figure. Emphasis on

conceptual and observational approach to structure and development of form. May be repeated once for credit with permission of instructor. Pre: ART 207 and 208 and 221 or permission of instructor.

**ART 332 Printmaking II** (3 crs.) Introduction to lithography including stone, plate, and photographic processes. Contemporary viewpoints and their relationship to traditional printmaking. May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work in intaglio and lithography. Pre: ART 231.

**ART 334 Relief Printing and Typography II** (3 crs.) Continuation of ART 233. Applications of previous studies to experimental workshop assignments leading to production of book pages, folders, posters, and other visual material incorporating type and print in a contemporary idiom. (Studio 6) Pre: ART 233 or permission of chairperson. May be repeated for credit with permission of instructor.

**ART 344 Sculpture II** (3 crs.) Continuation of ART 243. (Studio 6) May be repeated for up to 9 credits with permission of instructor, doing increasingly independent work. Pre: ART 243 or permission of instructor.

**ART 405 Studio Seminar** (3 crs.) Intensive self-directed work under guidance of instructor. Periodic critiques and discussion of work of all participants. (Studio 6) May be repeated once for up to 6 credits with permission of instructor. Not for graduate credit. Pre: Limited to senior B.A. and B.F.A. studio art majors.

**ART 501 Graduate Studio Seminar** (3 crs.) Intensive independent studio work under guidance of instructors. Periodic critiques and discussions related to work of all participants in the course. (Studio 6) Pre: 48 credits in studio.

## AST | Astronomy

**AST 108 Introductory Astronomy: Stars and Galaxies** (3 cr.) Celestial sphere, constellations. Constitution of sun, stars, nebulae, and galaxies. Planetarium used freely for lectures and demonstrations. (Lec. 3) (N)

**AST 118 Introductory Astronomy: The Solar System** (3 crs.) Celestial sphere, Earth, formation of and motions and characteristics of objects in solar system, the Sun, exoplanets, and search for extraterrestrial life. Planetarium used for lectures and demonstrations. (Lec. 3) (N)

**AST 334 Optics** (3 crs.) Cross-listed as (PHY), AST 334. Geometrical and physical optics; thick lens optics, interference, diffraction, polarization. (Lec. 3) Pre: PHY 112 or 205.

**AST 483 Laboratory And Research Problems In Physics** (3 crs.) Cross-listed as (PHY), AST, OCG 483. Research in current areas of physics. Students perform research projects with individual faculty members. Students in physics and physical oceanography may

coordinate their research project with a faculty member of the Graduate School of Oceanography. (Lec. 1, Lab. 6) Pre: PHY 381 and 382.

**AST 484 Laboratory And Research Problems In Physics** (3 crs.) Cross-listed as (PHY), AST, OCG 484. Research in current areas of physics. Students perform research projects with individual faculty members. Students in physics and physical oceanography may coordinate their research project with a faculty member of the Graduate School of Oceanography. (Lec. 1, Lab. 6) Pre: PHY 381 and 382.

**AST 491 Special Problems** (1-6 crs.) Cross-listed as (PHY), AST 491. Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study)

**AST 492 Special Problems** (1-6 crs.) Cross-listed as (PHY), AST 492. Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study)

## AVS | Animal and Veterinary Science

**AVS 101 Introduction to Animal Science** (3 crs.) Animal industry's role in world and national economy; inheritance, growth, physiology, nutrition, and diseases of domestic animals and poultry; geographic distribution and marketing of animal products. (Lec. 3) (N) [D]

**AVS 102 Introduction to Animal Science Laboratory** (1 cr.) Laboratory and demonstrations of principles of the animal industries. (Lab. 2) Pre: credit or concurrent enrollment in 101. Restricted to AVS majors.

**AVS 104 Animal Management Techniques** (2 crs.) Lecture and laboratory in the handling skills needed to maintain animal comfort and productivity. (Lec. 1, Lab. 2) Pre: AVS 101 and 102.

**AVS 110 Freshman Seminar in Animal and Veterinary Science** (1 cr.) Overview of the animal and veterinary sciences and the fields they encompass. Student projects, presentations, and field trips. (Seminar) Pre: AVS 101. Open only to freshmen.

**AVS 132 Animal Agriculture, Food Policy, and Society** (3 crs.) Cross-listed as (AFS), AVS 132. The impact of animal agriculture on the natural environment and on human society (arts and literature) is explored, as is the prospect for animal agriculture to alleviate human hunger and poverty here and abroad. (Lec. 3) (S)

**AVS 132H Honors Section of AFS/AVS 132: Animal Agriculture, Food Policy, and Society** (3 crs.) Cross-listed as (AFS), AVS 132H. Honors Section of AFS/AVS 132: Animal Agriculture, Food Policy, and Society. (Lec. 3) Pre: 3.30 overall GPA. (S)

**AVS 201 Companion Animal Management** (3 crs.) Nutrition, reproduction, behavior, and management of companion animals. (Lec. 3) Pre: AVS 101.

**AVS 212 Feeds and Feedings** (3 crs.) Principles and practices of feeding farm animals, nutrient requirements, physiology of digestion, identification and comparative value of feeds, computer calculation of rations for livestock. (Lec. 2, Lab. 2) Pre: AVS 101 and 102.

**AVS 301 Seminar in Animal and Veterinary Science** (1 cr.) Readings, reports, lectures, and discussions on scientific topics in animal and veterinary science. Subject matter adapted to student and faculty interest. (Seminar) Pre: junior or senior standing.

**AVS 302 Seminar in Animal and Veterinary Science** (1 cr.) Readings, reports, lectures, and discussions on scientific topics in animal and veterinary science. Subject matter adapted to student and faculty interest. (Seminar) Pre: junior or senior standing.

**AVS 323 Animal Management I** (3 crs.) Principles of care and management of domesticated ruminant animals including dairy cattle, beef cattle, sheep, and goats. Emphasis on the production methods of the animal industries. Participation in field trips required. (Lec. 3) Pre: AVS 101.

**AVS 324 Animal Management II** (3 crs.) Principles of the care and management of domesticated monogastric animals including swine, horses, and poultry. Emphasis will be given to modern production methods. Participation in field trips required. (Lec. 3) Pre: AVS 101.

**AVS 325 Animal Management III** (3 crs.) Principles of the care and management of exotic ruminant and monogastric animals. Emphasis will be on handling, care, feeding, breeding, behavior, and disease prevention. Participation in field trips. Pre: AVS 101 or permission of instructor.

**AVS 331 Anatomy and Physiology** (3 crs.) Fundamentals of anatomy and physiology of domesticated animals. (Lec. 3) Pre: BIO 101 or CHM 101 or CHM 103.

**AVS 332 Animal Diseases** (3 crs.) Specific diseases of avian and mammalian species; etiology, symptoms, and control. (Lec. 3) Pre: AVS 331.

**AVS 333 Anatomy and Physiology Laboratory** (1 cr.) The fundamental anatomy of domestic animals is examined. Demonstrations of physiological principles are performed. Laboratory techniques for screening physiological function in vivo and in vitro are covered. (Lab. 2) Pre: credit or concurrent enrollment in 331.

**AVS 340 Veterinary Pharmacology** (3 crs.) Cross-listed as (BPS), AVS 340. Principles of pharmacology including pharmacokinetics and pharmacodynamics, drug indications, usages and side effects, practical applications of drugs including drug handling, dosing cal-

ulation and administration methods. (Lec. 3) Pre: for AVS students: AVS 331 and 333 or permission of instructor; Pre: for BPS and Pharm.D. students: 2nd or 3rd year standing.

**AVS 343 Behavior of Domestic Animals** (3 crs.) Examination of the basis for, and exhibition and control of, behavioral patterns of domestic animals. (Lec. 3) Pre: AVS 101 and 102.

**AVS 372 Introductory Endocrinology** (3 crs.) Morphology and physiology of endocrine glands. Roles of hormones in regulation of body processes. Discussion of all endocrine organs and relationship of endocrine and nervous systems. Emphasis on domesticated animals and fowl. (Lec. 3) Pre: BIO 101 or permission of instructor.

**AVS 390 Wildlife and Human Disease** (3 crs.) Cross-listed as (AVS), ENT 390. Introduction to the important diseases of humans carried by wildlife, including surveillance, epidemiology, transmission, public health impact, and prevention. Interdisciplinary approach with emphasis on problem solving using real-life examples. (Lec. 3) Pre: BIO 101; BIO 262 or ENT 385 or equivalent.

**AVS 399 Animal Science Internship PRA** (1-6 crs.) Options in various professional experience programs involving the animal and veterinary sciences. (Practicum) Pre: permission of instructor. May be repeated for a maximum of 6 credits. S/U credit.

**AVS 412 Animal Nutrition** (3 crs.) Principles of animal nutrition, metabolism of carbohydrates, proteins, and fats; mineral and vitamin requirements; nutritive requirements for maintenance, growth, reproduction, lactation, and work. (Lec. 3) Pre: junior standing or above.

**AVS 420 Animal Breeding and Genetics** (3 crs.) Scientific methods for the genetic improvement of domesticated animals. Genetic variation and expected results of different types of selection and mating systems. (Lec. 3) Pre: junior standing or above. In alternate years.

**AVS 440 Seminar on Marine Mammals** (3 crs.) Leading scientists discuss the natural history, anatomy, physiology, husbandry, behavior and conservation of marine mammals. Current research is emphasized. (Lec. 3) Pre: junior standing, and BIO 101 and 102 and permission of the instructor. Not for graduate credit. Special registration and fee are required. Contact Mystic Aquarium, Mystic, CT.

**AVS 462 Laboratory Animal Techniques** (4 crs.) Management of laboratory animals with emphasis on animal biology, breeding, care, health, research use, and animal welfare. Laboratory animal applications in clinical studies and other selected topics. (Lec.3, Lab. 2) Pre: AVS 331 and 333.

**AVS 463 Animal Veterinary Technology** (3 crs.) Theory and application of animal health practices required of paraprofessionals in a veterinary practice. The role of the veterinary assistant in a modern clinical

practice will be emphasized. (Lec. 2, Lab. 3) Pre: AVS 331.

**AVS 472 Physiology of Reproduction** (3 crs.) Anatomy and physiology of reproduction, with emphasis on domestic animals. (Lec. 3) Pre: BIO 101 and AVS 331 or permission of instructor.

**AVS 473 Physiology of Reproduction Laboratory** (1 cr.) Laboratory exercises in mammalian reproductive physiology encompassing whole animal applications and gamete techniques. Current assisted reproductive technologies and management schemes will be discussed. (Lab. 2) Pre: concurrent enrollment in AVS 472.

**AVS 491 Special Projects** (1-3 crs.) Work that meets the individual needs of students in animal and veterinary science. (Independent Study)

**AVS 492 Special Projects** (1-3 crs.) Work that meets the individual needs of students in animal and veterinary science. (Independent Study)

**AVS 500 Instructional Methods in Life Sciences** (2 crs.) Organization and development of instructional material and teaching methods for graduate teaching assistants in the life sciences. Emphasis on practice presentation in classroom/lab setting. (Lec. 2) Pre: graduate standing or permission of instructor for senior undergraduate.

**AVS 503 Pathobiology** (3 crs.) Cross-listed as (AFS), AVS 503. Mechanisms and causes of disease in homeothermic and poikilothermic vertebrates. Cell death, inflammation, infection, metabolic disorders, and neoplasia in relation to fish, reptiles, birds, and mammals. Effects of disease at the cellular, tissue, organ, and organismal levels with a medical orientation. (Lec. 3) Pre: BIO 201 or AVS 331.

**AVS 504 Food Systems, Sustainability, and Health** (3 crs.) Cross-listed as (NFS), AVS 504. Scientific analysis of animal and human health and nutrition in various food systems. Interdisciplinary discussion on food systems and sustainability. (Lec. 3) Pre: graduate student in good standing or permission of instructor.

**AVS 504 Food Systems, Sustainability and Health** (3 crs.) Scientific analysis of animal and human health and nutrition in various food systems. Interdisciplinary discussion on food systems and sustainability. (Lec. 3) Pre: graduate student in good standing or permission of instructor.

**AVS 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

**AVS 538 Epidemiology of Infectious Diseases** (3 crs.) Cross-listed as (MIC), AFS, AVS

538. Principles of epidemiology, interrelationships of host, environment, and agent in infectious diseases. (Lec. 3)

**AVS 591 Research Problems** (3 crs.) Research problems to meet individual needs of graduate and honors students in the fields of animal breeding, nutrition, or physiology and food science. (Independent Study) Pre: permission of chairperson.

**AVS 592 Research Problems** (3 crs.) Research problems to meet individual needs of graduate and honors students in the fields of animal breeding, nutrition, or physiology and food science. (Independent Study) Pre: permission of chairperson.

**AVS 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## BCH | Biochemistry

**BCH 190 Issues in Biotechnology** (3 crs.) Cross-listed as (AFS), BCH, MIC, NRS, PLS 190. Introduction to modern biotechnology in medical, pharmaceutical, forensic, agricultural, marine, and environmental applications. Consideration of ethical, environmental, health, and social issues. (Lec. 3/Online) (N)

**BCH 211 Biochemical Aspects of Nutrition and Physiology** (3 crs.) Chemistry of biological transformations in the cell. Chemistry of carbohydrates, fats, proteins, enzymes, vitamins and hormones integrated into a general discussion of energy-yielding and biosynthetic reactions in the cell. (Lec. 3) Pre: one year college biology and one year of chemistry including CHM 124.

**BCH 242 Human Genetics and Human Affairs** (3 crs.) Basic principles of genetics including patterns of inheritance, mitosis and meiosis, sex determination and sex linkage. Genetic diseases, their cause and cures. Recombinant DNA and genetic engineering. Human diversity and evolution. (Lec. 3)

**BCH 311 Introductory Biochemistry** (3 crs.) Chemistry of biological transformations in the cell. Chemistry of carbohydrates, fats, proteins, nucleic acids, enzymes, vitamins, and hormones integrated into a general discussion of the energy-yielding and biosynthetic reactions in the cell. (Lec. 3) Pre: CHM 124 or equivalent.

**BCH 311H Honors Section of BCH 311: Introductory Biochemistry** (3 crs.) Honors Section of BCH 311: Introductory Biochemistry. (Lec. 3) Pre: CHM 124 or equivalent, and 3.30 overall GPA and permission of Honors Director.

**BCH 312 Introductory Biochemistry Laboratory** (2 crs.) Laboratory exercises illustrate chemical and physical properties of biomolecules, separation techniques, enzyme catalysis, symptoms of nutritional

deficiency, quantification of metabolic end-products, and drug detoxification. (Lab. 4) Pre: credit or concurrent enrollment in 311.

**BCH 352 General Genetics** (4 crs.) Cross-listed as (BIO), BCH 352. Introduction to basic genetic principles and concepts leading to an understanding of genes, heredity, and the nature of inherited variation. Applications and implications for animals, plants, fungi and bacteria. (Lec. 3, Rec. 1) Pre: BIO 101 and BIO 102.

**BCH 353 Genetics Laboratory** (1 cr.) Cross-listed as (BCH), BIO 353. Basic principles and concepts of genetics demonstrated with microorganisms, plants, and animals. (Lab. 2) Pre: credit or concurrent enrollment in BIO 352.

**BCH 412 Biochemistry Laboratory** (3 crs.) Same as BCH 312 plus an individual supervised laboratory project selected in consultation with the student. Projects may include enzyme action, enzyme induction, drug action, use of radioisotopes, and plant metabolism. (Lab. 6) Pre: credit or concurrent enrollment in 311.

**BCH 435 Introduction to the Biology and Genetics of Cancer** (3 crs.) Cross-listed as (BCH), MIC 435. Comprehensive instruction in the biology, genetics and biochemistry of cellular transformation and cancer. (Lec. 3) Pre: BCH 311 or BCH 352, or permission of instructor.

**BCH 437 Fundamentals of Molecular Biology** (3 crs.) Cross-listed as (BIO), BCH 437. Biochemical basis of heredity as seen through the structure and function of nucleic acids. Includes DNA replication, transcription, translation, gene regulation, and gene organization in prokaryotes and eukaryotes. Current methods emphasized. (Lec. 3) Pre: MIC 211, BIO 352, and BCH 311, or permission of instructor.

**BCH 451 Laboratory in Cell Biology** (1 cr.) Cross-listed as (BCH), MIC 451. Analysis of subcellular processes, structures, and molecules using techniques including gel electrophoresis, spectrophotometry, ultracentrifugation, and protein purification. Topics range from analysis of gene expression to subcellular localization of enzymatic activity. (Lab. 2) Pre: concurrent enrollment in 453 (or MIC 453) or permission of instructor.

**BCH 452 Advanced Topics In Genetics** (3 crs.) Cross-listed as (BCH), BIO 452. More detailed treatment of topics introduced in the general genetics course (352) including aspects of transmission genetics, molecular genetics, cytogenetics, biotechnology, developmental genetics, and the impact of genetics on society. (Lec. 3) Pre: BIO 352.

**BCH 453 Cell Biology** (3 crs.) Cross-listed as (BIO), BCH, MIC 453. Structure, replication, and function of eukaryotic cells at subcellular level. Topics considered include cell membranes, cytoplasmic organelles and nuclei, cell division, cellular differentiation, and methods. Emphasis on recent publica-

tions. (Lec. 3) Pre: two semesters of biological sciences, BCH 311, junior standing, or permission of instructor.

**BCH 464 Biochemistry of Metabolic Disease** (3 crs.) A study of the primary and secondary molecular changes in human metabolic diseases. Topics include aging, alcoholism, arteriosclerosis, diabetes, depression, and genetic diseases. (Lec. 3) Pre: BCH 311 or 481.

**BCH 482 Proteins and Enzymes** (3 crs.) Advanced discussions of selected topics in protein structure and function, enzyme catalysis and regulation, and case studies of proteins and enzymes in biological processes and diseases. Pre: BCH 311 or equivalent.

**BCH 491 Research in Biochemistry** (1-6 crs.) Special problems. Student outlines the problem, carries on experimental work, presents the conclusions in a report. (Independent Study) Pre: permission of instructor. Not for graduate credit in biochemistry.

**BCH 492 Research in Biochemistry** (1-6 crs.) Special problems. Student outlines the problem, carries on experimental work, presents the conclusions in a report. (Independent Study) Pre: permission of instructor. Not for graduate credit in biochemistry.

**BCH 495 Biochemistry Seminar** (1 cr.) Discussion and presentation of research papers on selected subjects in biochemistry. (Lec. 1) Pre: BCH 311, 482, or 582.

**BCH 496 Biochemistry Seminar** (1 cr.) Discussion and presentation of research papers on selected subjects in biochemistry. (Lec. 1) Pre: BCH 311, 482, or 582.

**BCH 500 Principles and Techniques in Molecular Cloning** (2 crs.) Current techniques and strategies in gene cloning, characterization, construction, and expression in prokaryotes and eukaryotes. Comprehensive knowledge and understanding necessary for gene cloning and vector construction emphasized. (Lec. 2) Pre: BCH 437 or permission of instructor.

**BCH 502 Techniques of Molecular Biology** (2 crs.) Cross-listed as (MIC), BCH 502. Basic techniques of molecular biology used in the study of gene structure and function including DNA/RNA and plasmid isolation, northern and southern blotting, PCR and gene cloning, among others. (Lab. 6) Pre: BIO 437 or permission of instructor.

**BCH 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

**BCH 521 Physical Biochemistry** (3 crs.) The use of calorimetry, centrifugation, electrophoresis, (SDS-PAGE, agarose gels, sequencing gels, immunoelectrophoresis,

capillary electrophoresis, and isoelectric focusing), chromatography (GFC, SPX, IEX, normal and reversed-phase HPLC, and micro-HPLC), mass spectrometry (ion-labeling, MALDI, FAB, electrospray, and MS/MS), radioactive labels, and x-ray crystallography to characterize biologically important macromolecules such as proteins, DNA/RNA, carbohydrates, and lipids. (Lec. 3) Pre: BCH 311 or 581, or concurrent registration in 581, or permission of instructor. In alternate years.

**BCH 522 Bioinformatics I** (3-4 crs.) Cross-listed as (CSC), STA, MIC, BCH, CSC 522, BPS 542. Integrates computing, statistical, and biological sciences, algorithms, and data analysis/management. Multidisciplinary student research teams. Modeling dynamic biological processes. Extra project work for 4 credits. (Lec. 3, Project 3) Pre: major in a computing, statistical, or biological science or permission of instructor.

**BCH 523 Special Topics in Biochemistry** (1-3 crs.) Advanced work arranged to suit the individual needs of the student. Lecture and/or laboratory according to the nature of the problem. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits.

**BCH 524 Special Topics in Biochemistry** (1-3 crs.) Advanced work arranged to suit the individual needs of the student. Lecture and/or laboratory according to the nature of the problem. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits. S/U credit.

**BCH 551 Topics in Biochemistry for the Clinical Scientist** (3 crs.) Cross-listed as (BCH), MLS 551. Description of the major components of biochemistry as it relates to the medical sciences. Major concepts include molecular genetics, regulatory biochemistry, and medically related applied biochemistry. (Lec. 3) Offered every third year.

**BCH 552 Microbial Genetics** (3 crs.) Cross-listed as (BCH), MIC 552. Recent research on the mechanism of mutation, genetic recombination, the genetic code, transposons, regulations, genetic engineering and regulation of DNA, RNA, and protein synthesis in microbial systems. (Lec. 3) Pre: MIC 201, BIO 352, and BCH 311.

**BCH 579 Advanced Genetics Seminar** (1 cr.) Cross-listed as (BCH), BIO 579. Current topics in genetics, including cytological, ecological, molecular, physiological, population, quantitative, and radiation genetics. (Seminar) Pre: BCH 352 and permission of instructor.

**BCH 581 General Biochemistry I** (3 crs.) First semester of a two-semester course on the principles of biochemistry. Topics include: bioenergetics, protein structure, enzymology, glycolysis, the tricarboxylic acid cycle, and oxidative phosphorylation. (Lec. 3) Pre: CHM 228 and 229.

**BCH 582 General Biochemistry II** (3 crs.) Second semester of a two-semester course on the principles of biochemistry.

Topics include: photosynthesis, membranes, hormones, metabolism, the biosynthesis of DNA, RNA, and proteins. (Lec. 3) Pre: 581 or permission of instructor.

**BCH 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**BCH 642 Biochemical Toxicology** (3 crs.) Cross-listed as (BPS), BCH 642. Biochemical and molecular aspects of chemically induced cell injury and chemical carcinogenesis. (Lec. 3) Pre: permission of instructor. Offered every third year.

**BCH 651 Research in Biochemistry** (3 crs.) Students are required to outline a research problem, conduct necessary literature survey and experimental work, and present the observations and conclusions in a substantial written report. (Independent Study) Pre: graduate standing.

**BCH 652 Research in Biochemistry** (3 crs.) Students are required to outline a research problem, conduct necessary literature survey and experimental work, and present the observations and conclusions in a substantial written report. (Independent Study) Pre: graduate standing.

**BCH 695 Graduate Seminar** (1 cr.) Cross-listed as (MIC), BCH 695. Reports of research in progress or completed. (Seminar) Required of all graduate students in microbiology. S/U credit.

**BCH 696 Graduate Seminar** (1 cr.) Cross-listed as (BCH), MIC 696. Reports of research in progress or completed. (Seminar) Required of all graduate students in microbiology. S/U credit.

**BCH 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## BES | Biological and Environmental Studies

**BES 599 Master's Thesis Research** (1-12 crs.) To be taken by students in the Master of Science - Biological and Environmental Sciences (BES) degree program. Number of credits determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: Enrollment in the MS-BES graduate program. S/U credit.

**BES 699 Doctoral Dissertation Research** (1-12 crs.) To be taken by students in the PhD - Biological and Environmental Sciences (BES) degree program. Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study)

Pre: Enrollment in the PhD-BES graduate program. S/U credit.

## BIO | Biological Sciences

**BIO 101 Principles of Biology I** (3 crs.) Chemistry, structure, metabolism, and reproduction of cells. Principles of genetics. Structure, development, and physiology of animals. Survey of the animal kingdom. (Lec. 3) Pre: Credit or concurrent enrollment in BIO 103. (N)

**BIO 102 Principles of Biology II** (3 crs.) Structure, physiology, and reproduction of plants. Diversity of plants, fungi, and algae. Principles of ecology and evolution. (Lec. 3) Pre: BIO 101, 103, and credit or concurrent enrollment in BIO 104. (N)

**BIO 103 Principles of Biology Laboratory I** (1 cr.) Selected laboratory exercises to accompany BIO 101. (Lab. 2) Pre: credit or concurrent enrollment in BIO 101.

**BIO 104 Principles of Biology Laboratory II** (1 cr.) Selected laboratory exercises to accompany BIO 102. (Lab. 2) Pre: BIO 101, 103 and credit or concurrent enrollment in 102.

**BIO 105 Biology for Daily Life with Laboratory** (3 crs.) Basic biological principles needed to understand contemporary issues in biology, for example, forensic biology, cloning, genetic engineering, reproductive technologies, alternative medicine, biodiversity, habitat alteration, and endangered species. Designed for nonmajors. (Lec. 2, Lab. 2) (N)

**BIO 121 Human Anatomy** (4 crs.) Elementary anatomy of the organ systems, studies with the aid of charts, models, and pre-dissected specimens. (Lec. 3, Lab. 3)

**BIO 130 Topics In Marine Biology** (1 cr.) Current and classical issues considered in small classes. Designed for students interested in marine biology. (Seminar) Pre: Limited to marine biology majors. Required of all freshmen marine biology majors and students entering the major with fewer than 24 credits. May not be repeated.

**BIO 201 General Animal Physiology** (3 crs.) Basic principles of physiology with emphasis on cellular and membrane mechanisms. Topics include bioenergetics and metabolism, enzymes, respiratory functions of blood cells, osmoregulation, bioelectricity and motility, cellular responses to humoral stimuli. (Lec. 2, Lab. 3) Pre: two semesters of biological sciences and one semester of chemistry recommended.

**BIO 242 Introductory Human Physiology** (3 crs.) Functions of the organ systems of the human body and their coordination in the whole human organism. Attention is given to the needs of students preparing for health-related professions. (Lec. 3) Pre: BIO 121.

**BIO 244 Introductory Human Physiology Laboratory** (1 cr.) Mechanisms of physiolog-

ical processes are illustrated by experiments on vertebrate animals. (Lab. 3) Pre: credit or concurrent enrollment in 242.

**BIO 262 Introductory Ecology** (4 crs.) Structure and function of ecosystems, limiting factors, population dynamics, population interactions, and community relationships. Selected habitats and general ecological effects of humans. (Lec. 3, Rec. 1) Pre: BIO 101, 102 or equivalent.

**BIO 272 Introduction to Evolution** (4 crs.) Cross-listed as (BIO), GEO 272. Introduction to evolution as the unifying thread in the biosphere. Processes and patterns discussed, including microevolution and macroevolution. Social impact of evolution discussed from a biological perspective. Pre: GEO 102 or one semester of biological sciences, or permission of instructors.

**BIO 286 Humans, Insects, and Disease** (3 crs.) Cross-listed as (BIO), ENT 286. Role of insects, ticks, and mites as vectors and as direct agents of diseases in humans; factors affecting the spread of these diseases and their role in our cultural development. (Lec. 3) Not for major credit for B.S. in biological sciences. (N) [D]

**BIO 300 Physiology of Exercise** (3 crs.) Cross-listed as (KIN), BIO 300. Applied human physiology, with applications to physical activity, exercise, and sport. Particular attention to acute and chronic adjustments of the circulatory, respiratory, metabolic, and muscular systems with exercise. (Lec. 3) Pre: BIO 201 or 242.

**BIO 301 Physiology of Exercise Laboratory** (1 cr.) Cross-listed as (KIN), BIO 301. Student participation in laboratory sessions designed to understand the physiology of exercise relating to body composition, EKG, pulmonary, and metabolic functions. (Lab. 3) Pre: BIO 201 or 242.

**BIO 302 Animal Development** (4 crs.) Survey of the patterns and mechanisms of animal development, including the molecular genetic control of development, medical developmental biology and evolution of development. (Lec. 3, Lab 3) Pre: BIO 101, 102, and two additional semesters of biological sciences; genetics recommended.

**BIO 311 Plant Structure and Development** (4 crs.) Structure of vascular plant cells, tissues and organs; cellular and molecular mechanisms controlling developmental processes including cell division, leaf initiation, epidermal patterning and vascular differentiation. (Lec. 3, Lab. 3) Pre: BIO 102 or permission of instructor.

**BIO 321 Plant Diversity** (4 crs.) Representative forms of prokaryotes, algae, fungi, bryophytes, and vascular plants with emphasis on evolution, ecology, and life cycle. (Lec. 3, Lab. 3) Pre: BIO 102 or permission of instructor.

**BIO 323 Field Botany and Taxonomy** (4 crs.) Collection, identification, and study of vascular flora of Rhode Island, including use

of manuals and herbarium specimens. Field trips throughout Rhode Island. Discussion of principles, methods, and data used in classification. (Lec. 2, Lab. 4) Pre: BIO 102.

**BIO 332 Plant Pathology: Introduction to Plant Diseases** (4 crs.) Cross-listed as (BIO), PLS 332. Nature, cause, and control of plant diseases. Use of basic techniques for identification of major types of plant diseases and their causal agents. (Lec. 4) Pre: BIO 102 or PLS 150 or permission of instructor.

**BIO 341 Principles of Cell Biology** (3 crs.) An introduction to the structure and organization of eukaryotic cells. Topics include membranes and organelles, gene expression, protein synthesis and secretion, energy utilization, the cytoskeleton, and signal transduction. (Lec. 3) Pre: one semester of biological sciences and one semester of organic chemistry.

**BIO 345 Marine Environmental Physiology** (3 crs.) The physiological basis of adaptation to the marine environment. Physiological methods adapted to marine plants and animals. (Lec. 2, Lab. 3) Pre: two semesters of biological sciences.

**BIO 346 Plant Physiology** (3 crs.) Development and function of vascular plants, including energy and nutrient assimilation, growth, reproduction, and interactions with other organisms and the physical environment. (Lec. 3) Pre: BIO 102, one semester of chemistry, or permission of instructor.

**BIO 348 Plant Physiology Laboratory** (1 cr.) Laboratory methods in plant physiology, including experimental design and reporting. Techniques include water potential measurement, chromatography, spectrophotometry, enzyme assay, tissue culture, bioassay, protein extraction, and gel electrophoresis. (Lab. 3) Pre: BIO 346, may be taken concurrently.

**BIO 352 General Genetics** (4 crs.) Cross-listed as (BIO), BCH 352. Introduction to basic genetic principles and concepts leading to an understanding of genes, heredity, and the nature of inherited variation. Applications and implications for animals, plants, fungi and bacteria. (Lec. 3, Rec. 1) Pre: BIO 101 and BIO 102.

**BIO 353 Genetics Laboratory** (1 cr.) Cross-listed as (BCH), BIO 353. Basic principles and concepts of genetics demonstrated with microorganisms, plants, and animals. (Lab. 2) Pre: credit or concurrent enrollment in BIO 352.

**BIO 354 Invertebrate Zoology** (4 crs.) Study of the origin and evolutionary relationship of the invertebrate animals. Emphasis on marine forms. Laboratory sessions include comparative study of selected examples and field trips to local environments. (Lec. 2, Lab. 4) Pre: BIO 101 and 102.

**BIO 355 Marine Invertebrates of Southern New England** (3 crs.) Collection and identification of marine invertebrates of southern New England. Emphasis on field work and laboratory studies. Students col-

lection will incorporate video photography. (Lab. 6) Pre: BIO 101 and 102 or permission of instructor.

**BIO 360 Marine Biology** (4 crs.) The nature of plants and animals of the sea. Diversity of species and adaptations to habitats from the sea surface to the depths of the ocean. (Lec. 3, Lab. 3) Pre: BIO 101 and 102.

**BIO 365 Biology of Algae** (4 crs.) Taxonomy, morphology, and evolution of all major algal divisions. Laboratory/field component focuses upon taxonomic identification of both live and preserved microscopic and macroscopic algal species. (Lec. 3, Lab. 3) Pre: BIO 102.

**BIO 366 Vertebrate Biology** (3 crs.) Life histories, adaptations, ecology, classifications, and distribution of vertebrate animals. Laboratory and extensive field work on local vertebrates. (Lec. 2, Lab 3) Pre: BIO 262 recommended.

**BIO 385 Introductory Entomology** (3 crs.) Cross-listed as (ENT), BIO 385. Introduction to the diverse components of entomology, emphasizing basic principles of insect morphology, physiology, behavior, and ecology. Current topics in insect biodiversity and management strategies. (Lec. 3) Pre: BIO 102 and BIO 101, or permission of instructor.

**BIO 386 Introductory Entomology Laboratory** (1 cr.) Cross-listed as (ENT), BIO 386. Insect structure, function, and systematics with field studies in ecology, survey, and collection of beneficial and pest insects in their natural environment. (Lab. 3) Pre: BIO/ENT 385 or concurrent enrollment in 385.

**BIO 396 Biology And Society** (2 crs.) A seminar course dealing with the impact of biological discoveries on societal questions and with the social influences that affect biological discovery. Discussion of original papers, magazines, newspaper articles, and books about various discoveries. (Seminar) Pre: three courses in biology (including current enrollment) or permission of instructor.

**BIO 397 Colloquium in Biological Sciences** (0 crs.) Introduction to modern scholarly work in biology. Lectures by visiting and resident scholars, with questions from the audience. Expected of students enrolled in the biology honors program. (Lec.) Pre: Open to biological sciences majors only. S/U only.

**BIO 398 Colloquium in Biological Sciences** (0 crs.) Introduction to modern scholarly work in biology. Lectures by visiting and resident scholars, with questions from the audience. Expected of students enrolled in the biology honors program. (Lec.) Pre: Open to biological sciences majors only. S/U only.

**BIO 404** (304) Comparative Vertebrate Anatomy (4 crs.) Anatomy of chordates emphasizing functional and evolutionary diversity. Lecture focuses on morphological variation and evolution including study of primary literature. Laboratory focuses on comparative anatomy through dissections and models. (Lec. 3, Lab. 3) Pre: BIO 101 and

102 and junior standing.

**BIO 412 Evolution and Diversity of Fishes** (4 crs.) Origin, evolution and diversification of fishes, their phylogenetic relationships, and morphological, physiological, ecological, and behavioral adaptations in marine and freshwater habitats. (Lec. 3, Lab. 3) Pre: BIO 101 or 102 and BIO 366 or permission of instructor. Not for graduate credit.

**BIO 417 Herpetology** (4 crs.) Cross-listed as (NRS), BIO 417. Introduces students to the biology, ecology, conservation, and management of reptiles and amphibians, including global perspectives, and field methods for studying amphibians and reptiles of north-eastern North America. (Lec. 2, Lab. 4) Pre: BIO 101/103 and 102/104; and NRS 223 or BIO 262, and permission of instructor. Not for graduate credit.

**BIO 418 Ecology of Marine Plants** (4 crs.) Ecology, development, and physiology of marine algae and higher plants. Topics include competition, herbivory, nutrient uptake, photosynthesis, and growth. (Lec. 3, Lab. 3). Pre: BIO 102 and BIO 262 or permission of instructor. Alternate years.

**BIO 437 Fundamentals of Molecular Biology** (3 crs.) Cross-listed as (BIO), BCH 437. Biochemical basis of heredity as seen through the structure and function of nucleic acids. Includes DNA replication, transcription, translation, gene regulation, and gene organization in prokaryotes and eukaryotes. Current methods emphasized. (Lec. 3) Pre: MIC 211, BIO 352, and BCH 311, or permission of instructor.

**BIO 441 Environmental Physiology of Animals** (3 crs.) The dynamics of the interaction of animal functions with the environment. Emphasis on quantitative study of physiological adaptations to environmental fluctuations. (Lec. 3) Pre: BIO 201 or equivalent. In alternate years.

**BIO 444 Insect Ecology** (3 crs.) Ecology of insects and other terrestrial arthropods at the physiological, individual, population, community, and ecosystem levels. Not for graduate credit. (Lec. 3) Pre: BIO 262 or ENT 385.

**BIO 445 Endocrinology I** (3 crs.) Hormones and their regulation of early development, growth, metabolism, salt and water balance, adaptation to stress, reproduction, and behavior. (Lec. 3) Pre: BIO 341 or 345 or equivalent; BCH 311 is recommended. Not for graduate credit.

**BIO 452 Advanced Topics In Genetics** (3 crs.) Cross-listed as (BCH), BIO 452. More detailed treatment of topics introduced in the general genetics course (352) including aspects of transmission genetics, molecular genetics, cytogenetics, biotechnology, developmental genetics, and the impact of genetics on society. (Lec. 3) Pre: BIO 352.

**BIO 453 Cell Biology** (3 crs.) Cross-listed as (BIO), BCH, MIC 453. Structure, replication, and function of eukaryotic cells at subcel-

lular level. Topics considered include cell membranes, cytoplasmic organelles and nuclei, cell division, cellular differentiation, and methods. Emphasis on recent publications. (Lec. 3) Pre: two semesters of biological sciences, BCH 311, junior standing, or permission of instructor.

**BIO 455 Marine Ecology** (3 crs.) Investigation of the structure and dynamics of various marine ecosystems. Includes mineral cycling, energy flow, community and population organization, and behavioral ecology in selected marine environments. (Lec. 3) Pre: 262 or permission of instructor.

**BIO 457 Marine Ecology Laboratory** (1 cr.) Field and laboratory work on community relationships of dominant organisms in Rhode Island marine environments. (Lab. 3) Pre: concurrent enrollment in 455. Limited to 15 students.

**BIO 467 Animal Behavior** (3 crs.) Roles of natural selection, individual learning, and cultural transmission in shaping animal behavior. (Lec. 3) Pre: two semesters of biology.

**BIO 469 Tropical Marine Invertebrates PRA** (5 crs.) Systematic survey of tropical invertebrates. Emphasis on examples from Bermuda's marine environment. Laboratory includes field collections, identification, and preparatory techniques for taxonomic studies. (Practicum, Lab. 8) Taught in Bermuda. Pre: BIO 101 and 102, junior standing, snorkeling experience.

**BIO 475 Coral Reef Ecology PRA** (5 crs.) Structure and function of coral reef ecosystems with emphasis on the biology of corals. Laboratory sessions focus on field surveys and research techniques. (Practicum, Lab. 8) Taught in Bermuda. Pre: BIO 262 and junior standing; SCUBA certification required.

**BIO 480 Community Ecology** (3 crs.) Exploration of community ecology, with an emphasis on interspecific interactions (competition, predation, mutualism), species diversity, succession, niche theory, and island bio-geography. Format includes lecture, case studies, and discussion. (Lec. 3) Pre: BIO 262 or permission of instructor. Not for graduate credit.

**BIO 485 Salt Marsh Ecology** (4 crs.) Cross-listed as (BIO), NRS 485. Structure and function of salt marsh ecosystems, including biogeochemistry, in the context of global change. Seminar-style discussions of primary scientific literature, laboratory and field exercises, and an independent research poster. (Lec. 2, Lab 4) Pre: BIO 262 or NRS 223 and 2 semesters of chemistry or permission of instructor. BIO 360 recommended. Not for graduate credit.

**BIO 491 Independent Biological Research** (1-3 crs. each) Individualized laboratory, field, or literature research projects. May be repeated for a total of 6 credits. (Independent Study) Pre: open only to undergraduates on arrangement with staff. S/U only.

**BIO 492 Independent Biological Re-**

**search** (1-3 crs. each) Individualized laboratory, field, or literature research projects. May be repeated for a total of 6 credits. (Independent Study) Pre: open only to undergraduates on arrangement with staff. S/U only.

**BIO 495 Tropical Marine Biology Research PRA** (6 crs.) Independent marine research in Bermuda. Topics may include marine ecology, physiology, systematics, etc. Proposal, oral report, and project paper required. (Practicum, Lab 12). Taught in Bermuda. Pre: Junior standing, BIO 475 and 469.

**BIO 498 Teaching Practicum in Biological Sciences PRA** (2 crs.) Teaching experience for undergraduates through participation in planning and assisting in the teaching of introductory laboratory courses. (Prac. 1, Workshop 1). Pre: Permission of instructor.

**BIO 500 Advanced Science Ethics** (1 cr.) This course focuses on the ethics of scientific research using case studies to inform discussion on common ethical issues in science. (Lec. 1) Pre: graduate standing or permission from the instructor.

**BIO 501 Advanced Scientific Communication** (2 crs.) This course focuses on the process of writing and reviewing scientific manuscripts and grant proposals. (Lec. 1, Sem. 1) Pre: graduate standing or permission from the instructor.

**BIO 502 Introduction to Neurobiology** (3 crs.) Cross-listed as (BIO), NEU 502. Fundamental processes in neurobiology with emphasis on cellular and membrane mechanisms of nerve functioning. (Lec 3). Pre: BIO 201 and MTH 141, or permission of instructor.

**BIO 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

**BIO 511 Special Readings in Developmental Plant Anatomy** (3 crs.) Intensive tutorial work, research, and reading on ontogeny of plant structures and morphogenetic mechanisms. (Independent Study) Pre: graduate standing and permission of instructor. Concurrent audit of 311 required. Offered on demand.

**BIO 512 Evolution and Diversity of Fishes** (4 crs.) Origin, evolution, and diversification of fishes, their phylogenetic relationships, and morphological, physiological, ecological, and behavioral adaptations in marine and freshwater habitats. (Lec. 3, Lab. 3) Pre: BIO 101, 102, and BIO 366, or permission of instructor.

**BIO 513 Functional Morphology** (3 crs.) Advanced study of the evolution and biological role of organismal structure including critical evaluation of recent research in functional morphology with an emphasis on vertebrates. (Lec. 3) Pre: BIO 304 or 366

recommended. Graduate standing.

**BIO 515 Light Microscopy Research Methods** (4 crs.) Introduction to optical techniques and biological specimen preparation for light microscopy with emphasis on application of these methods in biological research. Topics include optics, embedding and sectioning, fluorescence and immunocytochemistry, and computer image analysis. (Lec. 1, Lab. 6) Pre: graduate standing or permission of instructor.

**BIO 517 Herpetology** (4 crs.) Cross-listed as (NRS), BIO 517. This course provides an in-depth background on the biology, ecology, conservation, and management of reptiles and amphibians, including field methods for studying amphibians and reptiles of north-eastern North America. (Lec. 2, Lab. 4) Pre: graduate student in biological and environmental sciences

**and permission of instructor.**

**BIO 521 Recent Advances in Cell and Molecular Biology** (2 crs.) Cross-listed as (BIO), MIC 521. Reading and discussion of current literature (original research papers and review articles) in the area of molecular cell biology, and presentation of oral reports. Final written report or exam. Emphasis on eukaryotic cells. (Lec. 2) Pre: At least one of the following courses or an equivalent course emphasizing cell structure and function -- MIC 453, BCH 437, 453, 481, BIO 437, 453, or permission of instructor. May be repeated for a maximum of 4 credits.

**BIO 524 Methods in Plant Ecology** (3 crs.) Methods in analysis of vegetation and microenvironments. Emphasis on quantitative techniques in analysis of vegetation, soil, and microclimate; techniques in physiological ecology. (Lec. 2, Lab. 3) Pre: BIO 102 and 262 or equivalent; STA 412 recommended. In alternate years.

**BIO 541 Comparative Physiology of Marine Animals** (3 crs.) Comparison of physiological mechanisms by which animals maintain life with emphasis on marine invertebrates. Responses to external environment mediated by receptors, nervous systems, effectors. Living control systems for muscular activity and circulation. (Lec. 3) Pre: one physiology course. In alternate years.

**BIO 544 Insect Ecology** (2 crs.) Cross-listed as (ENT), BIO 544. Ecology of insects and other terrestrial arthropods at the physiological, individual, population, community, and ecosystem levels. Pre: permission of instructor. In alternate years.

**BIO 545 Endocrinology II** (3 crs.) Integration of cellular processes with whole animal challenges of early development, growth, metabolism, salt and water balance, adaptation to stress, reproduction, and behavior. (Lec. 3) Pre: graduate standing

**BIO 550 Advanced Topics in Neurobiology** (3 crs.) Published papers in selected aspects of neurobiology will be discussed. Representative topics include role of Ca<sup>++</sup>,

c-AMP in the nervous system, gating currents learning at the cellular level, cellular rhythmicity. (Seminar) In alternate years.

**BIO 551 Seminar In Marine Ecology** (1 cr.) Cross-listed as (BIO), NRS 551. Readings and discussion on current research involving ecological interactions of marine species. (Seminar) Pre: permission of instructor. May be repeated.

**BIO 553 Regulatory Processes in Eucaryotic Cells** (3 crs.) Regulation of eucaryotic cell biology by processes governing organization and function, including transport, protein sorting, signal transduction, gene expression, and changes in the cytoskeleton. Focus on GTP-binding proteins and protein kinases. (Lec. 3) Pre: BCH 311 or graduate standing.

**BIO 560 Seminar In Plant Ecology** (2 crs.) Recent topics and investigations pertinent to plant ecology. Library research, oral presentation of reports, and group discussions. (Seminar) Pre: BIO 262 or equivalent or permission of instructor. May be repeated.

**BIO 563 Biology and Ecology of Fishes** (4 crs.) Cross-listed as (BIO), NRS 563. Exploration of the functional biology and ecology of marine and freshwater fishes through lecture and discussion of primary literature. Laboratory involves specimen study, field trips, and a research project. (Lec. 3, Lab. 3) Pre: BIO 366 or equivalent, or permission of instructor.

**BIO 571 Natural Selection** (3 crs.) Ideas and controversies concerning the action of natural selection. Maintenance of genetic variability, neutral mutation, levels of selection, recombination and sexual reproduction, and rates of evolution. (Lec. 2, Lab. 3) Pre: BIO 262 and 352 or 472 or graduate standing.

**BIO 572 Advanced Evolutionary Biology** (4 crs.) Cross-listed as (BIO), GEO 572. A survey of modern evolutionary biology, including classic evolutionary theory, phylogenetics, evolution and development, adaptation, mass extinction and genomic evolution. (Lec. 4) Pre: BIO/GEO 272, graduate standing, or permission of instructor.

**BIO 579 Advanced Genetics Seminar** (1 cr.) Cross-listed as (BCH), BIO 579. Current topics in genetics, including cytological, ecological, molecular, physiological, population, quantitative, and radiation genetics. (Seminar) Pre: BCH 352 and permission of instructor.

**BIO 580 Community Ecology** (3 crs.) Explores community ecology, with an emphasis on interspecific interactions (competition, predation, mutualism), species diversity, succession, niche theory, and island biogeography. Format includes lecture, case studies, and discussion. (Lec. 3) Pre: BIO 262 or permission of instructor.

**BIO 581 Biological Sciences Colloquium** (1 cr.) Invited talks on selected research topics in selected areas related to biology. Required of graduate students majoring in biological sciences. (Seminar) Pre: graduate



standing in the department of Biological Sciences. S/U credit.

**BIO 582 Biological Sciences Colloquium** (1 cr.) Invited talks on selected research topics in selected areas related to biology. Required of graduate students majoring in biological sciences. (Seminar) Pre: graduate standing in department of Biological Sciences. S/U credit

**BIO 585 Salt Marsh Ecology** (4 crs.) Cross-listed as (BIO), NRS 585. Structure and function of salt marsh ecosystems, including biogeochemistry, in the context of global change. Seminar-style discussions, weekly assignments, written and oral presentations of independent proposal and research project. (Lec. 2, Lab. 4) Pre: permission of instructor. Prior undergraduate coursework equivalent to a course in ecology and 2 semesters of chemistry is expected.

**BIO 586 Medical and Veterinary Entomology** (3 crs.) Cross-listed as (BIO), ENT 586. Life history, classification, habits, and control of insects and other arthropods affecting human and animal health. Topics will include public health significance, vector-parasite interactions, and survey and research methodologies. (Lec. 3, Lab. 4) Pre: ENT 331 or 381 or equivalent. In alternate years.

**BIO 587 Seminar In Neurobiology** (1 cr.) Cross-listed as (NEU), BIO 587. Survey of current literature in the neurosciences. Topics include molecular and behavioral electrophysiology, ion channels, nerve net modelling, ultrastructure of excitable cells, receptor and pharmacological neurobiology of invertebrates and vertebrates. (Seminar) Pre: graduate standing or one advanced neuroscience course.

**BIO 591 Independent Biological Research** (1-6 crs.) Individualized laboratory, field, or literature research projects. May be repeated for a total of 6 credits. Pre: graduate standing and permission of instructor. S/U credit.

**BIO 592 Independent Biological Research** (1-6 crs.) Individualized laboratory, field, or literature research projects. May be repeated for a total of 6 credits. Pre: Graduate standing and permission of instructor. S/U credit.

**BIO 593 Special Topics in Biological Sciences** Selected areas pertinent to needs of individuals or small groups. Class, seminar or tutorial. Topics may include the following: biomechanics, cell biology, ecological morphology, functional morphology, ichthyology, molecular biology, morphology and mechanics, physiology, plant cell development and zoology. May be repeated for a total of 6 credits.

**BIO 594 Special Topics in Biological Sciences** Selected areas pertinent to needs of individuals or small groups. Class, seminar or tutorial. Topics may include the following: biomechanics, cell biology, ecological morphology, functional morphology,

ichthyology, molecular biology, morphology and mechanics, physiology, plant cell development and zoology. May be repeated for a total of 6 credits.

**BIO 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**BIO 642 Seminar In Physiology** (1-3 crs.) Reports and discussions on topics of current research in physiology. Subject matter adapted to meet interests of students. (Seminar) Pre: permission of instructor.

**BIO 654 Seminar in Ichthyology** (2 crs.) Reading, library research, reports, and class discussion on problems of current research interest in the biology of fishes. (Seminar) Pre: BIO 563 or permission of instructor. In alternate years.

**BIO 663 Phytoplankton Physiology** (3 crs.) Cross-listed as (BIO), OCG 663. Metabolic processes and methods of their investigation in phytoplankton with primary emphasis on functions pertinent to their ecology. Includes adaptation, uptake of nutrients, excretion, rhythms, pigments, and photosynthesis. (Lec. 3) Pre: graduate standing or permission of instructor.

**BIO 675 Advanced Ecology Seminars** (2 crs.) Specialized and advanced areas of ecological research and theory, including biogeography, Pleistocene ecology, population dynamics, energy flow in ecosystems, and radiation ecology. (Seminar) Pre: permission of instructor.

**BIO 691 Biological Problems** (1-6 crs.) Special work to meet the needs of individual students who are prepared to undertake special problems. (Independent Study) Pre: permission of chairperson. Open only to doctoral students.

**BIO 692 Biological Problems** (1-6 crs.) Special work to meet the needs of individual students who are prepared to undertake special problems. (Independent Study) Pre: permission of chairperson. Open only to doctoral students.

**BIO 695 Graduate Seminar** (1 cr.) Students to give seminar reports on their thesis research. Topics may also include professional development subjects, such as grant writing, presentation techniques, resume writing, etc. (Seminar) Pre: graduate standing. S/U credit. May be repeated for credit, but only 2 credits may be applied to the program of study.

**BIO 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## BIS | Bachelor of Interdisciplinary Studies

**BIS 100 Pro-seminar** (3 crs.) Introduction to critical approaches to learning with emphasis on reading and rhetorical skills appropriate to college students. Must be taken concurrently with URI 101B. S/U credit. (ECW)

**BIS 350 Directed Study or Research** (1-6 crs.) Directed research or study designed to meet the particular needs of individual students. (Independent Study) Pre: permission of the academic department chairperson and the B.I.S. coordinator. May be repeated for a maximum of 6 credits.

**BIS 390 Social Science Seminar** (6 crs.) Exploration of the social sciences for B.I.S. students who have completed the Pro-Seminar, started their major, and have the consent of their advisor. (Seminar) Required of B.I.S. students. Offered every third semester. (S) [D]

**BIS 391 Natural Science Seminar** (6 crs.) Exploration of the natural sciences for B.I.S. students who have completed the Pro-Seminar, started their major, and have the consent of their advisor. (Seminar) Required of B.I.S. students. (N) Offered every third semester.

**BIS 392 Humanities Seminar** (6 crs.) Exploration of the humanities for B.I.S. students who have completed their Pro-Seminar, started their major, and have the consent of their advisor. (Seminar) Required of B.I.S. students. (L) [D] Offered every third semester.

**BIS 397 Human Studies Major Seminar** (3 crs.) Capstone course of human studies major. Review and assessment of students' major education through intensive exploration of issues central to human studies. (Seminar/Online) Pre: completion of 30 credits of major. Required of B.I.S. human studies majors.

**BIS 398 Applied Communication Major Seminar** (3 crs.) Capstone course of applied communications major. Review and assessment of students' major education through intensive exploration of issues central to professional communications. (Seminar) Pre: completion of 30 credits of major courses. Required of all applied communication majors.

**BIS 399 Supervised Senior Project** (3 crs.) A project chosen by the student with faculty guidance on a topic relevant to the student's major, resulting in a paper or other demonstration of academic achievement. (Independent Study) Pre: senior standing in B.I.S. program and approval of advisor and B.I.S. coordinator. Required of B.I.S. students.

## BME | Biomedical Engineering

**BME 181 Biomedical Engineering Seminar I** (1 cr.) Seminar series given by instructor, invited experts, and students with focus on biomedical electronics, medical devices, rehabilitation engineering, medical instrumentation, and biomedical ethics. (Seminar) Pre: credit or concurrent enrollment in MTH

141 or permission of instructor.

**BME 207 Introduction to Biomechanics** (3 crs.) Engineering analysis of the human body in equilibrium, hard and soft tissue mechanics (stress and strain), elementary beam theory (bending and torsion) applied to bones, biocompatibility of fracture repair. (Lec. 3) Pre: (MTH 142 and PHY 204 and (credit or concurrent enrollment in BIO 121)) or permission of instructor.

**BME 281 Biomedical Engineering Seminar II** (1 cr.) Seminar series given by instructor, invited experts, and students with focus on physiological system modeling, biomechanics, biomaterials, tissue engineering, artificial organs, biosensors, and technologies for health care. (Seminar) Pre: BME 181 or permission of instructor.

**BME 307 Bioelectricity** (3 crs.) Quantitative analysis of electrical phenomena in biological cells, tissues, and organs. Action potentials and propagation in neurons, cardiac and skeletal muscle. (Lec. 3) Pre: ((ELE 212 or 220) and (MTH 243 or 362)) or permission of instructor.

**BME 360 Biomeasurement** (3 crs.) Principles of biomeasurement, patient safety, embedded system design with microcontrollers, programming with assembly and C++ languages, interrupts, timer, real-time digital filters, electrocardiogram (ECG) instrumentation, QRS detection, heart rate meter. (Lec. 3) Pre: (concurrent enrollment in BME 361 and ELE 212) or permission of instructor.

**BME 361 Biomeasurement Laboratory** (1 cr.) Constructing and experimenting with embedded systems using microcontrollers, implementing real-time digital filters with assembly and C++ languages, constructing an electrocardiogram (ECG) amplifier, implementing QRS detection and heart rate meter. (Lab.) Pre: Concurrent enrollment in BME 360 required.

**BME 391 Special Problems** (1-4 crs.) Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. (Independent Study)

**BME 461 Physiological Modeling and Control** (3 crs.) Cross-listed as (BME), ELE 461. Principles of physiological modeling and control of linear and nonlinear systems, stability analysis, root locus, Bode plots, linearization. (Lec. 3) Pre: ELE 314, or permission of instructor. Not for graduate credit.

**BME 462 Biomedical Instrumentation Design** (3 crs.) Fundamentals of biomedical instrumentation, biocompatibility, medical device materials; safety, noise rejection, biomedical signal processing; measuring, recording, monitoring, and therapeutic devices. (Lec. 3) Pre: (BME 207 and 360 and ELE 313 and 314) or permission of instructor. Not for graduate credit. Not open to students who have credit in ELE 562.

**BME 463 Biomedical Instrumentation Laboratory** (1 cr.) Development of a por-

table heart function monitor that measures the electrocardiogram and photoplethysmogram; embedded system design using instrumentation amplifier, op-amp, graphic LCD module, and PIC microprocessor with C programming. (Lab. 1) Pre: (ELE (205 or 208) and ELE 313 and 341) or permission of instructor. Not for graduate credit. Not open to students who have credit in ELE 562.

**BME 464 Medical Imaging** (3 crs.) Engineering and clinical applications of medical imaging systems including X-ray, computed tomography, radioisotope imaging, ultrasound, magnetic resonance imaging; picture archiving and communication system and medical image processing. (Lec. 3) Pre: (BME 207 and 360 and ELE 313 and 314) or permission of instructor. Not for graduate credit. Not open to students who have credit in ELE 564.

**BME 465 Medical Image Processing Laboratory** (1 cr.) Development of medical imaging processing algorithms with graphical user interface in C++ under the Windows operating system; smoothing and sharpening filters, morphological filters, area measurement and edge tracer. (Lab. 1) Pre: credit or concurrent enrollment in 464. Not for graduate credit. Not open to students who have credit in ELE 564.

**BME 468 Neural Engineering** (3 crs.) Principles and technologies of neuroengineering and clinical applications; brain stimulator, spinal cord stimulation, functional electrical stimulation (FES), neural-machine interface for motor prosthesis control, artificial visual/auditory devices for augmented sensory perception. (Lec. 3) Pre: BME 360 or permission of instructor. Not for graduate credit.

**BME 482 Biomedical Engineering Seminar III** (1 cr.) Seminar series given by instructor, invited experts, and students with focus on biomedical signals and systems, computers in medicine, technologies for health care, and biomedical ethics. (Seminar) Pre: (BME 207 or ELE 205 or 208) and ELE 313 and 342) or permission of instructor.

**BME 484 Biomedical Engineering Capstone Design I** (2 crs.) Applications of engineering skills; team projects in biomedical areas such as neuroengineering, assistive technology, cardiopulmonary measurements, medical imaging, and modeling of physiological systems. First of a two-course sequence. (Lec. 1, Lab. 3) Pre: (BME 207 and 360) or permission of instructor. Not for graduate credit.

**BME 485 Biomedical Engineering Capstone Design II** (2 crs.) Applications of engineering skills; team projects in biomedical areas such as neuroengineering, assistive technology, cardiopulmonary measurements, medical imaging, and modeling of physiological systems. (Lec. 1, Lab. 3) Second of a two-course sequence. Pre: BME 484 or permission of instructor. Not for graduate credit.

**BME 491 Special Problems** (1-4 crs.)

Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. (Independent Study) Not for graduate credit.

## BPS | Biomedical and Pharmaceutical Sciences

**BPS 201 How Drugs Work** (3 crs.) Drug actions, uses, and adverse effects of prescription and non-prescription medications, recreational drugs, and nutritional supplements. General audience. (Lec. 3) Open to all students except health science and related majors. (N)

**BPS 202 Maintaining Health in the Age of Chemicals** (2 crs.) Introduction for the general student to the potential hazards posed by drugs, food additives, and pollutants to the maintenance of health. (Lec. 2) Not for program credit for nursing or pharmacy majors in the third year or beyond.

**BPS 203 Herbal Medicines and Functional Food** (3 crs.) Study of traditional herbal medicines, commonly used medicinal plants, and modern plant-derived drugs. Medicinal foods, herbal supplements, and plant extracts (nutraceuticals) for health benefits beyond basic nutrition. (Lec. 3) Intended for freshmen and sophomores. (N)

**BPS 301 Dosage Forms I: Regulation of Drug Products and Biopharmaceutics** (2 crs.) Introduction to the regulation of drug products. Application of kinetics of drug products, dissolution, absorption, and other biopharmaceutical processes. Bioavailability and generic equivalence. (Lec. 2 cr.) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor. Open to CHE students in pharmaceutical track.

**BPS 303 Dosage Forms II: Solid and Solution Dosage Forms and Pharmaceutical Calculations** (2 crs.) Physicochemical properties of drug molecules and their effect on formulation, manufacturing, and administration of solid and solution products. Introduction to pharmaceutical calculations. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor. Open to CHE students in pharmaceutical track.

**BPS 305 Dosage Forms III: Disperse System, Sterile, and Specialty Dosage Forms** (2 crs.) Physicochemical properties of drug molecules and their effect on formulation, manufacturing, and administration of Disperse System, Sterile and Specialty Dosage Forms. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor. Open to CHE students in pharmaceutical track.

**BPS 310 Foundations of Human Disease: Renal and Cardiovascular Diseases** (2 crs.) Cross-listed as (PHP), BPS 310. The etiology, pathogenesis, epidemiology, and symptomatology, and diagnosis of renal and

cardiovascular diseases. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**BPS 311 Foundations of Human Disease I: Immunoinflammatory Disease** (2 crs.)

Cross-listed as (BPS), PHP 311. The pathogenesis, etiology, epidemiology, symptomatology, and diagnosis of immunoinflammatory and musculo-skeletal diseases. The pharmacology and medicinal chemistry of anti-inflammatory medications, immunosuppressives, and anti-rheumatic drugs. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor. Open to BSPS students.

**BPS 313 Principles of Medicinal Chemistry** (2 crs.) Physico-chemical properties of drug molecules; and principles needed to understand chemical basis of pharmacology and therapeutics, pharmacophores for drugs used to treat disease, and structure-activity relationships of drug-target interactions. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor. Open to BSPS students.

**BPS 318 Pharmacy Technology Laboratory** (1 cr.) Prescription processing and compounding techniques for pharmaceutical dosage forms. (Lab. 3) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**BPS 321 Principles of Pharmacology and Autonomic Pharmacology** (2 crs.) Fundamental principles of drug action with emphasis on drug/receptor interactions. Mechanisms of action and medicinal chemistry of drugs that affect the autonomic nervous system. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor. Open to BSPS students.

**BPS 325 Drug Metabolism and Bioanalysis** (2 crs.) Chemical, biochemical, genetic and clinical aspects of drug metabolism. Examples of modern bioanalysis and clinical chemistry and its importance to screening, diagnosis and evaluation of patients. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing, or permission of instructor.

**BPS 333 Nursing Pharmacology** (3 crs.) Comprehensive course in nursing pharmacology that forms the basis for therapeutics. (Lec. 3) Pre: NUR 213 and 234, or RN student status or permission of instructor.

**BPS 334 Pharmacology and Medicinal Chemistry of Cardiovascular and Renal Drugs** (2 crs.) Mechanism of action, adverse effects, and therapeutic applications of drugs affecting cardiovascular and renal function. (Lec. 2) Pre: Doctor of Pharmacy professional student in good standing; or permission of instructor.

**BPS 340 Veterinary Pharmacology** (3 crs.) Cross-listed as (BPS), AVS 340. Principles of pharmacology including pharmacokinetics and pharmacodynamics, drug indications,

usages and side effects, practical applications of drugs including drug handling, dosing calculation and administration methods. (Lec. 3) Pre: for AVS students: AVS 331 and 333 or permission of instructor; Pre: for BSPS and Pharm.D. students: 2nd or 3rd year standing.

**BPS 352 Personal Cosmetics** (3 crs.) Formulation and manufacture of various types of personal cosmetics and toilet preparations. Examples of types studied are prepared in laboratory. (Lec. 2, Lab. 3) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**BPS 403 Pharmacokinetics I** (3 crs.) Pharmacokinetics of drug distribution, metabolism, and elimination. Compartmental models, pharmacokinetic modeling, development of dosage regimens. (Lec. 3) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor.

**BPS 405 Physical Pharmacy** (3 crs.) Provides an understanding of the basic principles behind the formulation, manufacturing, storage stability and bio-availability of drug products. (Lec. 3) Pre: PHY 111, 185. Not for graduate credit.

**BPS 409 Foundations of Human Disease III: Infectious and Pulmonary Processes** (2 crs.) Cross-listed as (BPS), PHP 409. The etiology, pathogenesis, epidemiology, symptomatology, and diagnosis of infectious and pulmonary diseases. (Lec. 2) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor

**BPS 410 Foundations for Human Disease V: GI, Endocrine** (2 crs.) Cross-listed as (PHP), BPS 410. The etiology, pathogenesis, symptomatology, and diagnosis of endocrine, and gastrointestinal diseases. (Lec. 2) Pre: P3 standing in the Doctor of Pharmacy program.

**BPS 411 Biostatistics II** (3 crs.) Cross-listed as (STA), PHP, BPS 411. An overview of statistical methods used in performing research in pharmacotherapeutics and pharmacoepidemiology. Emphasis will be on understanding both common study designs and the output from statistical analysis of data obtained from these studies. (Lec. 3) Pre: an introductory statistics course (i.e., 307) or permission of instructor.

**BPS 412 Foundations of Human Diseases: CNS** (2 crs.) Cross-listed as (PHP), BPS 412. The etiology, pathogenesis, epidemiology, symptomatology, and diagnosis of diseases of the central nervous and musculoskeletal system. (Lec. 2) Pre: Doctor of Pharmacy student in good standing or permission of instructor. Not for graduate credit.

**BPS 418 Self-Care I** (3 crs.) An overview of alternative therapies and over the counter medicines with an emphasis on self-care and natural medicine. Basic information as well as case studies. (Lec. 3) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor.

**BPS 420 Biotechnology Products in**

**Pharmacy** (2 crs.) Cross-listed as (BPS), PHP 420. Clinical, pharmaceutical, and economic impact of biotechnology products in pharmacy, including monoclonal antibodies, interleukins, human growth factors, antigens oligonucleotides, DNase, and interferons. (Lec. 2)

**BPS 421 Pharmacology and Medicinal Chemistry of Anti-infective and Respiratory Agents** (2 crs.) Chemistry, mechanism of action, sensitivity, resistance and toxicity of anti-infections drugs, and an overview of antibacterial, antifungal, antiviral, antiprotozoal, respiratory drugs, and vaccines in current use. (Lec. 2) Pre: second-year Doctor of Pharmacy student in good standing; or permission of instructor.

**BPS 422 Endocrine, Gastrointestinal, and Biotechnologic Drugs** (2 crs.) Mechanisms of action of drugs used to treat endocrine and gastrointestinal disorders. Biological and biotechnologic sources, isolation, design, and medicinal chemistry of biopolymer drugs. (Lec. 2) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor.

**BPS 425 GMPs in the Manufacture of Pharmaceutical Products** (3 crs.) Application of current Good Manufacturing Practices to the manufacture and quality control of various pharmaceutical products. (Lec. 3) Pre: fourth-year standing or permission of instructor. Open to CHE students in pharmaceutical track. Not for graduate credit.

**BPS 432 CNS Drug Pharmacology and Medicinal Chemistry** (2 crs.) The pharmacologic and biochemical action and side effects of drugs used to treat neurologic, psychiatric, and skeletal muscle system diseases. (Lec. 2) Pre: Doctor of Pharmacy student in good standing or permission of instructor. Not for graduate credit.

**BPS 436 Psychotropic Drugs and Therapy** (3 crs.) Cross-listed as (BPS), PSY 436. Interaction of drug and non-drug therapy and of physiological and psychological origins of psychopathology. Intended for advanced undergraduate and graduate students interested in clinical psychology. (Lec. 3) Pre: any one of the following—BIO 101, 104B, 113, 121, PSY 381, or permission of instructor. Not for graduate credit.

**BPS 442 Pharmacogenetics and Pharmacogenomics** (3 crs.) Principles of how genetic and genomic factors contribute to individual variation in drug response and how these principles can be used to produce effective and safe drugs. (Lec. 3) Pre: BCH 311 and BPS 321.

**BPS 443 Formulation and Manufacturing Laboratory** (2 crs.) Provides general principles and hands-on experience in the preformulation, formulation, manufacturing, and quality control fields that are necessary in design, formulation, compounding and manufacturing of drug dosage forms. (Lab. 4) Pre: BPS 301 or 303 or 305.

**BPS 445 Natural Products and Biotechnological Drugs** (3 crs.) Natural drug products of biological or biotechnological origin. Sources, process of isolation or production, and general fundamental properties. (Lec. 3) Pre: CHM 228; MIC 201 or equivalent.

**BPS 450 Practical Tools for Molecular Sequence Analysis** (3 crs.) Cross-listed as (MIC), BPS 450. Introduction to practical ways to analyze DNA, protein and genome datasets. Students will be introduced to computing environments and publicly available software tools for analysis. (Lec. 2, Lab. 2) Pre: BCH 311 or BIO 352 (or BCH 352) or BIO 341 or permission of instructor. Not for graduate credit.

**BPS 451 Techniques in Medicinal Chemistry and Molecular Biology** (4 crs.) Provides students with an understanding of medicinal chemistry, molecular biology, and drug analysis techniques commonly used in pharmaceutical industry. The course combines laboratory exercises with easy-to-understand lectures. (Lec. 3, Lab. 4) Pre: BCH 311, BPS 313, and BPS 321.

**BPS 455 Protein Molecular Modeling for Biomedical Sciences** (3 crs.) Use of cutting edge computer software to explore the 3D-structure of proteins of biomedical interest. Independent application of course topics will be required: either a case study to teach existing knowledge or a research project to create new knowledge. (Lec. 1, Lab. 6) Pre: BCH 311 or equivalent with grade of B- or better, and CHM 227 (or 124) with grade of B- or better. Not for graduate credit.

**BPS 497 Special Problems** (1-5 crs.) Methods of carrying out a specific research project. Literature search, planning, laboratory work, writing an acceptable report. (Independent Study) Pre: permission of chairperson. Not for graduate credit.

**BPS 498 Special Problems** (1-5 crs.) Methods of carrying out a specific research project. Literature search, planning, laboratory work, writing an acceptable report. (Independent Study) Pre: permission of chairperson. Not for graduate credit.

**BPS 503 Pharmacokinetics and Pharmacodynamics for Scientists** (3 crs.) Presents the principles of pharmacokinetics and pharmacodynamics with specific emphasis on their application in pharmaceutical science. Pre: MTH 131.

**BPS 504 Pharmacokinetics II** (3 crs.) Applied pharmacokinetics, principles of clinical pharmacology, therapeutic drug monitoring and dose individualization. (Lec. 3) Pre: BPS 403, third-year Doctor of Pharmacy student in good standing; or permission of the instructor. Offered every fall semester.

**BPS 519 Self-Care II** (3 crs.) Cross-listed as (PHP), BPS 519. Expansion of nonprescription and complementary medicine therapeutics. Explore the implementation of pharmaceutical care programs in community pharmacy practice. (Lec. 3) Pre: PHP 418 (or BPS 418);

third-year Doctor of Pharmacy professional student.

**BPS 521 Cancer Chemotherapy and Toxicology** (3 crs.) Pharmacology and medicinal chemistry of oncology drugs. Principles of toxicology. (Lec. 3) Pre: third-year Doctor of Pharmacy student in good standing, or permission of the instructor.

**BPS 525 Experimental Techniques in Biomedical Sciences** (4 crs.) Provides experience with a variety of techniques used in biomedical science research, including HPLC, NMR, polarimetry, biotransformations, solid-phase synthesis, cell fractionation, and isolation and purification of proteins. (Lab. 4)

**BPS 526 Foundations of Human Disease VI: Hematology-Oncology** (2 crs.) The etiology, pathogenesis, symptomatology, and diagnosis of hematology and oncology diseases in people. Introduction to pharmacogenomics, gene-drug interactions, and genetic therapy in human disease. (Lec. 2) Pre: third-year Doctor of Pharmacy professional student standing. Taken concurrently with BPS 521 and PHP 513. Not for graduate credit.

**BPS 530 Drug Metabolism** (3 crs.) Mechanisms of Phase 1 (oxidation, reduction, hydrolysis) and Phase 2 (conjugations and synthesis) of drug metabolism. (Lec. 3) Pre: BCH 581 or permission of instructor. Offered every spring.

**BPS 533 Medicinal Plants** (3 crs.) Problems in drug plant chemotaxonomy with field work in the drug plant gardens. Emphasis is placed on certain alkaloid, glycoside and oil-yielding plants, weedicides and insecticides as related to measures for control. (Lec. 2, Lab. 3) Pre: third-year Doctor of Pharmacy student in good standing, or permission of the instructor.

**BPS 535 Pharmaceutical Biotechnology** (3 crs.) Introduction to pharmaceutical biotechnology, including drug design, DNA sequencing, cloning, recombinant proteins, monoclonal antibodies, and drug-screening techniques. (Lec. 3) Pre: BCH 581 or permission of instructor.

**BPS 536 Biotechnology Product Evaluation and Development** (3 crs.) Cross-listed as (MLS 571), BPS 536. The process through which candidate products produced using recombinant DNA technology are evaluated for safety and efficacy, including conductance of clinical trials, economic issues, and regulatory affairs. (Lec. 3/Online) Pre: graduate standing and permission of chairperson.

**BPS 540 Advanced Drug Delivery Systems** (3 crs.) The course will present the design and principles of advanced drug delivery systems, which have specified drug delivery profiles and significant advantages in therapeutics over conventional dosage forms. (Lec. 3) Pre: Students should have basic understanding of pharmaceutical formulations and physical chemistry before choosing this course.

**BPS 542 Bioinformatics I** (3-4 crs.) Cross-listed as (CSC), STA, MIC, BCH, CSC 522, BPS 542. Integrates computing, statistical, and biological sciences, algorithms, and data analysis/management. Multidisciplinary student research teams. Modeling dynamic biological processes. Extra project work for 4 credits. (Lec. 3, Project 3) Pre: major in a computing, statistical, or biological science or permission of instructor.

**BPS 544 Forensic Toxicology** (3 crs.) Theoretical and practical aspects of poisoning including the isolation and identification of toxic materials from pharmaceuticals, body fluids, and tissues. Isolation and identification of physiological fluids from stains, hairs, and tissue with application to forensic medicine. (Lec. 2, Lab. 3) Pre: permission of instructor.

**BPS 545 Applied Toxicology** (2 crs.) A two-credit lecture course dealing with cases of common toxic syndromes caused by drug overdose or exposure to environmental agents. Antidotes/patient decontamination measures will be surveyed. patient case studies will be discussed. (Lec. 2) Pre: BPS 322, 455, 521 or permission of instructor.

**BPS 546 Advanced Toxicology** (3 crs.) Toxic effects of selected drugs and other xenobiotics on physiological and biochemical processes. (Lec. 3) Pre: permission of instructor. Offered every third year.

**BPS 550 Practical Tools for Molecular Sequence Analysis** (3 crs.) Cross-listed as (MIC), BPS 550. Students will be introduced to practical ways to analyze DNA, protein and genome datasets. Students will be introduced to computing environments and publicly available software tools for analysis. Pre: BCH 311 or BIO/BCH 352 or BIO 341 or permission of instructor.

**BPS 551 Chemistry of Natural Products** (3 crs.) Introduction to chemistry of certain groups of natural products especially in relation to their chemotaxonomic position in plant classification. Topics limited to secondary metabolites; e.g., terpenoids, phenolic compounds, aromatic compounds, phytosterols, alkaloids. (Lec. 3) Pre: CHM 228 and CHM 230. In alternate years.

**BPS 552 Advanced Medicinal Chemistry** (3 crs.) Covers didactic topics of medicinal chemistry: Drug Discovery, Design, and Development; Drug-Receptor Interactions; Mechanisms of Enzyme Catalysis and Co-factors; Enzyme Inhibition and Inactivation; DNA Interactive Agents; Drug Metabolism; Prodrugs and Drug Delivery Systems. Pre: Introductory Organic Chemistry and permission of instructor.

**BPS 555 Protein Molecular Modeling for Biomedical Sciences** (3 crs.) Use of cutting edge computer software to study the 3D-structure of proteins of biomedical interest. Independent application of course topics will be required in the form of a research project to create new knowledge. (Lec. 2, Rec. 1) Pre: at least one course in biochemistry and one course in organic chemistry.

**BPS 560 Fundamentals of Cosmetic Science** (3 crs.) Study of the fundamentals of the function and behavior of skin, hair, and nails and their reactivity to cosmetic raw materials. Properties of cosmetic ingredients will also be addressed. (Lec. 3) Pre: permission of instructor.

**BPS 561 Basic Research in Cosmetic Science** (2 crs.) Laboratory exercises in the form of individual projects designed to provide an understanding of the basic properties and behavior of skin, hair, and nails. Assessment of cosmetic product performance and the basic properties of cosmetic ingredients. (Lab. 2) Pre: permission of instructor.

**BPS 562 Cosmetic Product Formulation Provides a basic understanding of cosmetic products, technology, and quality control; improves formulation skills with a particular emphasis on the application of new technological developments in cosmetic preparation.** (Lab. 2) Pre: permission of instructor.

**BPS 565 Pharmacokinetics** (3 crs.) The principles and application of clinical pharmacokinetics for advanced pharmacy students. Developing, modifying, and evaluating dosage regimens. (Lec. 3)

**BPS 572 Neural Bases of Drug Action** (3 crs.) Review of neuroanatomy, neurochemistry, and neurophysiology as they relate to drug action. (Lec. 3) Pre: BPS 446 or equivalent or permission of instructor. Offered every third year.

**BPS 587 General Pharmacology** (3 crs.) An introduction to principles of pharmacology and major drug categories, for graduate students and advanced undergraduate students in biological sciences. (Lec. 3) Pre: permission of instructor

**BPS 597 Special Problems** (1-3 crs.) Special graduate student project assignments in research under the supervision of faculty. (Independent Study) Pre: graduate standing. May be repeated for a maximum of 6 credits.

**BPS 598 Special Problems** (1-3 crs.) Special graduate student project assignments in research under the supervision of faculty. (Independent Study) Pre: graduate standing. May be repeated for a maximum of 6 credits.

**BPS 621 Manufacturing Pharmacy I Theory and practice in the manufacture of pharmaceuticals and the principles of operation of the equipment used for their production.** (Lec. 2) In alternate years.

**BPS 622 Manufacturing Pharmacy II** (3 crs.) Theories applied to the manufacture of pharmaceuticals with an emphasis on formulation considerations and principles of operation of equipment used for their production. (Lec. 3) Pre: BPS 621. In alternate years.

**BPS 623 Manufacturing Pharmacy Laboratory** (2 crs.) Practical application of the principles of all aspects of dose-form manufacture, including an emphasis on good manufacturing practices. (Lab.) Pre: credit or concurrent enrollment in 622.

**BPS 625 Advanced Physical Pharmacy** (4 crs.) Theory and application of physical chemical principles to problems in pharmaceutical research, with emphasis on methods by which properties of new medicinal agents are determined. (Lec. 4) Pre: permission of instructor.

**BPS 626 Advanced Physical Pharmacy Laboratory** (1 cr.) Laboratory exercises dealing with the physical-chemical principles used in the evaluation of pharmaceutical substances. (Lab. 4) Pre: permission of instructor.

**BPS 633 Biosynthesis** (3 crs.) Biogenesis of medicinally active principles of biological origin. Emphasis given to organic acids, polysaccharides, glycosides, steroids, and certain nitrogenous compounds. (Lec. 3) In alternate years.

**BPS 635 Pharmacognosy Techniques** (3-4 crs.) Physical and chemical factors influencing growth and development of active principles of drug plants. Certain biological analyses of results are performed. (Lec. 1, Lab. 6-9)

**BPS 636 Pharmacognosy Techniques** (3-4 crs.) Physical and chemical factors influencing growth and development of active principles of drug plants. Certain biological analyses of results are performed. (Lec. 1, Lab. 6-9)

**BPS 641 Biochemical Pharmacology** (3 crs.) Theory and application of pharmacological studies at the cellular and subcellular levels and their significance to drug action in the intact organism. (Lec. 2, Lab. 3) Pre: permission of instructor. Offered every third year.

**BPS 642 Biochemical Toxicology** (3 crs.) Cross-listed as (BPS), BCH 642. Biochemical and molecular aspects of chemically induced cell injury and chemical carcinogenesis. (Lec. 3) Pre: permission of instructor. Offered every third year.

**BPS 644 Cardiovascular Pharmacology** (3 crs.) Cellular mechanisms of drug action as a basis for understanding therapeutic effects. Emphasis on current developments in antihypertensive, antiarrhythmic, antianginal, and cardiotonic drug research. (Lec. 3) Pre: permission of instructor. Offered every third year.

**BPS 660 Industrial Project** (Pharmaceuticals) (3 crs.) A research project directed by the major professor on a topic in industrial pharmacy. A report must be submitted to the department faculty. The project will normally be conducted off campus. (Lab.) Pre: graduate standing in pharmaceuticals.

**BPS 670 Advanced Pharmacokinetics** (3 crs.) Application of classical compartmental and noncompartmental analyses to pharmacokinetics and pharmacodynamics emphasizing the use of PKPD analysis employed in the pharmaceutical industry. Pre: BPS 403 or permission of instructor. Graduate standing or in good standing in the P2-P4 years of the

Pharm.D. curriculum.

**BPS 691 Selected Topics in Medicinal Science** (3 crs.) Covers the following special research topics of interest: (a) heterocyclic chemistry, (b) nucleoside antibiotics, (c) prodrugs and isosteres, (d) nucleosides and nucleotides-synthesis and biological function, and (e) nucleic acid targeted drug design. (Lec. 3) Pre: permission of instructor. May be repeated for a maximum of 9 credits.

**BPS 697 Research in Biomedical and Pharmaceutical Sciences** (1-3 crs.) Literature survey, laboratory work, and a detailed research report on one or more assigned topics. (Independent Study)

**BPS 698 Research in Biomedical and Pharmaceutical Sciences** (1-3 crs.) Literature survey, laboratory work, and a detailed research report on one or more assigned topics. (Independent Study)

## BUS | Business

**BUS 110 Business Computing Applications** (3 crs.) Applications, concepts, and skills relevant to information technology in the context of the modern business environment. Topics include word processing, spreadsheet, presentation, and internet software. (Lec. 3/Online) Pre: open to students with a BU code or permission of the CBA dean's office.

**BUS 111 Introduction to Business Analysis and Applications** (3 crs.) Selected mathematical tools and techniques for analysis of business and economic problems and as aids in decision making. Topics from finite and modern mathematics and applied calculus. (Lec. 3) Pre: open to students with BU code or permission of instructor. Algebra proficiency test required. (MQ)

**BUS 140 Introduction To Business** (3 crs.) Nature, philosophy, objectives, and scope of the American business system. Emphasis on the interrelations of the functional areas. (Lec. 3) Not open to juniors and seniors in the College of Business Administration.

**BUS 201 Financial Accounting** (3 crs.) Basic concepts and systems used in financial accounting for business organizations. (Lec. 3) Open to students with more than 24 credits or permission of dean's office.

**BUS 201H Honors Section of BUS 201: Financial Accounting** (3 crs.) Honors Section of BUS 201: Financial Accounting. (Lec. 3) Pre: Must have a 3.30 overall GPA. Open only to students with more than 24 credits or permission of dean's office.

**BUS 202 Managerial Accounting** (3 crs.) Basic techniques and systems used by management accountants in budgeting, cost accounting, cost analysis, and control. (Lec. 3) Pre: BUS 201 or 201H or permission of instructor.

**BUS 210 Managerial Statistics I** (3 crs.) General statistical methods used in

the collection, presentation, analysis, and interpretation of statistical data. Includes frequency distribution, measures of central tendency and dispersion, probability theory, sampling distribution, central limit theorem, law of large numbers, estimation, and tests of hypothesis. Pre: BUS 111 or MTH 131 or MTH 141.

**BUS 211 Managerial Decision Support Systems** (3 crs.) Methodologies and information technologies that support decision making. Emphasis on the use of PC-based analytical software for solving managerial problems; case studies and group problem solving. (Lec. 3) Pre: BUS 110 and BUS 210.

**BUS 212 Managerial Statistics II** (3 crs.) Additional data analysis techniques, including tests of independence and goodness of fit, regression, correlation, analysis of variance, time series, and index numbers. (Lec. 3) Pre: BUS 210 or STA 308.

**BUS 301 Intermediate Accounting I** (3 crs.) Theoretical aspects of accounting principles and their application to preparation and analysis of corporate financial statements. Valuation, recognition and disclosure relative to current and long-term assets and liabilities. (Lec. 3) Pre: BUS 201 or 201H or permission of instructor. May be repeated once.

**BUS 302 Intermediate Accounting II** (3 crs.) Continuation of corporate financial reporting. Topics include stockholder's equity, earnings per share, revenue recognition, income taxes, pensions, leases, accounting changes, and statement of cash flows. (Lec. 3) Pre: BUS 301 with a grade of C or better and junior standing in a degree-granting college or permission of instructor.

**BUS 303 Cost Accounting** (3 crs.) Cost and managerial accounting systems and concepts including cost allocation, actual and standard cost systems, cost and profit planning, and control systems. (Lec. 3). Pre: BUS 202 and junior standing in a degree granting college or permission of instructor.

**BUS 310 Applications of Microcomputer Software in Business** (3 crs.) In-depth study of microcomputer software used in business applications. Emphasis on spreadsheets, data management, presentation graphics, and communication software. Student projects and microcomputer lab assignments required. (Lec. 3) Pre: BUS 110.

**BUS 315 Legal Environment of Business** (3 crs.) An introduction to the origins, framework, and concepts of the legal environment of business. Emphasis on the constitutional authority of government to regulate business, contracts, and their applications. (Lec. 3) Pre: junior standing in a degree-granting college.

**BUS 315H Honors Section of BUS 315: Legal Environment of Business** (3 crs.) Honors Section of BUS 315: Legal Environment of Business. (Lec. 3) Pre: junior standing in a degree-granting college and 3.30 or better overall GPA.

**BUS 316 Legal and Ethical Environment of Business II** (3 crs.) Operations of the U.S. system of jurisprudence and ethics as it affects the law of contracts, sales, debtor-creditor rights, and business organizations. (Lec. 3) Pre: BUS 315 and junior standing in a degree-granting college.

**BUS 317 International Business Communications Exchange** (3 crs.) Cross-listed as (BUS), COM 354. Examination of effective international business communication. Use of worldwide email network to exchange views on business topics with counterparts abroad. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

**BUS 320 Financial Management** (3 crs.) Study of the basic principles of finance and the applications of these principles. Topics include time value of money, risk and return, valuation, capital budgeting and other corporate financial decisions. (Lec. 3) Pre: ECN 201 or EEC 105, BUS 202, 210 or STA 308, and junior standing in a degree granting college.

**BUS 320H Honors Section of BUS 320: Financial Management** (3 crs.) Honors Section of BUS 320: Financial Management. (Lec. 3) Pre: Must have a 3.30 overall GPA. ECN 201 or EEC 105, BUS 202, 210 or STA 308, and junior standing in a degree-granting college.

**BUS 321 Security Analysis** (3 crs.) Exploration of investments in equity securities. Emphasis on the structure and functioning of securities markets, current investment theories, fundamental analysis, portfolio risk/return, and performance measurement. (Lec. 3) Pre: BUS 320 or 320H.

**BUS 322 Financial Institutions and Markets** (3 crs.) Comprehensive analysis of financial products and financial institutions as well as the markets in which they operate. Emphasis on the operational details of the institutions. (Lec. 3) Pre: ECN 201 or EEC 105, BUS 202, 210 or STA 308, and junior standing in a degree granting college.

**BUS 323 Fundamentals of Real Estate** (3 crs.) Analysis of real estate principles. An examination of land utilization, valuation, financing techniques, urban development, property rights, markets, and government regulation. (Lec. 3) Pre: ECN 201 or EEC 105, and junior standing in a degree granting college.

**BUS 335 Fundamentals of Risk Management and Insurance** (3 crs.) Basic course on risk management for corporations and individuals. Emphasis on risk identification, measurement, and management; homeowner insurance, basic life policies, commercial insurance and employee benefits. (Lec. 3) Pre: BUS 202 and 210 or STA 308.

**BUS 336 Commercial Property and Liability Insurance** (3 crs.) Analysis of commercial property and liability risk exposures and their related coverages. Coverage includes general property and liability insurance and specialized topics for marine, fidelity, surety,

and professional liability exposure. (Lec. 3) Pre: BUS 320 or 320H, and junior standing in a degree-granting college.

**BUS 337 Life Insurance** (3 crs.) Analysis of the many types of life insurance and health insurance contracts, computation of premiums and reserves, and contract interpretation. Included is an analysis of the uses of life insurance contracts. (Lec. 3) Note: This course is preparation for the Rhode Island state licensing examination in life and accident and health insurance and for Part I of the charter life underwriter examination. Pre: BUS 320 or 320H, and junior standing in a degree granting college.

**BUS 338 Social Insurance** (3 crs.) Analysis of the network of state and federal economic security programs including the OASDHI system, unemployment compensation, temporary disability programs, and the workers' compensation system. (Lec. 3) Pre: ECN 201 or EEC 105 and BUS 202, 320 or 320H, and junior standing in a degree granting college, or permission of instructor.

**BUS 340 Organization And Management Theory I** (3 crs.) Management processes, organizational theory and behavior, organizational structure, international business, ethics, and environmental analysis. Emphasis on developing conceptual and analytical skills. (Lec. 3) Pre: Junior standing in a degree granting college.

**BUS 341 Organizational Behavior** (3 crs.) Introduction to organizational behavior; theory of human relations in industry; individual and group dynamics as well as motivational theories applied to current business issues, international business, and technological changes. (Lec. 3/Online) Pre: Junior standing in a degree-granting college.

**BUS 341H Honors Section of BUS 341: Organizational Behavior** (3 crs.) Honors Section of BUS 341: Organizational Behaviors. (Lec. 3/Online) Pre: Must have a 3.30 overall gpa. Junior standing in a degree-granting college.

**BUS 342 Human Resources Management** (3 crs.) Role of the personnel department in an organization. Employer-employee problems at various internal levels and their impact on the organization and its environment. Covers such areas as manpower planning, the recruitment process, training, employee relations, pension planning, and occupational safety in the public and private sectors. Cases and lectures. (Lec. 3/Online) Pre: BUS 340 recommended, junior standing in a degree granting college.

**BUS 343 Skills Development In Organizational Behavior** (3 crs.) Developing the managerial skills and competencies of leadership, motivation, conflict resolution, and interpersonal relations through dynamic cases, experiential exercises, and personal development sessions. (Lec. 3) Pre: junior standing in a degree-granting college.

**BUS 344 Labor Problems** (3 crs.) Historical development of labor unions, changing composition of the labor force. Factors determining wage levels and employment in the firm and market. Analysis of mobility and occupational and regional wage differentials; the power of unions to raise wages; the role of investments in the human agent as a factor in economic growth. (Lec. 3) Pre: ECN 201 or EEC 105, or permission of instructor.

**BUS 345 Business in Society** (3 crs.) Examination of the contemporary social, political, cultural, legal and ethical forces that shape the business environment. Consideration of stakeholder relations and corporate social responsibility. (Lec. 3) Pre: junior standing in a degree-granting college.

**BUS 346 Women in Business and Management** (3 crs.) Analysis of sex-role behavior in the workplace. The history, current status, and future prospects of women and men in business and the organizational response to the changing work force. (Lec. 3) Pre: BUS 340 recommended. Not for graduate credit.

**BUS 355 Operations and Supply Chain Management** (3 crs.) Operations management problems in global and domestic environments. Operations strategy, service, and manufacturing; forecasting; inventory management; production and material requirements planning; scheduling; just-in-time; and quality management. (Lec. 3/Online) Pre: BUS 110 or CSC 101, BUS 210 or STA 308, and junior standing in a degree granting college or permission of instructor.

**BUS 356 Business Applications Programming** (3 crs.) Techniques for the development of business software applications using appropriate hardware platforms and software environments. Emphasis on creation and manipulation of data structures used in business systems. (Lec. 3) Pre: BUS 110 and junior standing in a degree granting college.

**BUS 357 Information Technology In Business Organizations** (3 crs.) An overview of existing and developing information technologies used in business organizations. Topics include computer hardware and software, business information systems, operating systems, data communications, and local- and wide-area networks. (Lec. 3) Pre: junior standing in a degree granting college.

**BUS 358 Business Data Communications And Networking** (3 crs.) Introduction to data communications and computer networks within the context of modern business organizations. Emphasis on current technologies and their impact on management information systems. (Lec. 3) Pre: Junior standing in a degree granting college.

**BUS 359 Management Systems Analysis** (3 crs.) Analysis, concepts, methods, and techniques used in the evaluation of business processes leading to the design strategies for developing management information systems. (Lec. 3) Pre: Junior standing in a degree granting college.

**BUS 360 Introduction to Logistics** (3 crs.) Provides the background to understanding the strategic possibilities and goals of logistics. Specifically addressing the design, operation, and control of logistics systems for firms. (Lec. 3) Pre: junior standing in a degree-granting college.

**BUS 361 International Transportation** (3 crs.) Background for understanding all critical issues in domestic and international transportation. Addresses regulations, key financial indicators, modes, carrier selection, transportation system management and design. (Lec. 3) Pre: Junior standing in a degree-granting college and BUS 355.

**BUS 362 Principles of Transportation** (3 crs.) Principles of transportation covering the role of transportation systems; modal components; managerial and economic aspects of the various modes, and analytical techniques to manage the transportation value chain. (Lec. 3) Pre: BUS 355.

**BUS 365 Marketing Principles** (3 crs.) An introduction to marketing from a managerial viewpoint. Examines social, economic, technological, legal, ethical, and other environmental factors and their impact on product, price, promotion, and distribution decisions in a worldwide market. (Lec. 3) Pre: junior standing in a degree-granting college. Proficiency test available if course was taken at a non-AACSB program prior to transfer to the University.

**BUS 366 Consumer Behavior** (3 crs.) A review of the consumer decision-making process and factors that influence consumers, including ethical issues. Implications for cross-cultural marketing are examined. (Lec. 3) Pre: BUS 365 or 365H or concurrent enrollment.

**BUS 367 Marketing Research** (3 crs.) Describes the nature and scope of marketing research activities. Reviews research designs, sampling, measurement, analysis, and other issues with focus on providing marketing information to management. (Lec. 3) Pre: BUS 210 or STA 308, BUS 211 and 365 or 365H.

**BUS 390 Junior Career Passport Program** (1 cr.) Exploration of career options. Develop personal and professional goals, and personal job searching tools. (Online) Pre: junior standing in the College of Business Administration.

**BUS 401 Accounting Computer Systems** (3 crs.) Accounting information systems and use of the computer for decision making; emphasis on sources of information and employment of analytical tools in solving accounting problems. (Lec. 3) Pre: BUS 301 or concurrent enrollment in 301, and junior standing in a degree granting college or permission of instructor.

**BUS 402 Advanced Accounting** (3 crs.) Accounting principles and policies for governmental and non-profit organizations, multinational and multidivisional organizations, partnerships, and other complex

organizational structures. (Lec. 3) Pre: BUS 302 or permission of instructor.

**BUS 402H Honors Section of BUS 402: Advanced Accounting** (3 crs.) Honors Section of BUS 402: Advanced Accounting (Lec. 3) Pre: BUS 302 or permission of instructor. Must have a 3.30 overall GPA.

**BUS 403 Federal Tax Accounting Federal laws, regulations, and other authorities affecting taxation of individuals.** (Lec. 3) Pre: BUS 202 and junior standing in a degree-granting college or permission of instructor.

**BUS 404 Auditing** (3 crs.) Auditing standards, procedures, programs, working papers, and internal control. (Lec. 3) Pre: BUS 302 or concurrent enrollment in 302 and senior standing in a degree-granting college, or permission of instructor.

**BUS 420 Advanced Financial Management** (3 crs.) Intensive research on selected current topics relating to the financial management of the firm. Extensive use of the case method. (Lec. 3) Pre: BUS 211, 320 or 320H or permission of instructor. Not for M.B.A. credit.

**BUS 421 Derivative Securities and Risk Management** (3 crs.) Advanced treatment of options, futures and other derivatives securities. Includes theoretical and normative valuation methods with applications to investment portfolios and corporate risk management. (Lec. 3) Pre: BUS 320 or 320H or permission of instructor.

**BUS 422 Student Investment Fund I** (3 crs.) Students analyze industries and companies and manage stocks owned by the Alumni Association. (Seminar) Pre: BUS 321. Not for graduate credit.

**BUS 423 Student Investment Fund II** (3 crs.) Students analyze industries and companies and manage stocks owned by the Alumni Association. (Seminar) Pre: BUS 321. Not for graduate credit.

**BUS 424 Fixed Income Security Analysis** (3 crs.) Pricing and institutional arrangements of fixed income securities such as corporate bonds, mortgage loans, and mortgage-backed securities; portfolio management of fixed income securities. (Lec. 3) Pre: BUS 320 or 320H, 321 and 322. Not for graduate credit.

**BUS 425 Mutual Funds Management** (3 crs.) Overview of mutual funds business. Portfolio management, risk management techniques, shareholder servicing, federal and state regulatory oversight, marketing and distribution, custody, technology, and societal issues. (Lec.3) Pre: BUS 320 or 320H, and 321, or permission of instructor.

**BUS 426 Bank Financial Management** (3 crs.) Nature of the financial decisions facing the management of an individual bank. Current bank financial practices, research, and appropriate banking models considered. (Lec. 3) Pre: BUS 320 or 320H, and 322, or

permission of instructor. Not for graduate credit for students in the College of Business Administration.

**BUS 427 Financial Theory and Policy Implications** (3 crs.) Examination of the determinants of long-run financial success of the firm. Includes a study of how the capital budgeting process is linked to capital structure management. (Lec. 3) Pre: BUS 320 or 320H. Not for M.B.A. credit.

**BUS 428 Multinational Finance** (3 crs.) Methods of financing multinational corporations. Foreign exchange, translation of financial statements, multinational funds flow and international liquidity, international financial reporting and tax policy, international money, stock, and bond markets. (Lec. 3) Pre: BUS 320 or 320H or permission of instructor. Not for M.B.A. credit.

**BUS 429 Global Investment Management** (3 crs.) Detailed analysis of the problems encountered in the process of investing funds in international capital markets. Particular attention is devoted to multi-currency dimensions, foreign information sources, and foreign regulations. (Lec. 3) Pre: BUS 320 or 320H, and BUS 321.

**BUS 430 Basic Managerial Economics** (3 crs.) Introduction to the classic theories of demand, production, and cost management in the context of modern financial theory. Includes empirical model building using microcomputers. (Lec. 3) Pre: BUS 320 or 320H. Not for graduate credit.

**BUS 435 Topics In Insurance** (3 crs.) Analysis of selected topics and current issues in the insurance marketplace. Topics will vary from semester to semester. (Seminar) Pre: BUS 320 or 320H, BUS 335, and BUS 337, or permission of instructor.

**BUS 441 Leadership Skills Development** (3 crs.) Application of organizational behavior concepts to develop leadership competencies and effective employee management programs. (Lec. 3) Pre: BUS 341 or 341H or permission of instructor.

**BUS 442 Organization and Management Theory** (3 crs.) Analysis of complex organizational situations emphasizing managerial problems dealing with structure, coordination, control, and integration. Conceptual skills for organizational analysis, including model and systems approaches. (Lec. 3) Pre: BUS 340 or permission of instructor.

**BUS 443 Organizational Design and Change** (3 crs.) Behavioral science applications to planning systematic organizational design, change and development using theory, concepts, technique, and cases for change agents and managers of change. (Lec. 3) Pre: BUS 341 or 341H, or permission of instructor.

**BUS 444 Labor Relations** (3 crs.) Public interest in labor relations and problems involved in collective bargaining. Major adjustments of public and private management to changes in labor policy of federal and

state governments, community, and labor unions. (Lec. 3/Online) Pre: BUS 342. Not for graduate credit.

**BUS 445 Strategic Management** (3 crs.) Case studies, simulation or company analysis used to study strategic theory and practice and problems of functional integration in domestic and global firms. (Lec. 3) Pre: BUS 202 and 320 or 320H and 341 or 341H and 355 and 365 or 365H and 315 or 345 (or concurrent enrollment in one of these classes), and senior standing in the College of Business Administration or permission of instructor. Not for graduate credit.

**BUS 445H Honors Section of BUS 445: Strategic Management.** (3 crs.) Honors Section of BUS 445: Strategic Management. (Lec. 3) Pre: Must have a 3.30 overall GPA and BUS 202, and 320 or 320H, and 341 or 341H, and 355, and 365 or 365H, and credit for or concurrent enrollment in BUS 315 or 345, and senior standing in the College of Business Administration or permission of instructor. Not for graduate credit.

**BUS 446 Advanced Management Seminar** (3 crs.) Integrated approach to problems in major areas of business management with emphasis on administrative and executive viewpoint. (Seminar) Pre: BUS 340.

**BUS 447 Compensation Administration** (3 crs.) Concepts, models, theories, and legislation related to the employee compensation process. Discussion and skill acquisition in job analysis, job evaluation, wage surveys, and performance appraisal. (Lec. 3) Pre: BUS 341 or 341H or permission of instructor. Not for graduate credit.

**BUS 448 International Dimensions of Business** (3 crs.) Introduction to the international aspects of business, including the cultural, legal, and political environment faced by the multinational corporation. (Lec. 3) Pre: senior standing or permission of dean. Not for M.B.A. credit.

**BUS 449 Entrepreneurship** (3 crs.) Procedures for starting one's own business including business plans, financial data analysis, legal issues, and assessing feasibility of business ideas. Also addresses evaluating career interests and skills in entrepreneurship. (Lec. 3) Pre: BUS 201 or 201H and senior standing in the College of Business Administration or permission of instructor; not open to students with credit in EEC 325.

**BUS 450 Small Business Management** (3 crs.) Investigation and evaluation of the small business enterprise. Current literature studied and projects completed to enable students to understand and appreciate the operations of small businesses. (Lec. 3) Pre: senior standing in the College of Business Administration or permission of instructor.

**BUS 455 Business Applications Programming II** (3 crs.) Intermediate concepts for developing software solutions to business applications using appropriate hardware platforms and software environments. (Lec.

3) Pre: BUS 202 and 320 and 340 or 341 and 355 and 365 and 315 or 315 concurrently and senior standing in the College of Business Administration. Not for graduate credit.

**BUS 456 Management of Databases** (3 crs.) Concepts and methods in management of data: creation, design, and implementation; data models; integrity; and security. Use of database management systems software. (Lec. 3) Pre: junior standing in a degree-granting college.

**BUS 457 Design For Management Information Systems** (3 crs.) Concepts, methods and techniques used in the design of management information systems. Field work required. (Lec. 3) Pre: BUS 359, BUS 456. Not for graduate credit.

**BUS 458 Seminar In Management Information Systems** (3 crs.) Preparation and presentation of papers on selected topics. (Seminar) Pre: Junior standing in a degree granting college. Not for M.B.A. credit.

**BUS 459 Management of Quality Control and Improvement** (3 crs.) Principles of quality management including control charts, process management, and other techniques, with emphasis on the effect of these principles on decision making in various organizations. (Lec. 3) Pre: BUS 110 and BUS 211 or BUS 212 or permission of instructor.

**BUS 460 Global Supply Chain Management** (3 crs.) Examines factors that impact on the design and management of global supply chains. Through simulations and cases explores impact of supply chain activities on a firm's strategies. (Lec. 3) Pre: BUS 355 or permission of instructor. Not for graduate credit.

**BUS 461 Forecasting** (3 crs.) Forecasting for advanced students in all areas of business administration. Introduction to time series analysis including decomposition of the multiplicative model, exponential smoothing, and ARIMA processes. A variety of software systems are employed, with special emphasis on microcomputer systems. (Lec. 3) Pre: BUS 110 and BUS 211 or BUS 212 or permission of instructor.

**BUS 462 Supply Chain Network Modeling and Optimization** (3 crs.) Factors and practices necessary for modeling/designing existing networks, and developing optimal networks using contemporary technologies. Modeling and optimization of global sourcing and distribution networks. (Lec. 3) Pre: BUS 355 and 360 and 460 or permission of instructor.

**BUS 463 Advanced Concepts in Supply Chain Management** (3 crs.) Advanced concepts in supply chain management and operations management such as demand management; multi-location inventories, capacity planning and control; theory of constraints. (Lec. 3) Pre: BUS 355 or permission of instructor.

**BUS 464 Supplier Relationship Management** (3 crs.) Comprehensive examination of



the management practices a firm deploys to develop effective relationships with suppliers of goods and services. (Lec. 3) Pre: BUS 355, 460 or permission of instructor.

**BUS 465 Marketing Communications** (3 crs.) The communications mix is explored in terms of a total promotional program. Characteristics of advertising media, sales promotion, public relations, and publicity are surveyed. (Lec. 3) Pre: BUS 365 or 365H or permission of instructor. Not for M.B.A. graduate credit.

**BUS 466 Product Innovation and Strategy** (3 crs.) Development and management of new and existing products and services from a decision-making perspective. Emphasis on value creation through the development of innovative products and services. (Lec. 3) Pre: BUS 365 or 365H. Not for MBA graduate credit.

**BUS 467 Customer Relationship Management** (3 crs.) Planning, organization, and control relationship activities, including sales techniques and strategies, development and management of sales organizations and distribution channels, and emerging technologies. (Lec. 3) Pre: BUS 365 or 365H. Not for M.B.A. graduate credit.

**BUS 468 Global Marketing** (3 crs.) Focus on understanding how cultural, political, economic, legal and other macro factors affect market strategies. Application of these factors in dealing with planning and organizing for global marketing operations. (Lec. 3) Pre: BUS 365 or 365H or equivalent. Not for M.B.A. graduate credit.

**BUS 469 Special Topics In Marketing** (3 crs.) Selected topics of current interest in marketing. (Lec. 3) Pre: BUS 365 or 365H. Not for M.B.A. graduate credit.

**BUS 470 Strategic Marketing Management** (3 crs.) Summary course focusing on the variety decisions involved in marketing including developing and managing branded goods and services. (Seminar) Pre: BUS 365 or 365H, and 366, and 367, and either BUS 465 or 467 or 468. Not for graduate credit.

**BUS 491 Directed Study** (1-3 crs.) Independent study supervised by college faculty. Seminar meetings concerned with specific business topics. (Independent Study) Pre: must be a student in the College of Business with more than 75 credits and permission of instructor. Not for graduate credit.

**BUS 492 Directed Study** (1-3 crs.) Independent study supervised by college faculty. Seminar meetings concerned with specific business topics. (Independent Study) Pre: must be a student in the College of Business with more than 75 credits and permission of instructor. Not for graduate credit.

**BUS 493 Internship In Business Administration PRA** (3 or 6 crs.) Approved, supervised work experience with participation in management and problem solving related to the student's major field. College of Business

internships for 3 credits require approximately 120 hours of field experience and 20 hours of class work. Internships for 6 credits require approximately double this amount of work. May be offered online. (Practicum/Online) Pre: junior standing with 75 credits, admission into internship program, and permission of instructor. Limited to 6 credits. Not for graduate credit. S/U only.

**BUS 601 Practicum In Business Teaching PRA** (1 cr.) Course involves training and experience in teaching undergraduate business courses under the supervision of a full-time faculty member. Participation in the instructional development program is an essential component of the class. (Practicum) Pre: enrollment in Ph.D. program in business administration and permission of Ph.D. program director. S/U only. May be repeated.

**BUS 602 Doctoral Colloquium in Business Research** (1 cr.) Course involves presenting the results of at least one piece of original research to faculty and other Ph.D. candidates. When not presenting, students are expected to play an active role in critiquing the presented research. (Lec. 1) Pre: permission of Ph.D. program director. S/U only. May be repeated.

**BUS 603 Special Problems in Business Research** (1-6 crs.) Advanced research and writing of theoretical and empirical papers in business administration in the student's area of specialization under the supervision of a faculty advisor. All doctoral students in Phase II of the doctoral program in business administration who have completed their course work must register for this course. Pre: permission of Ph.D. Program Director. S/U only. May be repeated.

**BUS 604 Doctoral Research Seminar** (3 crs.) Provides a rigorous analysis of current research questions and research techniques used to address those questions in the finance discipline. Recent developments and current issues addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**BUS 605 Organizational Behavior** (3 crs.) Incorporates the insights gleaned from the disciplines of psychology, sociology, anthropology, and the social sciences of politics, economics, and history in the study of the behavior of organizations and of their principal actors. (Lec. 3) Pre: MBA 502 or permission of instructor.

**BUS 606 Advanced Organizational Theory and Behavior** (3 crs.) Previous knowledge of classical and traditional management thought used to provide concepts, analytical approaches, and skills for understanding how behavioral sciences influence complex organizational systems. (Lec. 3) Pre: BUS 605.

**BUS 607 Doctoral Research Seminar** (3 crs.) Provides a rigorous analysis of current research questions and research techniques used to address those questions in the management discipline. Recent developments and current issues addressed. (Seminar) Pre:

enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**BUS 608 Doctoral Research Seminar** Provides a rigorous analysis of current research questions and the research techniques used to address those questions pertinent to Management Information Systems. Recent developments and current issues are addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**BUS 609 Doctoral Research Seminar** (3 crs.) Provides a rigorous analysis of current research questions and the research techniques used to address those questions in the management science discipline. Recent developments and current issues addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**BUS 610 Seminar In Marketing** (3 crs.) Preparation and presentation of papers on selected topics in marketing. (Seminar) Pre: MBA 505 or permission of instructor. May be repeated.

**BUS 611 Doctoral Research Seminar** (3 crs.) Provides a rigorous analysis of current research questions and research techniques used to address those questions in the marketing discipline. Recent developments and current issues addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**BUS 612 Knowledge Systems In Managerial Disciplines** (3 crs.) Examination of knowledge production and dissemination systems in management disciplines. Discussion of various paradigms and philosophy of science perspectives. Metascientific and research program issues are examined. (Seminar) Pre: Ph.D. candidate.

**BUS 691 Directed Study in Business** (3 crs.) Advanced doctoral level work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**BUS 692 Directed Study in Business** (3 crs.) Advanced doctoral level work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**BUS 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: enrollment in Phase III of the Ph.D. program in business administration. S/U credit. May be repeated.

## CHE | Chemical Engineering

**CHE 212 Chemical Process Calculations** (3 crs.) Orientation to chemical and biological engineering, material and energy

balance computations on chemical processes, use of gas laws, vapor pressure, humidity, solubility, and crystallization. (Lec. 3) Pre: CHM 112 or 192 or permission of instructor.

**CHE 272 Introduction To Chemical Engineering Calculations** (3 crs.) Introduction to the use of computers and numerical methods, including numerical solution of differential equations as applied to chemical and biological engineering. (Lec. 3) Pre: CHE 212 and credit or concurrent enrollment in MTH 243 or permission of instructor.

**CHE 313 Chemical Engineering Thermodynamics I** (3 crs.) Applications of the first, second, and third laws of thermodynamics involving thermophysics, thermochemistry, energy balances, combustion, power cycles, refrigeration and properties of pure fluids. (Lec. 2, Lab. 3) Pre: CHE 212 or CHM 431 and MTH 243 or concurrent enrollment in MTH 243, or permission of instructor.

**CHE 314 Chemical Engineering Thermodynamics II** (3 crs.) Continuation of CHE 313 with applications to thermodynamics of mixtures, phase and chemical equilibria. (Lec. 2, Lab. 3) Pre: CHE 313 or permission of instructor.

**CHE 322 Chemical Engineering Micro-laboratory** (2 crs.) Use of microprocessors, A/D and D/A converters, sensors, and control hardware to analyze and control laboratory-scale processes. (Lab. 6) Pre: credit or concurrent enrollment in 348.

**CHE 328 Industrial Plants** (1 cr.) Field trips to nearby plants demonstrating various phases of chemical engineering. Written reports are required. (Lab. 3) Pre: CHE 348 or permission of instructor.

**CHE 332 Physical Metallurgy** (3 crs.) Fundamentals of physical metallurgy as they apply particularly to the engineering metals and their alloys. Properties, characteristics, and structure of metals, theory of alloys, thermal processing, and studies in corrosion. (Lec. 2, Lab. 3) Not open to students with credit in CHE 333. Pre: CHM 101, 103, or 191, or permission of instructor.

**CHE 333 Engineering Materials** (3 crs.) First course in engineering materials devoted largely, but not exclusively, to physical metallurgy. Includes structure and properties of pure substances and binary systems at equilibrium and, when used intentionally, at nonequilibrium. (Lec. 2, Lab. 3) Pre: junior standing or permission of instructor. Not open to students with credit in CHE 332.

**CHE 345 Chemical Engineering Laboratory** (2 crs.) Quantitative studies illustrating chemical engineering principles. Emphasis on report writing and the interpretation of experimental data. (Lab. 6) Pre: CHE 348 or permission of instructor.

**CHE 346 Chemical Engineering Laboratory** (2 crs.) Quantitative studies illustrating chemical engineering principles. Emphasis on report writing and the interpretation of experimental data. (Lab. 6) Pre: CHE 348 or

permission of instructor.

**CHE 347 Transfer Operations I** (3 crs.) Dimensional analysis; fluid statics; mass, energy, and momentum balances for fluid systems, boundary layers, turbulence, incompressible flow; flow through fixed beds of solids and fluidized beds; filtration. (Lec. 3) Pre: MTH 243 or permission of instructor.

**CHE 348 Transfer Operations II** (3 crs.) Heat and mass transfer: conduction, convection, radiation, diffusion, transport analogies and equipment design. Biological applications and some separations are covered. (Lec. 2, Lab. 3) Pre: CHE 347 or permission of instructor.

**CHE 349 Transfer Operations III** (3 crs.) Theory, design and application of separation processes with a focus on stage operations; distillation, extraction, and adsorption. Integrated processes and new technologies will be examined. (Lec. 2) Pre: CHE 348 or permission of instructor.

**CHE 351 Plant Design and Economics I** (3 crs.) Elements of plant and process design integrating the principles learned in previous courses. Emphasis is on optimum economic design and the writing of reports. (Lec. 1, Lab. 6) Pre: CHE 314 and CHE 348 or permission of instructor.

**CHE 352 Plant Design and Economics II** (3 crs.) Elements of plant and process design integrating the principles learned in previous courses. Emphasis is on optimum economic design and the writing of reports. (Lec. 1, Lab. 6) Pre: CHE 349 and 351, and credit for or concurrent enrollment in CHE 464 or permission of instructor.

**CHE 425 Process Dynamics and Control** (3 crs.) Principles involved in automatic control of processing plants. Modeling and responses of dynamic systems, feedback control. (Lec. 3) Pre: MTH 243, CHE 464, and credit or concurrent enrollment in CHE 347 or MCE 354 or permission of instructor. Not for graduate credit.

**CHE 438 Failure Analysis and Prevention** (3 crs.) Failure analysis of engineering components. Examples of overload, fatigue, creep, corrosion, and electrical failures in metals, glasses, ceramics, composites, polymers, concrete, and semiconductors. Case studies, microscopic techniques, and prevention are emphasized. (Lec. 3) Pre: CHE 332 or 333.

**CHE 464 Chemical Kinetics and Reactor Design** (3 crs.) Mole balances in batch and continuous chemical reactors; reaction rate fundamentals; isothermal and non-isothermal chemical reactors. (Lec. 3) Pre: CHE 313 or permission of instructor. Not for graduate credit.

**CHE 471 Nuclear Reactor Engineering** (3 crs.) Cross-listed as (MCE), CHE 471. Energy production from nuclear reactions, cross sections, number density, and binding energy. Fission process, neutron life cycle, criticality, neutron diffusion, reactor design, reactor

kinetics and control, reactivity feedback, nuclear system design. (Lec. 3) Pre: MTH 244 and MCE 341 or CHE 313, or permission of instructor.

**CHE 472 Power Plant System Design and Safety Analysis** (3 crs.) Cross-listed as (MCE), CHE 472. Energy production, power systems, energy conversion system design, safety engineering and design, phenomenological modeling and analysis, probabilistic risk assessment, risk-informed design, advanced power plant systems design. (Lec. 3) Pre: MCE 341 or CHE 313 or permission of instructor.

**CHE 473 Nuclear Fuel Cycle and Performance** (3 crs.) Cross-listed as (CHE), MCE 473. Analysis and design of stages of the nuclear fuel cycle including mining, milling, conversion, enrichment, fuel fabrication, fuel burn-up, spent fuel interim storage, reprocessing, safety and aspects of high level waste. (Lec. 3/Online) Pre: MTH 244 and MCE 341 or CHE 313, or permission of instructor.

**CHE 474 Nuclear Reactor Thermal-Hydraulics** (3 crs.) Cross-listed as (CHE), MCE 474. Analysis and design of stages of the nuclear fuel cycle including mining, milling, conversion, enrichment, fuel fabrication, fuel burn-up, spent fuel interim storage, reprocessing, and aspects of high level waste. (Lec. 3) Pre: (MTH 244 and (MCE 341 or CHE 313)), or permission of instructor. Not for graduate credit.

**CHE 476 Mechanics of Materials in Nuclear Applications** (3 crs.) Cross-listed as (MCE), CHE 476. Nuclear systems, material microstructure and mechanical properties, high temperature deformation mechanisms, radiation effects, reactor materials, materials selection for primary and secondary cycles. (Lec. 3) Pre: (CVE 220 and (CHE 332 or 333)), or permission of instructor.

**CHE 491 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits, of which a total of 6 credits can be applied to professional electives. Not for graduate credit in chemical engineering.

**CHE 492 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits, of which a total of 6 credits can be applied to professional electives. Not for graduate credit in chemical engineering.

**CHE 501 Graduate Seminar** (1 cr.) Seminars presented by speakers from academia and industry. (Seminar) Required of all graduate students, with a maximum of 1 credit per year allowed. May be repeated for a maximum of 2 credits. S/U credit.

**CHE 502 Graduate Seminar** (1 cr.) Seminars presented by speakers from academia

and industry. (Seminar) Required of all graduate students, with a maximum of 1 credit per year allowed. May be repeated for a maximum of 2 credits. S/U credit.

**CHE 503 Dynamics of Chemical Engineering Applications** (3 crs.) Emphasizes analytical and/or numerical techniques commonly used in analysis arising from classical chemical engineering applications; necessary for understanding more complex problems.

**CHE 513 Advanced Chemical Engineering Thermodynamics I** (3 crs.) Applications of the first, second, and third laws of thermodynamics and their relation to chemical engineering processes. Emphasis on properties of fluids, chemical and physical equilibria, phase stability, and polymers. (Lec. 3) Pre: CHE graduate standing, or CHE 313 and CHE 314 or their equivalent, or permission of instructor. In alternate years.

**CHE 529 Polymer Experimental Methods** (3 crs.) Theory and practice of experimental methods used to characterize and process polymer systems. Characterizations include chemical, thermal, and mechanical analysis. Lectures discuss methods beyond those applied in lab. (Lec. 2, Lab. 2) Pre: permission of instructor.

**CHE 530 Polymer Chemistry** (3 crs.) Molecular weight distribution, polymer synthesis, chain conformation, solution properties and phase behavior, and characterization techniques. (Lec. 3) Pre: CHM 228 and CHE 332 or permission of instructor. In alternate years.

**CHE 531 Polymer Engineering** (3 crs.) Glass and crystalline transitions, viscoelasticity, time-temperature superposition, polymer processing, and mechanical properties of plastics, fibers, and elastomers. (Lec. 3) Pre: CHE 348 or MCE 448 or permission of instructor. In alternate years.

**CHE 532 Ceramic Engineering** (3 crs.) Properties of ceramic materials as related to starting materials and forming, densification, and finishing processes. Emphasis on resulting phases and microstructure. Application of physical and chemical principles to tailor properties to engineering needs. (Lec. 3) In alternate years.

**CHE 534 Corrosion and Corrosion Control** (3 crs.) Cross-listed as (CHE), OCE 534. Chemical nature of metals, electrochemical nature of corrosion. Types of corrosion, influence of environment, methods of corrosion control. Behavior of engineering materials in corrosion with emphasis on industrial and ocean environments. (Lec. 3) Pre: permission of instructor.

**CHE 537 Advanced Materials Engineering** (3 crs.) Engineering properties, molecular design, and applications of materials. Synthesis, fabrication, and processing of materials. Effects of environment on materials, materials products, devices, and systems. (Lec. 3) Pre: 437 and PHY 341.

**CHE 539 Electron and Light Microscopy**

**of Solids** (3 crs.) Theory and physical principles governing the design and use of light and electron optical systems in identification, analysis, and structural characterization of metals, ceramics, polymers, glasses, and composites. Emphasis on polarized light and scanning electron microscopy. (Lec. 3)

**CHE 541 Transport Phenomena I** (3 crs.) Analysis of transport processes including momentum, heat and mass transfer. Development of mathematical models and their solutions. (Lec. 3) Pre: CHE graduate standing, or CHE 347 and CHE 348 or their equivalent, or permission of instructor. In alternate years.

**CHE 542 Advances in Interfacial Phenomena** (3 crs.) Topics will include capillarity, surface tension; surface thermodynamics, electrical aspects of surface chemistry; contact angles and wettability; emulsions and foams; adsorption from solutions; hydrodynamic stability of interfaces. (Lec. 3) Pre: CHM 431, 432 or equivalent, or permission of instructor. In alternate years.

**CHE 548 Separations For Biotechnology** (3 crs.) A study of methods of concentration used in the biotechnology and pharmaceutical industries for production and isolation of products. (Lec. 3) Pre: CHE 348 or CHE 447. In alternate years.

**CHE 550 Bionanotechnology** (3 crs.) Principles and applications of bionanotechnology. Intermolecular forces, self-assembly, biomolecular structure, biological processes, molecular manufacturing, and surface functionalization for designing biodevices and nanomaterials. Overview of current and emerging technologies, safety and ethics. (Lec. 3) Pre: graduate standing or permission of instructor.

**CHE 560 Fabrication Engineering at the Micro and Nanoscale** (3 crs.) Chemical and physical processes used in the fabrication of microscale and nanoscale devices including MEMS. Particular emphasis on crystal growth, oxidation, CVD, PVD, plasma processing, lithography, diffusion, metallization and packaging. (Lec. 3) Pre: CHM 431, CHE 349, or equivalent. In alternate years.

**CHE 564 Reaction Engineering** (3 crs.) Homogeneous and heterogeneous reactions in reactor models. Kinetics of multiple reactions industrial reactor analysis. Mechanistic models of catalytic reactors. Mathematical methods for calculation of reactor performance. (Lec. 3) Pre: CHE graduate standing or permission of instructor.

**CHE 574 Biochemical Engineering I** (3 crs.) Application of chemical engineering principles to topics in bioprocessing and biotechnology, such as enzyme and cell-growth kinetics, enzyme and cell immobilization, bioreactors, medium sterilization. (Lec. 3) Pre: permission of instructor.

**CHE 576 Process Engineering for Pollution Prevention** (3 crs.) Management of processes and development of techniques

for waste minimization in the chemical process, machine tool coating, plating, plastics, and other industries. (Lec./Workshop) Pre: permission of instructor.

**CHE 578 Seminar In Sensors And Surface Technology** (1 cr.) Students, faculty, and invited outside speakers present and discuss selected topics related to research interests of the Sensors and Surface Technology Partnership. (Seminar) Pre: permission of instructor. May be repeated. S/U only.

**CHE 591 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**CHE 592 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**CHE 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each semester in consultation with the major professor. (Independent Study) S/U credit.

**CHE 614 Advanced Chemical Engineering Thermodynamics II** (3 crs.) Advanced topics in phase stability, phase and chemical equilibrium, and statistical thermodynamics. (Lec. 3) Pre: CHE 513. In alternate years.

**CHE 641 Transport Phenomena II** (3 crs.) Steady, unsteady, and multidimensional heat transfer. Mass transport at low and high fluxes; approximate methods for heat and mass transfer problems. (Lec. 3) Pre: CHE 541 or permission of instructor. In alternate years.

**CHE 691 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**CHE 692 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**CHE 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## CHM | Chemistry

**CHM 099 Basic Chemistry Lecture** Part one of a two-semester 101 sequence designed for students who need additional work in problem-solving skills. Successful completion of part one leads to a special section of 101 in the second semester. (Lec. 3) Not for general education or program credit. S/U credit.

**CHM 100 Chemistry of Our Environment** (3 crs.) Elementary chemistry for nonscience majors, emphasizing chemical aspects of the human environment. Chemistry of the biosphere, pollution, and aspects of industrial chemistry. (Lec. 3) (N)

**CHM 101 General Chemistry Lecture I** (3 crs.) Fundamental chemical concepts and principles. Topics include states of matter, stoichiometry, reactivity, atomic structure, thermochemistry, bonding, molecular structure and solutions. Not open to students with credit in CHM 103 or CHM 191. (N)

**CHM 102 Laboratory for Chemistry 101** (1 cr.) Experimental applications of chemical concepts and reactivity emphasizing safety and technique. Experiments follow the content of CHM 101. Pre: credit or concurrent enrollment in CHM 101.

**CHM 103 Introductory Chemistry Lecture** (3 crs.) One-semester general chemistry course designed for students whose curriculums require the one-semester organic chemistry course, CHM 124. (Lec. 3) Not open to students with credit in CHM 101 or CHM 191. (N)

**CHM 105 Laboratory for Chemistry 103** (1 cr.) Fits course content of CHM 103. (Lab. 3) Pre: credit or concurrent enrollment in CHM 103.

**CHM 112 General Chemistry Lecture II** (3 crs.) Chemical kinetics, equilibrium, elementary thermodynamics and electrochemistry integrated with descriptive chemistry and practical applications. Pre: CHM 101 with a grade of C- or better. (N)

**CHM 114 Laboratory for Chemistry 112** (1 cr.) Experiments follow the content of CHM 112. (Lab. 2) Pre: CHM 102 and credit or concurrent enrollment in CHM 112.

**CHM 124 Introduction To Organic Chemistry** (3 crs.) Elementary principles of organic chemistry with emphasis on aliphatic compounds, especially those of physiological significance such as amino acids and proteins, carbohydrates, fats, and waxes. (Lec. 3) Pre: CHM 101 with a grade of C- or better or CHM 103 with a grade of C- or better. Not open to chemistry or chemical engineering majors.

**CHM 126 Laboratory for Chemistry 124** (1 cr.) Introduction to chemistry procedures, with emphasis on properties of substances of physiological significance. (Lab. 3) Pre: CHM 102 or CHM 105, and credit for or concurrent enrollment in CHM 124. Not for chemistry or chemical engineering majors.

**CHM 191 General Chemistry** (5 crs.) Atomic theory and structure, stoichiometry, chemical reactions, thermo-chemistry, bonding and states of matter. Laboratory experiments illustrate basic procedures, concepts, and principles. (Lec. 4, Lab. 3) Pre: Chemistry major. Not open to students with credit in CHM 101.

**CHM 192 General Chemistry** (5 crs.) Continuation of 191. Principles of kinetics, equilibrium, and thermodynamic integrated with descriptive chemistry and qualitative analysis. Laboratory experiments parallel lecture topics. (Lec. 4, Lab. 3) Pre: chemistry major, CHM 101 and 102 with grade of C- or better, or CHM 191 with grade of C- or better. Not open to students with credits in CHM 112.

**CHM 212 Quantitative Analysis** (4 crs.) Principles of gravimetric and volumetric analysis with detailed attention to solution of stoichiometric problems. Laboratory analysis of representative substances by gravimetric or volumetric procedures. (Lec. 3, Lab. 3) Pre: CHM 112 and 114 with grade of C- or better or CHM 192 with grade of C- or better.

**CHM 226 Organic Chemistry Laboratory** (2 crs.) Common techniques and typical preparative methods in both aliphatic and aromatic series. (Lab. 6) Pre: CHM 114 and credit or concurrent enrollment in CHM 228. Not open to students with credit in CHM 229 or 230.

**CHM 226H Honors Section of CHM 226-Organic Chemistry Laboratory** (2 crs.) Honors Section of CHM 226: Organic Chemistry Laboratory. (Lab. 6) Pre: CHM 114, credit or concurrent enrollment in CHM 228H, and 3.30 overall GPA. Not open to students with credit in CHM 229 or 230.

**CHM 227 Organic Chemistry Lecture I** (3 crs.) General principles and theories with emphasis on classification, nomenclature, methods of preparation, and characteristic reactions of organic compounds in aliphatic series. (Lec. 3) Pre: CHM 112 with grade of C- or better or CHM 192 with grade of C- or better.

**CHM 227H Honors Section of CHM 227: Organic Chemistry Lecture I** (3 crs.) Honors Section of CHM 227: Organic Chemistry Lecture I (Lec. 3) Pre: CHM 112 with a grade of C- or better, or CHM 192 with a grade of C- or better, and 3.30 overall GPA.

**CHM 228 Organic Chemistry Lecture II** (3 crs.) Continuation of 227 with emphasis on the aromatic series. (Lec. 3) Pre: CHM 227 with a grade of C- or better.

**CHM 228H Honors Section of CHM 228: Organic CHM Lecture II** (3 crs.) Honors Section of CHM 228: Organic Chemistry Lecture II. Pre: CHM 227 with a grade of C- or better and 3.30 overall GPA.

**CHM 229 Organic Chemistry Laboratory I** (1 cr.) Common techniques and typical preparative methods in aliphatic series. (Lab. 3) Pre: credit or concurrent enrollment in 227.

**CHM 230 Organic Chemistry Laboratory II** (1 cr.) Continuation of CHM 229 with emphasis on the aromatic series. (Lab. 3) Pre: CHM 229 or equivalent and credit or concurrent enrollment in CHM 228. Only for students requiring a second credit of organic laboratory.

**CHM 291 Organic Chemistry** (3 crs.) Development of principles and theory through an examination of structure, nomenclature, and reactions of organic compounds. (Lec. 3) Pre: CHM 192 with grade of C- or better, and chemistry major. Not open to students with credit in CHM 227.

**CHM 292 Organic Chemistry** (5 crs.) Continuation of CHM 291 with extension to several additional families of compounds. (Lec. 3, Lab. 6) Pre: CHM 291 with grade of C- or better, and chemistry major. Not open to students with credit in CHM 228.

**CHM 335 Physical Chemistry Laboratory** (2 crs.) Physical chemical properties of gases, liquids, and solutions; electrochemical cells; phase diagrams of binary and ternary systems; and chemical kinetics. Designed for chemistry majors. (Lab. 4) Pre: 431. May be taken concurrently with CHM 431.

**CHM 353 Undergraduate Research** (1-12 crs.) Methods of approach to a research problem. Literature, laboratory work, and a report of an original problem or problems. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**CHM 354 Undergraduate Research in Forensic Chemistry** (1-12 crs.) Methods of approach to a research problem in forensic chemistry. Literature, laboratory work, and a report of an original problem or problems. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**CHM 391 Forensic Science Overview** (1 cr.) A seminar/discussion group designed to introduce students to the areas and issues in Forensic Science. Students seeking a forensic science minor should attend this weekly seminar two semesters. (Lec. 1) May be repeated for a total of 3 credits.

**CHM 392 Introduction to Criminalistics** (3 crs.) Cross-listed as (CHM), FOS 392. A class designed to introduce students to the basic areas and issues in forensic science in criminalistics. It is required for students seeking a forensic science minor. May not be repeated for credit. May not be taken in the same semester as CHM 391. (Lec. 3)

**CHM 401 Intermediate Inorganic Chemistry** (3 crs.) Principles of inorganic chemistry broadly related to structure and reactivity. Many-electron atoms bonding theories, acid-base concepts, coordination chemistry, reaction mechanisms. (Lec. 3) Pre: CHM 432.

**CHM 402 Physical Inorganic Laboratory** (2 crs.) Synthesis of inorganic compounds emphasizing inert atmosphere and vacuum line techniques; characterization by spectroscopic and electrochemical techniques. (Lab. 6) Pre: CHM 401.

**CHM 412 Instrumental Methods of Analysis** (3 crs.) Theory and application of optical and electrical instruments to solution of chemical problems: flame photometry, emission spectroscopy, ultraviolet, visible,

and infrared spectrophotometry, colorimetry, turbidimetry, nephelometry, fluorometry, potentiometry, voltametric titration methods. (Lec. 3) Pre: 228 and credit or concurrent enrollment in 432.

**CHM 414 Instrumental Methods of Analysis Laboratory** (2 crs.) Applications of instrumental methods to the solution of problems in analytical chemistry. (Lab. 6) Pre: credit or concurrent enrollment in 412.

**CHM 425 Qualitative Organic Analysis** (2 crs.) Techniques in organic chemical research, including handling air sensitive chemicals, flash chromatography, and instrumental methods of structure determination. Separation of mixtures and identification of components by infrared and nuclear magnetic resonance spectroscopies. (Lab. 6) Pre: CHM 292 or 226 and 228 and credit or concurrent enrollment in CHM 427.

**CHM 427 Intermediate Organic Chemistry** (3 crs.) Intermediate organic chemistry with emphasis on organic reaction mechanism, stereochemistry, spectroscopic characterization, and newer synthetic methods. (Lec. 3) Pre: CHM 226 and 228 with a grade of C- or better, or CHM 292 with a grade of C- or better.

**CHM 431 Physical Chemistry I** (3 crs.) Gas laws, laws of thermodynamics, chemical equilibrium, phase equilibria, and electrochemistry. (Lec. 3) Pre: CHM 112 and 114 with a grade of C- or better, or CHM 192 with a grade of C- or better, and PHY 112 or PHY 204. May be taken for graduate credit by graduate students whose undergraduate programs do not require physical chemistry.

**CHM 432 Physical Chemistry II** (3 crs.) Atomic theory, quantum chemistry, bonding, molecular interactions, chemical kinetics, kinetic theory, and spectroscopy. (Lec. 3) Pre: CHM 431 with a grade of C- or better. May be taken for graduate credit by graduate students whose undergraduate programs do not require physical chemistry.

**CHM 441 The Chemistry of Biological Systems** (3 crs.) Chemical biology, molecular aspects of biological structures, equilibria, energetics, reactions, and metabolism. (Lec. 3) Pre: CHM 228, 432.

**CHM 492 Seminar In Chemistry** (1 cr.) Preparation and presentation of papers on selected topics in chemistry. Required of seniors in chemistry. (Seminar) Pre: credit or concurrent enrollment in CHM 432. Not for graduate credit.

**CHM 500 Chemical Safety and Research Ethics** (1 cr.) This course will equip first-year graduate students with the necessary hygiene and safety skills, and ethical standards for performing chemical research. Essential skills for success as a professional scientist. (Lec. 1) Pre: Graduate standing or permission of instructor.

**CHM 501 Advanced Inorganic Chemistry I** (3 crs.) Systematic analysis of bonding

schemes and structural aspects of molecular systems encountered in inorganic chemistry. Special emphasis on electron density distributions, physical methods of analysis, and practical applications of quantum mechanics. (Lec. 3) Pre: CHM 401.

**CHM 502 Advanced Inorganic Chemistry II** (3 crs.) Modern inorganic chemistry approached from experimental, theoretical, and descriptive points of view. Includes electronic structure and bonding in coordination chemistry, topology, thermodynamics of complex formation, mechanisms, lanthanides, and actinides. (Lec. 3) Pre: CHM401 or equivalent.

**CHM 505 Chemical Synthesis and Mechanism** (3 crs.) The theory and design of modern synthetic schemes. Emphasis will be placed on broadly used reactions that can be applied to interdisciplinary bioorganic, organometallic and materials chemistry research. (Lec. 3) Pre: CHM 427 or permission of the instructor.

**CHM 506 Chemical Analysis** (3 crs.) Fundamental principles governing methods and instrumentation used for chemical analysis. (Lec. 3) Pre: CHM 412 or permission of the instructor.

**CHM 507 Chemical Structure and Material Property** (3 crs.) Fundamentals and applications of chemical thermodynamics, molecular structures, chemical transformations, principles and practice of computational chemistry. (Lec. 3) Pre: CHM 432 or permission of the instructor.

**CHM 511 Advanced Analytical Chemistry I** (3 crs.) Complex Equilibria and Electrochemistry: Topics include solution theory; acid-base, precipitation and complexation reactions; redox chemistry, amperometry, voltammetry, specialized electrodes and electrochemical sensors. Statistical treatment of data. (Lec. 3) Pre: CHM 412 or permission of instructor.

**CHM 512 Advanced Analytical Chemistry II** (3 crs.) Fundamentals of chromatographic and electrophoretic separations and major spectroscopic techniques. Basic theory, instrumentation, advantages, limitations, and applications of these techniques as well as new instrumental developments are discussed. (Lec. 3) Pre: CHM 412 and MTH 243.

**CHM 513 Adv Analytical Lab**

**CHM 519 Theoretical Concepts in NMR** (3 crs.) The physical concepts of NMR phenomena are presented, beginning with signals generated in the probe, carried through the spectrometer console, into the computer, and finally represented as a spectrum. (Lec. 3) Pre: CHM 292, PHY 112, and MTH 141, or equivalents, or permission of instructor.

**CHM 520 Interpretation of One-Dimensional and Two-Dimensional NMR Spectra** (3 crs.) Uses of chemical shifts and coupling constants are presented for interpreting one-dimensional (1D) and two-dimensional (2D) proton and carbon spectra. Includes relaxation time measurements,

decoupling, and simple 2D interpretation. (Lec. 3) Pre: CHM 292, PHY 112, and MTH 141, or equivalents, or CHM 519 or permission of instructor.

**CHM 521 Advanced Organic Chemistry I** (3 crs.) Emphasis on the structures, reactivities, and syntheses of organic molecules. (Lec. 3) Pre: CHM 226 and 228 or equivalent.

**CHM 522 Advanced Organic Chemistry II** (3 crs.) Advanced fundamental organic chemistry including mechanism, synthesis, organometallics, bio-organic, organic materials, and/or molecular recognition. (Lec. 3) Pre: CHM 427 or 521 or equivalent.

**CHM 531 Advanced Physical Chemistry I** (3 crs.) Principles and applications of chemical thermodynamics and chemical statistical thermodynamics. Includes the three laws of thermodynamics, statistical distributions, statistical thermodynamic ensembles and fluctuations. Applications to ideal gases and crystals, real fluid, and chemical equilibrium. (Lec. 3) Pre: CHM 432 or permission of instructor.

**CHM 532 Advanced Physical Chemistry II** (3 crs.) Principles and applications of quantum chemistry. Includes the formal development of quantum theory and applications to electronic structure as well as other problems of chemical interest. (Lec. 3) Pre: CHM 432 or permission of instructor.

**CHM 551 Nonthesis Master's Research** (3 crs.) Research on original problem for fulfillment of research requirement of nonthesis master's degree. Literature survey, laboratory work, and detailed report required. (Independent Study) Pre: permission of chairperson.

**CHM 552 Nonthesis Master's Research** (2-3 crs.) Research on original problem for fulfillment of research requirement of nonthesis master's degree. Literature survey, laboratory work, and detailed report required. (Independent Study) Pre: permission of chairperson.

**CHM 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. A minimum of 6 credits is required of students who have chosen the thesis option for the master's degree. (Independent Study) S/U credit.

**CHM 618 Theory of Separations** (3 crs.) In-depth presentation of theory of separation processes. Emphasis on methods development, advanced topics, and current advances using gas and liquid chromatography. (Lec. 3) Pre: CHM 511 or permission of instructor.

**CHM 621 Advanced Topics in Physical Organic Chemistry** (3 crs.) Mechanistic aspects of organic chemistry: molecular orbital theory, thermal and photochemical cycloadditions and rearrangements. Consideration of carbenes, nitrenes, and free radicals. Evaluation of steric, stereoelectronic, and secondary orbital effects. (Lec. 3) Pre: CHM 521 and 522 or permission of instructor.

**CHM 642 Graduate Seminar** (1 cr.) Results of detailed literature surveys are presented orally and in writing. Required for candidates for advanced degrees in chemistry. (Seminar) S/U credit.

**CHM 643 Graduate Seminar** (1 cr.) Results of detailed literature surveys are presented orally and in writing. Required for candidates for advanced degrees in chemistry. (Seminar) S/U credit.

**CHM 644 Graduate Seminar** (1 cr.) Results of detailed literature surveys are presented orally and in writing. Required for candidates for advanced degrees in chemistry. (Seminar) S/U credit.

**CHM 691 Special Topics** (1-3 crs.) Covers special research topics of interest. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 6 credits.

**CHM 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## CHN | Chinese

**CHN 101 Beginning Chinese I** (3 crs.) Fundamentals of grammar and pronunciation, exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior Chinese is required. (FC) [D]

**CHN 101H Honors Section of CHN 101: Beginning Chinese I** (3 crs.) Honors Section of CHN 101: Beginning Chinese I. (Lec. 3) Pre: no prior Chinese is required. (FC) [D] Must have 3.30 overall GPA.

**CHN 102 Beginning Chinese II** (3 crs.) Continuation of CHN 101. Students enrolling in this course should have taken CHN 101 or equivalent. (Lec. 3) (FC) [D]

**CHN 103 Intermediate Chinese I** (3 crs.) Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. Students enrolling in this course should have taken CHN 102 or equivalent. (Lec. 3). (FC) [D]

**CHN 104 Intermediate Chinese II** (3 crs.) Continuation of CHN 103. Students enrolling in this course should have taken CHN 103 or equivalent. (Lec. 3) (FC) [D]

**CHN 111 Intensive Beginning Chinese I** (4 crs.) The fundamentals of Chinese with special emphasis on listening and speaking structures. (Lec. 4) (FC) [D]

**CHN 111H Honors Section of CHN 111: Intensive Beginning Chinese I** (4 crs.) Honors Section of CHN 111: Intensive Beginning Chinese I. (Lec. 4) Pre: 3.3 overall gpa. (FC) [D]

**CHN 112 Intensive Beginning Chinese II** (4 crs.) The fundamentals of Chinese with special emphasis on listening and speaking structures. (Lec. 4) Pre: CHN 111 or equivalent. (FC) [D]

**CHN 112H Honors Section of CHN 112:**

**Intensive Beginning Chinese II** (4 crs.) Honors Section of CHN 112: Intensive Beginning Chinese II. (Lec. 4) Pre: CHN 111 or equivalent and 3.30 overall gpa. (FC) [D]

**CHN 113 Intensive Intermediate Chinese I** (4 crs.) Intensive Chinese language intermediate courses. Focus on practice in listening and speaking. Development of reading and writing skills. Intermediate-level grammatical structures. (Lec. 4) Pre: CHN 102 or 112 or equivalent. (FC) [D]

**CHN 113H Honors Section of CHN 113: Intensive Intermediate Chinese I** (4 crs.) Honors Section of CHN 113: Intensive Intermediate Chinese I. (Lec. 4) Pre: 3.30 overall gpa and CHN 102 or 112 or equivalent. (FC) [D]

**CHN 114 Intensive Intermediate Chinese II** (4 crs.) Intensive Chinese language intermediate courses. Focus on practice in listening and speaking. Development of reading and writing skills. Intermediate-level grammatical structures. (Lec. 4) Pre: CHN 103 or 113 or equivalent. (FC) [D]

**CHN 114H Honors Section of CHN 114: Intensive Intermediate Chinese II** (4 crs.) Honors Section of CHN 114: Intensive Intermediate Chinese II. (Lec. 4) Pre: 3.30 overall gpa and CHN 103 or 113 or equivalent. (FC) [D]

**CHN 205 Composition and Conversation** (3 crs.) Development of facility in spoken and written Chinese using contemporary topics; emphasis on general classroom discussion. (Lec. 3) Pre: CHN 104 or permission of instructor. (FC) [D]

**CHN 205H Honors Section: CHN 205: Composition and Conversation** (3 crs.) Honors Section of CHN 205: Composition and Conversation. (Lec. 3) Pre: 3.30 or better overall GPA and CHN 104 or permission of instructor. (FC) [D]

**CHN 206 Composition and Conversation** (3 crs.) Development of facility in spoken and written Chinese using contemporary topics; emphasis on general classroom discussion. (Lec. 3) Pre: CHN 205 or permission of instructor. (FC) [D]

**CHN 215 Intensive Conversation and Composition I** (4 crs.) Intensive course in further development of spoken and written Chinese. Advanced-low level grammatical structures. Students enrolling in CHN 215 should have taken CHN 104 or 114 or equivalent. (Lec. 4) 9FC0 [D]

**CHN 215H Honors Section of CHN 215: Intensive Conversation and Composition I** (4 crs.) Honors Section of CHN 215: Intensive Conversation and Composition I. Students should have taken CHN 104 or 114 or equivalent. (Lec. 4) Pre: 3.30 overall gpa. (FC) [D]

**CHN 216 Intensive Conversation and Composition II** (4 crs.) Intensive course in further development of spoken and written Chinese. Advanced-low level grammatical

structures. Students enrolling in CHN 216 should have taken CHN 205 or 215 or equivalent. (Lec. 4) (FC) [D]

**CHN 216H Honors Section of CHN 216: Intensive Conversation and Composition II** (4 crs.) Honors Section of CHN 216: Intensive Conversation and Composition II. (Lec. 4) Pre: 3.3 overall gpa. (FC) [D]

**CHN 305 Advanced Composition and Conversation I** (3 crs.) Intensive practice in spoken and written Chinese using contemporary writings and topics in Chinese-speaking countries. Emphasis on classroom discussion. (Lec. 3) Pre: CHN 206 or permission of instructor.

**CHN 306 Advanced Composition and Conversation II** (3 crs.) Intensive practice in spoken and written Chinese using contemporary writings and topics in Chinese-speaking countries. Emphasis on classroom discussion. (Lec. 3) Pre: CHN 305 or permission of instructor.

**CHN 307 Introduction to Chinese Culture and Civilization** (3 crs.) Overview of major Chinese cultural developments and civilization achievements. Significant figures and events in culture, art, and society from ancient to contemporary China. (Lec. 3) Pre: CHN 306 or permission of instructor or section head.

**CHN 315 Intensive Advanced Composition and Conversation I** (4 crs.) Intensive course in development of spoken and written Chinese. Advanced level discourse structures. (Lec. 4) Pre: CHN 206 or 216 or equivalent.

**CHN 315H Honors Section of CHN 315: Intensive Advanced Composition and Conversation I** (4 crs.) Honors Section of CHN 315: Intensive Advanced Composition and Conversation I. (Lec. 4) Pre: 3.30 overall gpa, and CHN 206 or 216 or equivalent.

**CHN 316 Intensive Advanced Composition and Conversation II** (4 crs.) Intensive course in development of spoken and written Chinese. Advanced level discourse structures. (Lec. 4) Pre: CHN 305 or 315 or equivalent.

**CHN 316H Honors Section of CHN 316: Intensive Advanced Composition and Conversation II** (4 crs.) Honors Section of CHN 316: Intensive Advanced Composition and Conversation II. Intensive course in development of spoken and written Chinese. Advanced level discourse structures. (Lec. 4) Pre: CHN 305 or 315 or equivalent, and 3.3 overall gpa.

**CHN 320 Chinese News Media** (3 crs.) Survey of Chinese language news media including print, television and Internet. (Lec. 3) Pre: CHN 306 or permission of instructor.

**CHN 401 Topics on Chinese Culture and Civilization** (3 crs.) Students will study various topics on Chinese culture, society and civilization through selected readings and multimedia. (Lec. 3) Pre: CHN 306 or permission of instructor. Not for graduate credit.

**CHN 421 Modern Chinese Literature I** (3 crs.) Advanced literature course focusing on readings and discussions of major modern Chinese writers and their masterpieces from the end of the Imperial Era through the Chinese Civil War in 1949. (Lec. 3) Pre: CHN 306 or permission of instructor. Not for graduate credit.

**CHN 422 Modern Chinese Literature II** (3 crs.) Literary works of famous writers in contemporary China. Students will read and discuss representative literary selections from the start of the New China, through the Cultural Revolution to the present. (Lec. 3) Pre: CHN 421 or permission of instructor. Not for graduate credit.

**CHN 485 Chinese Studies Seminar I** (4 crs.) Advanced literature and civilization course focusing on major modern and contemporary Chinese writers and their works. Readings and discussions focus on Chinese literary masterpieces and movies from the Chinese Civil War through the early 20th century (Lec. 4). Pre: CHN 306, 307, 316 or equivalent. Not for graduate credit.

**CHN 486 Chinese Studies Seminar II** (4 crs.) Advanced literature and civilization course focusing on major modern and contemporary Chinese writers and their works. Readings and discussions focus on Chinese literary masterpieces and movies from the early 20th century to the present. Pre: CHN 485, 421, 401 or equivalent. Not for graduate credit.

**CHN 497 Directed Study** (1-3 crs.) Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of a project by a faculty member and approval of section head. Not for graduate credit.

**CHN 498 Directed Study** (1-3 crs.) Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of a project by a faculty member and approval of section head. Not for graduate credit.

## CLA | Classics

**CLA 110 Ancient Greece: History and Archaeology** (3 crs.) Cross-listed as (HIS), CLA 110. An introduction to the history and archaeology of ancient Greece and Greek Civilization from the Bronze age to the death of Alexander the Great. (Lec. 2, Rec. 1) (L) [D]

**CLA 301 The Hellenistic World** (3 crs.) Cross-listed as (HIS), CLA 301. The history, archaeology, and civilization of the Hellenistic World from Alexander the Great to the Death of Cleopatra VII. (Lec. 3) Pre: sophomore standing or permission of instructor.

**CLA 302 The Roman Empire** (3 crs.) Cross-listed as (HIS), CLA 302. The history, archaeology, and civilization of the Roman Empire from Augustus to Constantine. (Lec.

3) Pre: sophomore standing or permission of instructor.

**CLA 391 Ancient Laughter: The Comic Tradition in Greece and Rome** (3 crs.) Introduction to the comic tradition in Western literature through its origins in Greece and Rome. Readings in English translation include examples of comic drama, novel, and satire. (Lec. 3) (A) [D]

**CLA 395 Greek Mythology: Gods, Heroes, and Humans** (3 crs.) Nature and function of myth in the ancient world and today: ideas of divinity, relationship of divine to human, origins of cosmos and human society, male and female principles, power hierarchies, coming of age, the heroic experience. Theories of myth analysis. Readings in English translation. (Lec. 3) (A) [D]

**CLA 396 Myths of Rome** (3 crs.) Nature and function of myth in Roman society; origins and influence of Romanitas as found in Roman literature: history, epic, lyric, novel. Roman religion: magic, animism, anthropomorphism, gods and goddesses. Readings in English translation. (Lec. 3) (A) [D]

**CLA 397 Greek Myth and Tragedy** (3 crs.) Relationship between Greek myth and classical tragedy, birth and evolution of tragedy (ancient, medieval, French, English, American), employment of the same myth for different dramatic and political purposes. Readings in English translation. (Lec. 3) (A) [D]

**CLA 497 Directed Study** (1-6 crs.) Individual research. (Independent Study) Pre: faculty acceptance of project. Prior or concurrent registration in a LAT or GRK or CLA course recommended. May be repeated for credit with different topic. Not for graduate credit.

## CLS | Comparative Literature Studies

**CLS 160 Literatures of the World** (4 crs.) Cross-listed as (ENG), CLS 160. Introduction to significant works of world literature. (Lec. 3, Online 1) (A) (L) [D]

**CLS 335 Interdisciplinary Studies in Comparative Literature** (3 crs.) Cross-listed as (ENG), CLS 335. Study of the interrelationships of two or more national literatures (in translation) with another discipline. (Lec. 3) May be repeated for credit as often as topic changes.

**CLS 335H Honors Section of CLS/ENG 335: Interdisciplinary Studies in Comparative Literature** (3 crs.) Cross-listed as (CLS), ENG 335H. Honors Section of CLS/ENG 335: Interdisciplinary Studies in Comparative Literature. (Lec. 3) May be repeated for credit as often as topic changes. Must have a 3.30 overall GPA.

**CLS 451 Advanced Topics in International Film Media** (4 crs.) Cross-listed as (FLM), ENG, CLS 451. Study of international film genres from one or more national, regional or diasporic cultures and traditions. Empha-

ses on theoretical, historiographic and media research methods. (Lec. 3, Lab. 2) Pre: junior standing or permission of instructor. FLM 204 or 205 recommended. May be repeated for a maximum of 8 credits with change of emphases or topics.

**CLS 597 Special Problems** (1-6 crs.) Group and/or individual investigation of special problems in comparative literature studies. (Independent Study)

## CMD | Communicative Disorders

**CMD 160 Introduction to Communicative Disorders** (3 crs.) Survey of speech, language, and hearing disorders. Discussion includes etiology, symptomatology, and the profession of SLP and audiology. (Lec. 3)

**CMD 175 Gestural Communication** (3 crs.) Visual language systems with emphasis on the chirology and syntax of Ameslan, and levels of language among deaf communicators; finger spelling and sign language for educational, rehabilitative, and artistic goals studied. (Lec. 3)

**CMD 272 Auditory and Speech Mechanisms** (3 crs.) Structure and function of the organs of hearing and speech as they relate to normal and pathological communication; theories of cortical involvements, central and peripheral nervous systems relevant to rehabilitation procedure. (Lec. 3) Pre: sophomore standing.

**CMD 273 Phonetics** (3 crs.) International Phonetic Alphabet; analysis of phonetic and phonemic elements in major American English dialects; practice in transcription of standard and defective speech. (Lec. 3) Pre: sophomore standing.

**CMD 274 Communication Process** (3 crs.) Psychological and cognitive processes basic to language and communication; models of language processing; explorations into biological and social bases. (Lec. 3) Pre: sophomore standing.

**CMD 276 Introduction to Speech Science** (3 crs.) Physical properties of the speech signal, analysis of the physical bases of speech production, instrumentation used to assess speech output, theories of speech perception. (Lec. 3) Pre: CMD 272 and 273.

**CMD 278 Introduction to Hearing Science** (3 crs.) Overview of the measurement of sound, acoustic properties of the sound wave, and perception of sound by human beings. Psychophysical methods of sound perception, psychoacoustics, use of instrumentation to measure sounds. Anatomy and physiology of the normal auditory mechanism. (Lec. 3) Pre: CMD 276

**CMD 361 Introduction to Audiology** (3 crs.) Pathologies of the hearing mechanism, methods of audiological assessment, interpretation of the audiogram, recommendations based on diagnostic audiology results.

Methods of middle ear and retrocochlear assessment. Training in the administration of basic audiological evaluations. (Lec. 3) Pre: CMD 160 and 278.

**CMD 375 Language Development** (3 crs.) Development phenomena in speech and language; causal factors of delayed speech and language; survey of evaluative and habilitative programs for children with deviant language development. (Lec. 3) Pre: CMD 274.

**CMD 377 Functional Neuroanatomy** (3 crs.) Examination of the brain and spinal cord, emphasizing connection and functions of the neural system. This course is designed for communicative disorders majors. (Lec. 3) Pre: CMD 272 and junior standing.

**CMD 440 Advanced Head And Neck Anatomy** (3 crs.) Cross-listed as (PHT), CMD 440. Study of structure and function of human head and neck anatomy, supplemented by dissection laboratory. Emphasis on the musculoskeletal, visceral, nervous, and vascular systems related to dental hygiene and communicative disorders. (Lec. 2, Lab. 2) Pre: BIO 121 or equivalent.

**CMD 454 Rehabilitative Audiology** (3 crs.) Theoretical and methodological approaches to aural rehabilitation of the adult with impaired hearing. Topics include use of amplification, speechreading, assistive listening devices, auditory training, and case management. (Lec. 3) Pre: CMD 160 and three of the following-CMD 372, 373, 374, 375, 376, and senior or graduate standing with 551 as prerequisite for graduate standing.

**CMD 460 Speech and Language Disorders** (3 crs.) Survey of developmental and acquired speech and language disorders. Discussion includes etiology, symptomatology, and assessment. (Lec. 3) Pre: senior standing.

**CMD 465 Clinical Methods in Communicative Disorders** (4 crs.) Observation of diagnosis and treatment of communicative disorders; developing interviewing, report writing, and counseling techniques; introduction to diagnostic procedures; establishing therapeutic goals, treatment, and remediation of various disorders. (Lec. 4) Pre: Senior or graduate standing only; not for graduate credit in communicative disorders.

**CMD 491 Special Problems** (1-3 crs.) Selected areas of study pertinent to communicative disorders. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) 491: S/U credit.

**CMD 492 Special Problems** (1-3 crs.) Selected areas of study pertinent to communicative disorders. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) 491: S/U credit.

**CMD 493 Cultural and Linguistic Diversity in Communicative Disorders** (3 crs.) Application of concepts and information

from the study of cultural and linguistic diversity to issues involving communicative incompetence and disorder. (Lec. 3) Pre: CMD 274 or 375.

**CMD 494 Autism and Pervasive Developmental Disorders** (3 crs.) Current perspectives on diagnosis, etiology, and core challenges in social communication and emotional regulation for children with autism and PDD. Role of speech-language pathologists within a comprehensive intervention framework. (Lec. 3) Pre: Senior standing or CMD 375, or permission of instructor.

**CMD 504 Research in Communicative Disorders** (3 crs.) Types of research in speech pathology, audiology, and communication science; critiques of representative models with special emphasis on experimental research; individual pilot projects or master's thesis. (Lec. 3) Pre: 372, 373, 374, 375, graduate standing, or permission of instructor.

**CMD 550 Audiology for Speech-Language Pathologists A,B,C** (1-3 crs.) Introduction to audiology for the speech-language pathology graduate student. Hearing disorders, hearing assessment, child and adult aural rehabilitation. Modular format with variable credits. (Lec. 1-3) Pre: graduate standing. Offered once per year.

**CMD 551 Measurement of Hearing I** (4 crs.) Diagnostic protocols for routine audiologic assessment including pure tone, speech, and immittance procedures. Discussion of etiology and symptomatology of hearing disorders. (Lec. 4) Pre: CMD 372, 373, 374, 375, and 376; graduate standing or permission of instructor.

**CMD 553 Pediatric Audiology** (3 crs.) Theoretical and methodological approaches to the identification and management of children with auditory disorders. Topics discussed include auditory development, audiometric evaluation, and hearing aids. (Lec. 3) Pre: graduate standing and CMD 551 or permission of instructor. In alternate years.

**CMD 554 Advanced Rehabilitative Processes for Hearing Impaired** (3 crs.) Advanced techniques and technology in aural rehabilitation including family-based management, multidiscipline approaches and complex assistive devices. (Lec. 3) Pre: CMD 454 and CMD 551, and graduate standing. Offered Spring.

**CMD 556 Hearing Aids** (3 crs.) Application of technological and behavioral strategies in fitting hearing aids, including aid selection and delivery, counseling, assessment of wearer performance, marketing, and legal issues. (Lec. 3) Pre: CMD 555. In alternate years.

**CMD 557 Electrophysiological Measures In Audiology** (4 crs.) Basic electrophysiological assessment procedures and instrumentation. Otoacoustic emissions, electrocochleography, auditory brainstem response, and middle, late, and steady-state auditory evoked potentials. (Lec. 4) Pre: graduate

standing and CMD 551 or permission of instructor. In alternate years.

**CMD 560 Voice Disorders** (3 crs.) Etiology and symptomology of vocal pathology for adults and children: intervention strategies for organic, behavioral and psychological voice disorders: rehabilitation team approach to voice-resonance problems associated with cleft palate. Pre: Graduate standing or permission of instructor.

**CMD 561 Phonological Disorders** (3 crs.) Assessment, design, and implementation of therapeutic management programs for various speech production disorders at the articulatory and phonological levels. (Lec. 3) Pre: CMD 372, 373, 374, 375, or equivalent, or permission of instructor.

**CMD 562 Speech-Language Pathology for Audiologists A,B,C** (1-3 crs.) Speech-language pathology for audiology students. Language disorders in children, speech sound disorders, speech/language change and disorders in adults. Modular format with variable credits (Lec. 1-3) Pre: graduate standing. Offered alternate years in the spring semester.

**CMD 563 Language Disorders in Infants and Toddlers** (3 crs.) The speech-language pathologist's role and responsibilities in the diagnosis and treatment of infants and toddlers (0-3 yrs.) either at risk for or exhibiting bona fide communication delays or disorders; family-centered approaches to intervention. (Lec. 3) Pre: graduate standing, completion of CMD 375 (Language development) or equivalent or permission of instructor. Offered alternate years in the spring semester.

**CMD 564 Language Disorders In School-Aged Children** (3 crs.) Study of communication deficits in learning-disabled school-aged children; differential diagnoses; assessment of cognitive functioning; language processing and discourse; and therapeutic strategies for training abstract and functional language. (Lec. 3) Pre: graduate standing or permission of instructor.

**CMD 565 Pre-Practicum in Speech-Language Pathology** (1 cr.) Case study methodology to facilitate students' transition from coursework to clinic. Solve open-ended real world problems. Apply course knowledge to analyze issues and formulate workable solutions. (Seminar, 1) Pre: Graduate standing. S/U

**CMD 569 Test and Measurement in Speech-Language Pathology** (3 crs.) Procedures for evaluation and diagnosis in speech-language pathology. Psychometric considerations in testing. Implications of evaluation information for differential diagnosis, prognosis, referrals, and therapeutic programs. Multicultural considerations in the diagnostic process. (Lec. 3) Pre: CMD 372, 373, 374, 375, 465 or equivalent; graduate standing or permission of instructor.

**CMD 570 Clinical Practicum In Communi-**



**cativ Disorders PRA** (1-5 crs.) Supervised assessment and rehabilitation procedures with persons experiencing communicative disorders in speech-language pathology and/or audiology. Practicum sites scheduled on campus and within hospital, school, institutional, and private settings. (Practicum) Pre: graduate standing, 25 observation hours, and appropriate course work.

**CMD 571 Medical Speech-language Pathology** (2 crs.) Teaches evaluation, diagnosis, and treatment of adults and children seen in a medical setting. Appropriate for clinicians working in a medical setting or treating people discharged from a medical setting. (Seminar) Pre: graduate standing.

**CMD 574 Hearing Conservation** (2 crs.) The auditory and non-auditory effects of noise on human beings. Hearing conservation plan development and monitoring as well as legal issues will be reviewed. (Lec. 2) Pre: permission of instructor. Offered Spring.

**CMD 575 Management of Deaf and Special Populations** (3 crs.) Identification of needs related to health, communication, and quality of life in deaf and special populations. Management strategies and the audiologists role will be described. (Lec. 3) Pre: CMD 454 and 551, graduate standing. Offered Spring.

**CMD 576 Cochlear Implants** (2 crs.) Concepts and issues related to cochlear implantation as a remediation for deafness in adults and children. Hardware, programming, rehabilitative, and surgical issues will be addressed. (Lec. 2) Pre: graduate standing in audiology or permission of instructor. Offered fall every third year.

**CMD 577 Vestibular Rehabilitation and Tinnitus Management** (2 crs.) Management of the vertiginous patient to reduce symptoms and restore function. Tinnitus assessment and therapeutic strategies are reviewed. (Lec. 2) Pre: CMD 454, 551, and 572, graduate standing. Offered Spring.

**CMD 580 Augmentative and Alternative Communication** (2 crs.) Review of unaided (manual) approaches to communication. Discussion of aided methods using communication boards or other mechanical electronic devices. (Lec. 2) Pre: graduate standing or permission of instructor.

**CMD 581 Dysphagia** (3 crs.) Basic introduction to the knowledge and skills needed by speech-language pathologists providing clinical services to dysphagic patients in medical settings. (Lec. 3) Pre: graduate standing or permission of instructor.

**CMD 582 Motor Speech Disorders** (3 crs.) Neurosystem pathologies and mechanisms affecting speech. Prepares students to diagnose, assess, and treat adults with acquired motor speech disorders. (Lec. 3) Pre: Graduate standing and a neuroanatomy course or concurrent registration in CMD 377.

**CMD 583 Acquired Cognitive Communication Disorders** (3 crs.) Study of acquired cognitive problems resulting from neuro-

logical disorders and diseases; differential diagnoses; assessment of the domains of cognition; and therapeutic strategies for cognitive rehabilitation. (Lec. 3) Pre: graduate standing.

**CMD 584 Language Disorders in Developmentally Young Children** (3 crs.) Study of communication deficits in developmentally young and multi-handicapped children; types of language problems; differential diagnoses; assessment of conceptual requisites and concrete language skills; and interactive therapeutic strategies. (Lec. 3) Pre: graduate standing or permission of instructor.

**CMD 585 Language Disorders in Adults** (3 crs.) Provides basic information on the characteristics, assessment, and treatment of adults with acquired language disorders secondary to stroke, head injury, and progressive neurological diseases. (Lec. 3) Pre: graduate standing or permission of instructor.

**CMD 592 Disorders of Fluency** (3 crs.) Study of nature and causes of stuttering; analyses of current theories and research concerning stuttering and cluttering; development of a rationale for diagnosis, case selection, and intervention. (Lec. 3) Pre: graduate standing and/or permission of instructor.

**CMD 594 Counseling in Communicative Disorders** (1 cr.) Considerations in counseling in speech-language pathology and audiology. Multiple factors influencing communication between client/family and professionals. Study of clinical skills in counseling. Ethical and professional issues. (Lec. 1) Pre: graduate standing or permission of instructor. In alternate years.

**CMD 595 Instrumentation and Computer Use in Communicative Disorders** (1 cr.) Topics in applied instrumentation and computer use for students in speech-language pathology and audiology. Practical experience in calibration of instruments and the use of current professional software. (Lab. 2) Pre: graduate standing or permission of instructor. In alternate years.

**CMD 598 Special Problems** (1-6 crs.) Selected areas of study pertinent to communicative disorders. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) Pre: graduate standing.

**CMD 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: graduate standing. S/U credit.

**CMD 658 Advanced Electrophysiological Assessment of Hearing** (4 crs.) Study of the most current research regarding electrophysiological assessment of hearing. Detailed consideration of such issues as stimulus variables, age, sex, sleep state, etc. Consideration of the neurophysiology underlying the measured electrical potentials. Must be taken

concurrently with CMD 659. (Lec. 4) Pre: graduate standing in audiology or permission of instructor. Offered fall every third year.

**CMD 670 Audiology Residency EXT** (6 crs.) Full-time equivalent off campus clinical residency in audiology. Direct clinical experience with on-site supervision plus oversight by URI faculty. Placements may vary and combine more than one site. (Externship) May be repeated for a total of 12 credits. Pre: graduate standing in audiology and completion of CMD 570.

**CMD 691 Independent Study in Audiology** (1-3 crs.) Selected areas of study pertinent to audiology. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) Pre: graduate standing in audiology.

**CMD 698 Capstone Project in Audiology** (3 crs.) This registration purposes to tie together classroom and clinical experiences. Discussions will be based on externship experiences. A major paper on one clinical problem chosen by the student will be presented to students and faculty in audiology. (Seminar) Pre: graduate standing in audiology.

## COM | Communication Studies

**COM 100 Communication Fundamentals** (3crs.) Integrates basic theory and experience in a variety of communication contexts including public speaking, small groups, and interpersonal communication. Examines human differences in order to develop more effective communication skills. Not open to students with credit in 110. (Lec. 3) (EC) [D]

**COM 100H Honors Section of COM 100: Communication Fundamentals** (3 crs.) Honors Section of COM 100: Communication Fundamentals. Not open to students with credit in COM 110. (Lec. 3) (EC), [D]. Pre: Must have a 3.30 overall GPA.

**COM 108 Spaceship Earth: An Introduction to Systems** (4 crs.) Cross-listed as (COM), ECN, SUS 108. Through in-depth study of films, readings and web sites, students will explore the economic and ecological principles of sustainability and the rhetorical strands linking scientific evidence, public policies and individual behavior. (Lec. 3, Rec. 1) (EC) (S)

**COM 110 Communication Fundamentals** (4 crs.) Integrates basic theory and experience in communication contexts including public speaking, small groups, and interpersonal communication. Examines human differences in order to develop more effective communication skills, and uses online environments to extend classroom instruction (Lec. 3, Lab 2). Not open to students with credit in COM 100. Pre: sophomore standing (30+ credits). (EC) [D]

**COM 202 Public Speaking** (3 crs.) Theory, attitudes and skills essential to effective and ethical public communication. Focus on research, selection and use of evidence, construction of arguments, organization, audience analysis and presentational skills. (Lec. 3) Pre: COM 100 or 100H or 110.

**COM 207 Forensic Workshop PRA** (1 cr.) Open to students participating in speech or debate activities. (Practicum) Pre: COM 100 or 100H or 110 and permission of the director of debate. May be repeated for a maximum of 4 credits.

**COM 208 Argumentation and Debate** (3 crs.) Introduces argumentation theory through the model of academic debate. Stresses critical-thinking skills including analysis, research, organization, and written and oral presentations. Debates are conducted on important social and political issues. (Lec. 3) Pre: COM 100 or 100H or 110.

**COM 209 Great American Speeches** (3 crs.) The study of historically significant ideas, issues, and causes through the critical analysis of selected American speeches. (Lec. 3) Pre: COM 100 or 100H or 110.

**COM 210 Persuasion: The Rhetoric of Influence** (3 crs.) Analysis of communication influencing beliefs, attitudes, and/or behavior. Investigation of rhetorical elements of logical, emotional, and ethical appeals. Study of elements critical for effective producers and consumers of persuasion. (Lec. 3/Online) Pre: COM 100 or 100H or 110.

**COM 221 Interpersonal Communication** (3 crs.) Examines basic theory and skills, including impart of perception, self-concept, listening, nonverbal messages, and language on interpersonal communication, including conflict, relationship development, friendship, family and romantic relationships. (Lec. 3/Online) Pre: COM 100 or 100H or 110.

**COM 230 The Art of Storytelling** (3 crs.) Recognition and appreciation of content and communication of thought and emotion through storytelling. Practice in the creation and delivery of stories through oral performance and digital storytelling. (Lec. 3) Pre: COM 100.

**COM 231 Oral Interpretation of Literature** (3 crs.) Recognition and appreciation of content and communication of thought and emotion through oral reading. Practice in the analysis and interpretation of poetry and prose fiction. (Lec. 3)

**COM 246 New Media and Society** (3 crs.) Introduction to basic practices and theories necessary for understanding and contributing to digital culture. Combines new media theory and practice on topics including blogging, social networking, and virtual reality. (Lec. 3) (L) [D]

**COM 246H Honors Section of COM 246: New Media and Society** (3 crs.) Honors section of COM 246: New Media and Society. (Lec. 3) (L) [D] Pre: 3.30 overall GPA.

**COM 251 Small Group Communication** (3 crs.) The study of communicative functions in the small group setting. Includes group dynamics, leadership, problem solving, and decision making. Emphasis on theory and application. (Lec. 3/Online) Pre: COM 100 or 100H or 110.

**COM 271 Web Design and Programming** (4 crs.) For students who want to learn to communicate effectively using web development technology. Explores principles and techniques of client-side programming using XHTML, CSS, and JavaScript following leading-edge standards. Includes designing for web standards, accessibility, usability, and workflow for web design. (Lec. 2, Lab. 4)

**COM 291 Communication Teaching Practicum PRA** (1 cr.) Supervised participation in instructional practice for students in communication. Provides exposure to pragmatic classroom issues and experience in various aspects of teaching at a college level. (Practicum) Pre: permission of instructor. May be repeated for a maximum of 2 credits. S/U only.

**COM 302 Advanced Public Speaking** (3 crs.) Advanced study of public speaking and speech writing. Speaking in television and business settings. Speaking with a manuscript, writing speeches for others, and speech criticism. (Lec. 3) Pre: COM 202 and junior standing in a degree-granting college or permission of instructor.

**COM 307 Audio Communication In The Media** (3 crs.) Examination of techniques and production of audio communication. Explores elements of audio communication including radio drama, commercials, news reporting, sports commentary, monologues, narration and voice-over work. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor.

**COM 308 Advanced Argumentation and Debate** (3 crs.) Analysis of the theories of argumentation through specialized forms of debate. Use of legislative, legal, and other situationally specific forms of debate to apply the theories of argumentation. (Lec. 3) Pre: COM 208 and junior standing in a degree-granting college or permission of instructor.

**COM 310 Topics in Communication** (3 crs.) Analysis of contemporary rhetorical theories as they relate to speaking in business, civil rights, education, government, labor, law, and religion. Focus each semester on a critical contemporary issue. (Lec. 3/Online) Some topics are offered online. Pre: junior standing in a degree-granting college or permission of instructor. May be repeated for credit.

**COM 312 Introduction to Video Games: Design and Development** (4 crs.) Cross-listed as (SCM), ART, COM, FLM 312. Introduces video game development through the perspective of artistic design and production. Projects include pitches, storyboards and mock-ups, narratives and scripts, and proto-

types. Entails substantial collaborative work. (Lec. 3, Studio 2) Pre: sophomore standing.

**COM 313 Introduction to Video Games: Users and Contexts** (4 crs.) Cross-listed as (SCM), ART, COM, FLM, WRT 313. Introduces video game development through the perspective of different users' experiences and contexts. Projects include critical analyses, observations, multi-media pitch presentations. Requires substantial game playing outside of class. (Sem. 3, Prac. 2) Pre: sophomore standing.

**COM 315 Environmental Dimensions of Communication** (3 crs.) Cross-listed as (COM), SUS 315. Investigation of individual and mediated environmental messages, analysis and experimentation with the ways communication can affect environmental knowledge, attitudes and behavior, design of communication campaigns to affect resource use and ecological responsibility. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

**COM 316A Rhetorical Criticism** (3 crs.) Study of select methods in the evaluation of communication. Critical methods include but are not limited to rhetorical, media, cultural and various critical theories of race and gender. May be offered online. (Lec. 3/Online) Pre: COM 202 and COM 208 or COM 209 or COM 210. May not be repeated.

**COM 316B Television Criticism** (3 crs.) Study of select methods in the evaluation of communication. Critical methods include but are not limited to rhetorical, media, cultural and various critical theories of race and gender. Pre: COM 202 and COM 208 or COM 209 or COM 210. May not be repeated.

**COM 322 Gender and Communication** (3 crs.) Survey of theories and research on gender and communication. Examines interface of gender and human interaction in interpersonal, group (including family), educational, organizational, mass media, and social movement contexts. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

**COM 324 Nonverbal Communication** (3 crs.) Examines nonverbal communication codes, including their structures, usages, and interrelationships. Stresses student understanding, analysis, and application of nonverbal communication through lecture, discussion, and experiential activities. (Lec. 3) Pre: COM 202 or 221, and junior standing in a degree-granting college or permission of instructor.

**COM 325 Communication in Interviewing** (3 crs.) Theory and practice of interviewing as planned communication in different settings for various purposes, including research, professions, and employment. Human diversity, ethics, interpersonal dynamics, and writing are emphasized. (Lec. 3) Pre: COM 202 and junior standing in a degree-granting college or permission of instructor.

**COM 326 Family Communication** (3 crs.) Examines family communication from a symbolic interaction and systems theory perspective. Focuses on primary family functions including cohesion, and case studies. (Lec. 3/Online) Pre: COM 202 and 221 and junior standing in a degree-granting college or permission of instructor.

**COM 333 Oral Interpretation of Black Literature** (3 crs.) Cross-listed as (COM), AAF 333. Study and oral presentation of literature by black American authors. Class performances, discussion, reports, and analysis of the literature. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor. COM 231 recommended.

**COM 334 Orality and Ancient Greece** (3 crs.) Integration of the significant role of rhetoric, orality, presentation skills/styles, literature and history with the culture of the time. (Lec. 3) Pre: COM 100 and junior standing in a degree-granting college or permission of instructor.

**COM 335 Orality and Ancient Rome** (3 crs.) Integration of the significant role of rhetoric, orality, presentation skills/styles, literature and history with the culture of the time. (Lec. 3) Pre: COM 100 and junior standing in a degree-granting college or permission of instructor.

**COM 340 Electronic Media Programming** (3 crs.) Overview of various aspects of the operation of radio, television, and cable TV, including industry structure, audience measurement (ratings), programming, and promotion. (Lec. 3) Pre: Junior standing in a degree-granting college or permission of instructor.

**COM 341 Documentary Pre-production** (3 crs.) Understanding the documentary form in both its historic and modern context. Basic camera, shooting, and interviewing techniques are studied. Research and writing a documentary proposal required. (Lec. 3) Pre: Junior standing in a degree-granting college or permission of instructor.

**COM 342 Documentary Production** (3 crs.) Builds on work completed in 341. Field camera operation, lighting, archival materials, writing, directing, producing, and editing a documentary short on a topic researched and pre-produced in 341. (Lec. 3) Pre: COM 341 and junior standing in a degree-granting college or permission of instructor.

**COM 346 Social and Cultural Aspects of Media** (3 crs.) Explores social and cultural dimensions of media. Includes case studies of print, television, film, video, and computer-mediated communication. (Lec. 3) Pre: Junior standing in a degree-granting college or permission of instructor.

**COM 351 Organizational Communication Skills** (3 crs.) Examination of business and organizational communication. Emphasis on channels of communication, communication barriers, leadership, and the development of communication skills for business and

professions. (Lec. 3) Pre: Junior standing in a degree-granting college or permission of instructor.

**COM 354 International Business Communications Exchange** (3 crs.) Cross-listed as (BUS), COM 354. Examination of effective international business communication. Use of worldwide email network to exchange views on business topics with counterparts abroad. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

**COM 361 Intercultural Communication** (3 crs.) Study of cultural similarities and differences as they affect communication within and across cultural boundaries. (Lec. 3/Online) Pre: Junior standing in a degree-granting college or permission of instructor.

**COM 361H Honors Section of COM 361: Intercultural Communication** (3 crs.) Honors Section of COM 361: Intercultural Communication. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor and 3.30 overall GPA.

**COM 372 Dynamic Web Design and Programming** (4 crs.) Leading edge Web-based information technology for communication in all disciplines. Technology will vary by semester, covering Microsoft or Open Source server-side programming technologies and databases, and relevant design and security issues. (Lec. 2, Lab. 4) Pre: COM 271 and junior standing in a degree-granting college or permission of instructor.

**COM 381 Research Methods in Communication** (3 crs.) Basic concepts and techniques of communication research. Emphasis on analysis of existing communication research and on application of research processes to communication problems or phenomena. (Lec. 3/Online) Pre: COM 202 and junior standing in a degree-granting college or permission of instructor.

**COM 382 Communication Theory** (3 crs.) A critical survey of social science based communication theories; an examination of the nature, processes and functions of communication theory in a variety of contexts. (Lec. 3/Online) Pre: COM 100, COM 202 or COM 221 and junior standing in a degree-granting college or permission of instructor.

**COM 383 Rhetorical Theory** (3 crs.) Surveys and analyzes rhetorical communication theories and theorists from classical to contemporary times and focuses on rhetoric's relationship with philosophy, knowledge, reason, science, technology, and culture. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor. COM 202, and COM 221 or COM 210 recommended.

**COM 385 Communication and Social Influence** (3 crs.) Focuses on theories of social influence in interpersonal, group, and public settings. Topics include audience analysis, ethics, motivation, messages, psychological

and rhetorical, principles, source credibility, and attitude change. (Lec. 3) Pre: COM 202 or 210 or 221 and junior standing in a degree-granting college or permission of instructor.

**COM 391 Communication Honors Work** (1-3 crs.) Thesis work or an equivalent independent project under faculty supervision for honor students. (Independent Study) Pre: Junior standing in a degree-granting college or permission of instructor.

**COM 392 Communication Honors Work** (1-3 crs.) Thesis work or an equivalent independent project under faculty supervision for honor students. (Independent Study) Pre: Junior standing in a degree-granting college or permission of instructor.

**COM 402 Leadership and Motivation** (3 crs.) Examination of theory and research in the areas of leadership and motivation in organizational settings. Emphasis on application of theory in developing essential leadership skills within individuals and in creating effective motivational programs within organizations. (Lec. 3) Pre: BUS 340, 341 or COM 251 and junior standing in a degree-granting college or permission of instructor.

**COM 405 Humor In Communication** (3 crs.) Examination of genres, history, content, structure and performance styles of presentational comedy. Exploration of role of humor in society. Development of original materials for public performance. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor. Not for graduate credit.

**COM 410 Advanced Topics in Communication Studies** (3 crs.) Advanced study of selected topics. Subject will vary according to the expertise and availability of instructors. (Lec. 3/Online) Pre: COM 100 and any 300-level COM course and junior standing in a degree-granting college or permission of instructor. May be repeated for a total of 9 credits with different topics. Not for graduate credit.

**COM 411 Advanced Rhetorical Theory** (3 crs.) Advanced study of select contemporary rhetorical theories and their relevance to current topics in language, knowledge, philosophy, culture, modernity and postmodernity. (Lec. 3) Pre: COM 383 and junior standing in a degree-granting college or permission of instructor.

**COM 414 The Rhetoric of Sports in Film** (3 crs.) Studies the rhetoric of sports in film. Students identify and analyze rhetorical messages embedded in films that deal with sports as reflections of the filmmaker's vision by applying film and rhetorical theory. (Lec. 3/Online) Pre: COM 381 and 383 and junior standing in a degree-granting college or permission of instructor. Not for graduate credit.

**COM 415 The Ethics of Persuasion** (3 crs.) Relation of persuasion to ethics is examined. Purposes, means, results, and contexts are considered in making rhetorical judgments

of interpersonal, political, and institutional communication. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

**COM 416 Propaganda** (3 crs.) Examines the history, theory and practice of propaganda. (Lec. 3/Online) Pre: COM 383 and junior standing in a degree-granting college or permission of instructor.

**COM 421 Advanced Interpersonal Communication** (3 crs.) Critical study of major issues and theories of interpersonal communication. Focuses on history, models, and research, including conversation, influence, intimacy, language, and relationships. (Lec. 3) Pre: COM 221 and junior standing in a degree-granting college or permission of instructor.

**COM 422 Communication and Conflict Intervention** (3 crs.) An examination of the role of communication theories in conflict intervention in interpersonal, group, and organizational settings. Emphasis on applying theories through simulations, role plays, case studies, and discussions. (Lec. 3) Pre: COM 221 or COM 251 and junior standing in a degree-granting college or permission of instructor.

**COM 435 Directing Group Performance of Nondramatic Literature** (3 crs.) Practice in Reader's Theatre and Chamber Theatre. Emphasis on direction as a rhetorical device in group work with nondramatic literature and compilation of scripts for individual and group performance. (Lec. 3) Pre: COM 231 and junior standing in a degree-granting college or permission of instructor. In alternate years.

**COM 440 Telecommunications Processes and Audience Behavior** (3 crs.) Surveys theories and research concerning role of electronic mass media in contemporary society. Focuses on interplay between mass media content and audience behavior; provides framework for analyzing current telecommunications issues. (Lec. 3/Online) Pre: COM 340 and junior standing in a degree-granting college or permission of instructor.

**COM 441 Race, Class, and Gender in the Media** (3 crs.) Exploration of the complex dynamics of race relations and political discourse as contexted in the media. Rhetorical methods of analysis are used to study contemporary media coverage of race issues. (Lec. 3/Online) Pre: COM 316A or COM 383 and junior standing in a degree-granting college or permission of instructor.

**COM 442 Strategic Media Communication** (3 crs.) Cross-listed as (PRS), WRT, COM 442, JOR 443. Introduces strategic media relation tactics when responding to the media, specifically crisis communication situations. Students gain practical experience in various writing and speaking opportunities to effectively work with the media. (Lec. 3) Pre: PRS 340. Open only to majors in Communication Studies, Public Relations, Journalism, and Writing. Not for graduate credit.

**COM 445 Media Advertising** (3 crs.) Examination of theory and practice in media advertising. Students will acquire and analyze commercials made by professionals and create and produce media advertisements. (Lec. 3) Pre: COM 210 and junior standing in a degree-granting college or permission of instructor. Not for graduate credit.

**COM 446 Media Theory** (3 crs.) Examines major theoretical approaches to the study of media. Includes perspectives on media institutions, media texts, and media audiences. (Lec. 3)

**COM 450 Organizational Communication Theory** (3 crs.) Surveys theory and practice of communication in organizations. Examines interface of organizational, management, and communication theories. Explores human interaction, flows and formats in organizations; stresses student analysis of organizational communication. (Lec. 3) Pre: COM 251 and junior standing in a degree-granting college or permission of instructor.

**COM 455 Science and Communication in a Century of Limits** (3 crs.) Communication of scientific observations and projections of global resource and environmental limits is focused on persuading formation of publics and social movements needed for widespread action in the 21st century. (Lec. 3) Pre: seniors with varied backgrounds in science and communications. Not for graduate credit.

**COM 461 Managing Cultural Differences in Organizations** (3 crs.) Exploring how to manage cultural differences in organizations and to adapt to culturally diverse organizations by applying the skills of intercultural sensitivity and intercultural competence. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor. Not open to students who have credit for BUS 448, MBA 579.

**COM 462 Communication and Global Society** (3 crs.) Exploring various aspects of the relationship between communication and globalization, including a new sense of community, cultural diversity, cultural identity, global media, and global citizenship. (Lec. 3/Online) Pre: six credits in communication and junior standing in a degree-granting college or permission of instructor.

**COM 471 Internship in Communication Studies PRA** (1-3 crs.) Provides the student with direct supervised participation in a variety of communication situations and occupations. (Practicum) Pre: 18 credits in communication studies and junior standing in a degree-granting college and permission of instructor. S/U only.

**COM 472 Internship in Communication Studies PRA** (1-3 crs.) Provides the student with direct supervised participation in a variety of communication situations and occupations. (Practicum) Pre: 18 credits in communication studies and junior standing in a degree-granting college and permission of instructor. S/U only.

**COM 491 Special Problems** (1-3 crs.) Selected areas of study pertinent to communication. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) Pre: junior standing in a degree-granting college and permission of instructor.

**COM 492 Special Problems** (1-3 crs.) Selected areas of study pertinent to communication. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) Pre: junior standing in a degree-granting college and permission of instructor.

**COM 501 Communication Theory** (3 crs.) Discusses the significance of theory to the understanding of communication. Gives an overview of select major theories applicable to the study of communication. Explores the relationship between theory and research and investigates emerging theories and applications of theory to emerging forms of communication. (Seminar)

**COM 502 Communication Methods** (3 crs.) Explores research methods to understand communication phenomena, critique and analyze the value of communication studies, and independently conduct research to answer communication questions and problems. (Seminar)

**COM 503 Graduate Practicum Teaching Communication Seminar** (1 cr.) Practicum for students teaching postsecondary courses in communication. Provides pedagogical training through discussion, observation, and critique. Development and practice of skills, strategies, and pragmatic aspects of teaching in a university community. Must be taken for a total of 3 credits. (Seminar) Pre: communication studies graduate teaching status. S/U only.

**COM 510 Seminar In Interpersonal Communication** (3 crs.) In-depth examination of a topic in interpersonal communication. Students review and discuss appropriate literature and author a major research paper. (Seminar) Pre: graduate standing or permission of instructor.

**COM 520 Seminar in Media Studies** (3 crs.) In-depth examination of a topic in mass or electronic media, or new information technologies. Students review and discuss appropriate literature and author a major research paper. May be repeated under a different topic. (Seminar) Pre: graduate standing or permission of instructor.

**COM 530 Seminar in Organizational Communication** (3 crs.) In-depth examination of a topic in organizational communication. Students will review and discuss appropriate literature and author a major research paper. May be repeated once under a different topic. (Seminar)

**COM 540 Seminar in Public Discourse** (3 crs.) In-depth examination of a topic in public

discourse. Students will review and discuss appropriate literature and author a major research paper. May be repeated once under a different topic. (Seminar)

**COM 591 Independent Study** (1-3 crs.) Students will work with faculty on independent research projects designed to enhance their research skills and further emphasize the content area most germane to the student.

**COM 592 Independent Study** (1-3 crs.) Students will work with faculty on independent research projects designed to enhance their research skills and further emphasize the content area most germane to the student.

**COM 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## CPL | Community Planning

**CPL 202 Introductory Urban Geography: Understanding Cities** (3 crs.) Cross-listed as (CPL), GEG 202. Introduction to urbanization processes, primarily in North America; national settlement systems; intra urban form; migration, racial, ethnic, gender, and class segregation; urban economics; environmental issues; planning and governance; urban applications of GIS. (Lec. 3/Online) (S) [D]

**CPL 391 Directed Study in Community Planning** (1-3 crs.) Independent work in planning for individual students or groups. (Independent Study) Pre: CPL 410 and permission of instructor.

**CPL 392 Directed Study in Community Planning** (1-3 crs.) Independent work in planning for individual students or groups. (Independent Study) Pre: CPL 410 and permission of instructor.

**CPL 397 Field Work In Community Planning PRA** (1-3 crs.) Student works as a part-time intern in a planning agency under the supervision of a faculty advisor. Fieldwork must be pre-arranged with agency and instructor. (Practicum) Pre: CPL 410 and permission of instructor.

**CPL 410 Fundamentals of Community Planning Practice** (3 crs.) Survey of the planning profession and its different functional areas: land use, environment, urban design, transportation, housing, economic development, and growth management. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**CPL 434 Introduction to Environmental Law** (3 crs.) Cross-listed as (CPL), LAR 434. Surveys issues arising out of laws designed to protect the environment and manage resources: right to a decent environment, government regulation versus private property rights, citizen participation in planning environmental controls. (Lec. 3) Pre:

sophomore standing (45 credits completed) and above.

**CPL 450 Urban Design** (3 crs.) Concepts of contemporary urban landscapes, ranging from entire cities to specific building sites. Includes private development, public spaces, transportation systems, aesthetics, and sprawl. Emphasis on urban design processes and standards. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**CPL 475 The Revolutionary City: Cuba** (3 crs.) Cross-listed as (CPL), GEG 475. Taught in Cuba, summer session. Theory and practice of Cuban urbanization. Cities in the revolutionary relationship between city and country, morphology of Cuban cities, residential differentiation, housing, community activism and Cuban urban policy. Field trips to Cuban cities (Lec. 3) Pre: permission of instructor. Application required. Not for graduate credit.

**CPL 483 Land Development** (3 crs.) Study of land development including land acquisition, development and project effectiveness. Techniques focus on land suitability and project viability, as well as environmental considerations. Focus on coastal development. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**CPL 485 Environmental Planning** (3 crs.) Theories, methodologies, and substantive concerns of environmental resource analysis with attention given to coastal environmental issues. Focus on land, soils, watersheds, water quality, vegetation, air quality, wildlife, noise pollution. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**CPL 498 Community Planning Seminar** (3 crs.) Seminar in community planning from an interdisciplinary perspective. (Seminar) Pre: CPL 210 or 410 or permission of instructor. Not for graduate credit.

**CPL 501 Introduction to Community Planning Practice** (3 crs.) The development of community planning in the United States, history of governmental planning and evaluation of the planning profession, and the elements of planning practice. (Lec. 3)

**CPL 510 Community Planning and Political and Social Change** (3 crs.) Introduction to systems and central theories of determinants for social and planned change in urban and urbanizing communities. Focus on methodologies for political and social assessments. (Seminar) Pre: CPL 523 or permission of instructor.

**CPL 516 Seminar On The Urban Waterfront** (3 crs.) Cross-listed as (MAF), CPL 516. The urban environment and its evolution, structure, and function as it pertains to metropolitan waterfronts and small recreational harbors. Emphasis on the permitting process, public participation, marine recreation, and management issues. Field trip and student project required. (Seminar)

**CPL 522 Planning Law** (3 crs.) General

review and discussion of legal principles and thought concerned with property rights, political power, and the legal aspects pertinent to the planning and development of public and private activities. (Lec. 3) Pre: second-year graduate standing or permission of instructor.

**CPL 523 Planning Theory** (3 crs.) Critical survey of planning theories and contemporary planning concepts. Values, assumptions, and processes of various planning paradigms as related to decisions in community planning. Specific emphasis on values and ethics in planning theory. (Seminar) Service Learning.

**CPL 525 Introduction To Planning Methods** (4 crs.) Application of basic quantitative methods in planning: collection, analysis, and presentation of demographic, housing, and economic data. Introductory survey techniques. Introduction to computer applications in planning. (Lec. 3, Lab. 2) Pre: one course in statistics or permission of instructor.

**CPL 526 Techniques And Methodologies Of Planning Research** (3 crs.) Elementary social science research methods. Introduction to methodological approaches, research design, quantitative and qualitative data collection, and computerized data analysis in community planning and related urban social science. (Lec. 3, Lab. 2) Pre: CPL 525.

**CPL 536 International Comparisons In Urban And Regional Planning** (3 crs.) Urban and regional development issues and policies in advanced and developing countries. Emphasis on population growth, urbanization, and spatial development. (Seminar) In alternate years.

**CPL 537 Land Resource Economics** (3 crs.) Cross-listed as (CPL), EEC 532. The study of economic relationships of human and scarce natural and human-made resources. Supply and demand, rent theory, resources conservation, and the impact of public policy and law. (Lec. 3)

**CPL 538 Site Planning** (3 crs.) Site analysis, planning, and design processes. Principles and techniques addressing residential, commercial, and mixed-use developments. Presents techniques to review site plans and evaluate post-development impacts. (Lec. 3) Pre: graduate standing or permission of instructor.

**CPL 539 Environmental Law** (3 crs.) Analysis of specific environmental issues and policies including facility siting, land use and constitutional issues, comprehensive planning, public trust doctrine, concurrence and state impact assessments. Independent research and presentation required. (Lec. 3)

**CPL 546 Urban and Rural Transportation** (3 crs.) Cross-listed as (CPL), CVE 546. Issues confronting planning for urban and rural transportation systems; the variety of policies that governments pursue in addressing issues and problems; technical and polit-

ical constraints, transportation studies, and demand analysis techniques. (Lec. 3) Pre: CPL 410 or 501 or permission of instructor. In alternate years.

**CPL 549 Seminar In Ecological Planning** (3 crs.) Advanced seminar in ecological planning. Topics include hazardous waste, power plant siting, major transportation facilities, solid waste, aquifer protection, among others. Particular emphasis on wetlands and marine and coastal settings. (Seminar) Pre: CPL 511 or permission of instructor.

**CPL 591 Special Problems in Planning** (1-6 crs.) Individual investigation of special problems in planning. (Independent Study)

**CPL 592 Special Problems in Planning** (1-6 crs.) Individual investigation of special problems in planning. (Independent Study)

## CSC | Computer Science

**CSC 101 Computing Concepts** (4 crs.) Capabilities and limitations of computers. Applications of computers in today's society. Overview of computing systems and programs. Students will complete several projects using a computer. (Lec. 3, Lab. 2/Online) Not open to students who have credit in any college-level computer science course, or to computer science majors. (MQ)

**CSC 106 The Joy of Programming** (4 crs.) The art of problem solving through computer programming. Students explore innovative and cutting edge applications that may include mobile apps, multimedia, computer games, puzzles, robotics, graphics and animation, social networking, physical computing. (Lec. 3, Lab. 1)

**CSC 110 Survey of Computer Science** (4 crs.) Broad introduction to computer science, with an emphasis on problem-solving. Algorithm discovery. Algorithm analysis. Algorithmic solutions to problem in various sub-fields including operating systems, digital forensics, computer graphics, artificial intelligence, and bioinformatics. (Lec. 3, Lab. 2) Open only to computer science majors with 4 or fewer credits in CSC courses.

**CSC 192 Introductory Topics in Computing** (1-4 crs.) Introductory topics of current interest in computing. This course may be repeated under different topics. (Lec., Project) Pre: permission of instructor.

**CSC 200 Computer Problem Solving For Science and Engineering** (4 crs.) An integrated symbolic, numerical, and graphical approach to computer problem solving. Structured design; fundamental programming techniques. Computer algebra systems. Scientific, engineering, and mathematical applications. (Lec. 3, Lab. 2/Online) Pre: credit or concurrent enrollment in MTH 131 or 141. Not for major credit in computer science. May not be taken for credit by students with credit in CSC 201 or 211.

**CSC 201 Introduction to Computer Programming** (4 crs.) Computer characteristics, algorithms, data representation, program development. Students will write several programs to solve numerical and nonnumerical problems. (Lec.3, Lab. 2) Pre: MTH 111 or equivalent. May not be taken for credit by students with credit in 200 or 211. (MQ)

**CSC 211 Object-Oriented Programming** (4 crs.) Problem specification, solution design, and algorithm development. Object-oriented programming and program structure. Functions, selection, iteration, recursion, classes, arrays, and files. Required programs will solve numerical and nonnumerical problems. (Lec. 3, Lab. 2) Pre: prior experience with computers and programming and MTH 111 or equivalent. Intended for computer science and computer engineering majors.

**CSC 212 Data Structures and Abstractions** (4 crs.) Abstract data types and data structures. Pointers, linked lists, stacks, queues, binary trees, and tables. Fundamentals of software engineering. Development of object-oriented programming techniques. (Lec. 3, Lab. 2/Online) Pre: CSC 211 and MTH 141. Intended for computer science and computer engineering majors.

**CSC 292 Topics in Computing** (1-4 crs.) Topics of current interest in computing. This course may be repeated under different topics. (Lec., Project) Pre: permission of instructor.

**CSC 301 Fundamentals of Programming Languages** (4 crs.) Organization of programming languages, data and control structures, syntax and semantics, compilers and interpreters. Block structured languages, recursion, parameter passing, run-time storage management. Procedural, functional, object-oriented, and logical languages. (Lec. 3, Lab. 2/Online) Pre: CSC 212.

**CSC 305 Software Engineering** (4 crs.) Programming environments and methodologies for the design, development, testing, and maintenance of large software systems. Student teams will develop a substantial software product from requirements to delivery using disciplined techniques. (Lec. 3, Project 3) Pre: CSC 212.

**CSC 320 Social Issues in Computing** (4 crs.) Discussion of the social and ethical issues created by the use of computers. The problems that computers solve and those that they produce. Ethics and responsibilities of the computer professional. (Lec. 4) Pre: CSC 211.

**CSC 340 Applied Combinatorics** (4 crs.) Combinatorial problem-solving for computer science. Set theory and logic, proofs by induction and contradiction, elementary probability; arrangements, selections, distributions, binomials, inclusion-exclusion; recurrence relations and their solution; graph theory, trees, networks. (Lec. 4) Pre: CSC 212 and credit or concurrent enrollment in MTH 215, and student must be admitted to a

degree-granting college. Student may not receive credit for this course and CSC 447.

**CSC 392 Intermediate Topics in Computing** (1-4 crs.) Intermediate-level topics of current interest in computing. This course may be repeated under different topics. (Lec., Project) Pre: permission of instructor.

**CSC 402 Programming Language Implementation** (4 crs.) Grammars and languages; lexical analysis and parsers; interpreters, translators, and virtual machines; symbol tables and type systems; code generation for real and virtual machines. Students will implement a number of interpreters, translators, and virtual machines for various small languages. (Lec. 3, Project 3) Pre: CSC 301, and student must be admitted to a degree-granting college.

**CSC 406 Computer Graphics** (4 crs.) Interactive raster graphics; hardware, software, and algorithms. Point plotting, line drawing, geometrical transformations, clipping and windowing. Three-dimensional graphics including curves, surfaces, perspective, hidden objects, shading. User interfaces; graphical programming environments. (Lec. 3, Project 3) Pre: CSC 305, MTH 215 and 243, and student must be admitted to a degree-granting college.

**CSC 411 Computer Organization** (4 crs.) Logical structure of computer systems viewed as a hierarchy of levels. Assembly language programming, assemblers, linkers, loaders. Computer architecture including digital logic, processor organization, instruction sets, addressing techniques, virtual memory, microprogramming. (Lec. 3, Project 3) Pre: CSC 301 and student must be admitted to a degree-granting college.

**CSC 412 Operating Systems and Networks** (4 crs.) General concepts underlying operating systems and computer networks. Topics include process management, concurrency, scheduling, memory management, information management, protection and security, modeling and performance, networking and communication. (Lec. 3, Project 3/Online) Pre: CSC 301 and student must be admitted to a degree-granting college.

**CSC 415 Introduction to Parallel Computing** (4 crs.) Programming techniques to engage a collection of autonomous processors to solve large-scale numerical and non-numerical problems. Processor interconnections. Parallel programming languages and models. Performance measures. (Lec. 3, Project 3) Pre: CSC 301, and student must be admitted to a degree-granting college. In alternate years.

**CSC 417 Computer Communications** (3 crs.) Cross-listed as (ELE 437), CSC 417. Computer networks, layering standards, communication fundamentals, error detection and recovery, queuing theory, delay versus throughput trade-offs in networks, multiple-access channels, design issues in wide and local area networks. (Lec. 3) Pre: ((ELE 205 or 208 or CSC 211), and (ELE 436 or MTH 451

or ISE 411)), or permission of instructor.

**CSC 418 Information and Network Security** (4 crs.) Cross-listed as (ELE), CSC 418. Elementary cryptography, public key, private key, symmetric key, authentication protocols, firewalls, virtual private networks, transport layer security, and wireless network security. (Lec. 3, Project 3) Pre: ELE 208 or MTH 362 or MTH 451 or ISE 411 or junior or senior standing in computer engineering or computer science or permission of instructor.

**CSC 420 Introduction to Information Assurance** (4 crs.) Introduces fundamental concepts necessary to understand the threats to security and various defenses against those threats. Emphasizes understanding of existing threats; planning for security; technology used to defend computer systems; implementing security measures and technology. (Lec. 3, Lab. 2). Pre: CSC 212 or ELE 437/CSC 417 or permission of instructor.

**CSC 423 Network Security and Intrusion Detection** (4 crs.) Provides knowledge needed to defend a network against attackers. Investigates approaches to network security. Examines isolated systems as a method of detecting attacks and gathering data on different attack vectors. (Lec. 3, Lab. 2) Pre: CSC 420 or permission of instructor.

**CSC 436 Database Management Systems** (4 crs.) Construction and management of large data systems. Data modeling, relational and object-oriented systems, main memory databases, query languages, query optimization, concurrency control, transaction management, distributed systems, disk organization, indexes, and emerging technologies. (Lec. 3, Project 3) Pre: CSC 301 or 412 or permission of instructor, and student must be admitted to a degree-granting college.

**CSC 440 Design and Analysis of Algorithms** (4 crs.) Algorithm design and analysis, advanced data structures, computational complexity. Sorting, searching including hashing and balanced trees, string pattern matching, polynomial and matrix calculations, graph and network algorithms, NP-completeness and intractability. (Lec. 3, Project 3) Pre: CSC 340 and student must be admitted to a degree-granting college.

**CSC 445 Models of Computation** (4 crs.) Abstract models of computational systems. Classical models for uniprocessor, sequential, and stored program computers. New models based on recent advances in hardware, software, and communications and their implications in practice. (Lec. 3, Project 1) Pre: CSC 340 and student must be admitted to a degree-granting college. In alternate years.

**CSC 447 Discrete Mathematical Structures** (3 crs.) Cross-listed as (MTH), CSC 447. Concepts and techniques in discrete mathematics. Finite and infinite sets, graphs, techniques of counting, Boolean algebra and applied logic, recursion equations. (Lec. 3) Pre: junior standing or better in physical or mathematical sciences, or in engineering, or

permission of instructor.

**CSC 450 Scientific Computing** (4 crs.) Symbolic, numerical, and graphical approaches to mathematical computation. Pitfalls in numerical computation. Root finding. Numerical integration and differentiation. Approximation of functions. Interpolation and curve fitting. Linear systems. Ordinary differential equations. Multidimensional numerical optimization. (Lec. 3, Lab. 2) Not for graduate credit. Pre: CSC 212 and MTH 215 and 243.

**CSC 481 Artificial Intelligence** (4 crs.) Theories, formalisms, techniques to emulate intelligent behavior using information processing models. Symbolic programming, search, problem solving, knowledge-based techniques, logic, and theorem proving. Optional topics: natural language processing, machine learning, and computer vision. (Lec. 3, Project 1) Pre: CSC 301 or permission of instructor, and student must be admitted to a degree-granting college.

**CSC 485 Computer Forensics** (4 crs.) The science, technology, procedures and law of acquiring and analyzing digital evidence from computers and devices (Lec 3, Lab 3/Online). Pre: CSC 412, or permission of instructor.

**CSC 486 Network Forensics** (4 crs.) The science, technology, procedures and law of acquiring and analyzing digital evidence from computer network activity. (Lec. 3, Lab. 3) Pre: CSC 485.

**CSC 491 Directed Study in Computer Science** (1-4 crs.) Advanced work in computer science. Conducted as supervised individual projects. (Independent Study) Pre: permission of instructor. S/U credit.

**CSC 492 Special Topics in Computer Science** (1-4 crs.) Advanced topics of current interest in computer science. (Lec.1-4, Project 1-3) Pre: permission of instructor.

**CSC 499 Project In Computer Science PRA** (4 crs.) Supervised work on a capstone project in computer science that prepares students for careers in industry and graduate study. (Practicum) Pre: advanced standing in computer science and departmental approval. Normally taken twice in two consecutive semesters. May be repeated for a maximum of 8 credits. Not for graduate credit. S/U credit.

**CSC 501 Programming Language Semantics** (4 crs.) Design, analysis, implementation, and comparative study of major programming language families. Topics include procedural and block-structured languages, interpretive languages, concurrency, functional languages, object-oriented programming, logic programming, dataflow languages and machines. (Lec. 3, Project 3) Pre: CSC 301.

**CSC 502 Theory of Compilers** (4 crs.) An advanced course in compiler construction covering advanced parsing techniques, compiler-writing tools, type checking and type

inference, code optimization, and compiling nonstandard language features. (Lec. 3, Project 3) Pre: CSC 402. In alternate years.

**CSC 505 Advanced Topics in Software Engineering** (4 crs.) Lifecycle models; software development environments; project management. Metrics, performance, and testing. Paradigms for software design and architecture. Legal and ethical issues. (Lec. 3, Project 3) Pre: CSC 305. In alternate years.

**CSC 509 Object-Oriented System Design** (4 crs.) Object-oriented design and programming, the software engineering process. Traditional and current object-oriented design methods. Software reuse. Design tools. Impact of the technology on traditional software engineering. (Lec. 3, Project 3) Pre: CSC 305 and working knowledge of an object-oriented language. In alternate years.

**CSC 511 Advanced Computer Organization** (4 crs.) Evaluation of high-performance computer systems with respect to architectures, operating systems, and algorithms. High-speed conventional machines; array processors; multiprocessors; data flow machines; RISC architectures; VLSI-based machines. (Lec. 3, Project 3) Pre: CSC 411. In alternate years.

**CSC 512 Topics In Distributed Systems** (4 crs.) Advanced topics in distributed systems. Networking; standard distributed computing environments. Distributed computing algorithms. Concurrency and threading. Real-time computing, scheduling, concurrency control, load allocation. (Lec. 3, Project 3) Pre: CSC 412. In alternate years.

**CSC 519 Computer Networks** (4 crs.) Cross-listed as (ELE 543), CSC 519. Computer network architectures, data link control and access protocols for LANs, internet protocols and applications, software and hardware issues in computer communication, delay analysis, and current research in computer networking. (Lec. 4) Pre: ELE 437 or equivalent or CSC 412 or equivalent.

**CSC 522 Bioinformatics I** (3-4 crs.) Cross-listed as (CSC), STA, MIC, BCH, CSC 522, BPS 542. Integrates computing, statistical, and biological sciences, algorithms, and data analysis/management. Multidisciplinary student research teams. Modeling dynamic biological processes. Extra project work for 4 credits. (Lec. 3, Project 3) Pre: major in a computing, statistical, or biological science or permission of instructor.

**CSC 523 Advanced Intrusion Detection and Defense** (4 crs.) Presents advanced techniques and research on intrusion detection and network defense. Topics may include securing mobile devices, machine learning for intrusion detection, distributed firewalls, virtual private clouds, advanced persistent threats. (Lec. 3, Lab. 2). Pre: CSC 423 or permission of instructor.

**CSC 525 Systems Simulation** (3 crs.) Cross-listed as (ISE), CSC 525, ELE 515. Simulation of random processes and systems.

Continuous and discrete simulation models. Data structures and algorithms for simulation. Generation of random variates, design of simulation experiments for optimization and validation of models and results. Selected engineering applications. (Lec. 3) Pre: CSC 212 or ISE 325, ISE 433 or ELE 509, or permission of instructor.

**CSC 536 Topics in Data Management Systems** (4 crs.) Current research and developments in database management systems. Relational, semantic, object-oriented, real-time, distributed, heterogeneous, and logic databases. Concurrency control, security, active rules, recovery, and integrity subsystems. (Lec. 3, Project 3) Pre: CSC 436 or permission of instructor. In alternate years.

**CSC 541 Advanced Topics In Algorithms** (4 crs.) Algorithm design techniques such as dynamic programming, greedy method, branch and bound. Linear programming; NP-completeness; graph algorithms; number theoretic algorithms; approximation algorithms for NP-complete problems; probabilistic and parallel algorithms. (Lec. 3, Project 3) Pre: CSC 440 or 445. In alternate years.

**CSC 542 Mathematical Analysis of Algorithms** (4 crs.) Mathematical techniques for the analysis of algorithms. Sums and products; finite difference calculus; properties of binomial coefficients; Stirling, harmonic, and Fibonacci numbers; recurrence relations; generating functions; asymptotic approximation. Case studies. (Lec. 3, Project 3) Pre: CSC 440. In alternate years.

**CSC 544 Theory Of Computation** (4 crs.) Finite automata, pushdown automata, formal grammars and Chomsky hierarchy, Turing machines, computability, basics of complexity theory. Advanced topics including some of the following: cryptography, interactive proofs, circuit complexity, completeness for various complexity classes, relations among complexity classes, new models of computation. (Lec. 3, Project 3) Pre: CSC 440 or 445. In alternate years.

**CSC 547 Combinatorics** (3 crs.) Cross-listed as (MTH), CSC 547. Enumeration: generation functions, recurrence relations, classical counting numbers, inclusion-exclusion, finite set systems and designs. Polya theory, coding theory, and Ramsey theory. Finite fields and algebraic methods. (Lec. 3) Pre: MTH 316. Offered alternate fall semesters.

**CSC 548 Graph Theory** (3 crs.) Cross-listed as (MTH), CSC 548. Basic concepts and techniques of graph theory as well as some of their applications. Topics include: connectivity, matchings, colorings, extremal problems, Ramsey theory, planar graphs, algebraic techniques. (Lec. 3) Pre: MTH 316.

**CSC 550 Advanced Numerical Comp** (4 crs.) Symbolic mathematical computation; history, use, representation of information, algorithms and heuristics. Big number arithmetic, manipulation of polynomials and rational expressions; algebraic simplification; factoring; symbolic integration. Organization

and implementation of computer algebra systems. (Lec. 3, Project 3) Pre: CSC 350, 440. In alternate years.

**CSC 581 Special Topics in Artificial Intelligence** (3 crs.) Cross-listed as (CSC), ELE 581. Topics of specialized or current interest, which may change. Topics may include expert systems, natural language processing, neural network models, machine learning. AI applications in remote sensing. (Lec. 3) Pre: CSC 481 or permission of instructor. May be repeated with permission. In alternate years.

**CSC 583 Computer Vision** (3 crs.) Cross-listed as (ELE), CSC 583. Algorithms used to extract information from two-dimensional images. Picture functions. Template matching. Region analysis. Contour following. Line and shape descriptions. Perspective transformations. Three-dimensional reconstruction. Image sensors. Interfacing. Applications. (Lec. 3) Pre: MTH 362 or equivalent.

**CSC 585 Topics in Computer Forensics** (4 crs.) Advanced topics in computer forensics. Emerging research, law and techniques in acquiring and analyzing digital evidence from computers and devices (Lec. 3/Lab.3) Pre: CSC 485 or permission of instructor.

**CSC 586 Topics in Network Forensics** (4 crs.) Advanced topics in network forensics. Emerging research, law and techniques in acquiring and analyzing digital evidence from computer networks. (Lec. 3/Lab. 3). Pre: CSC 585.

**CSC 590 Digital Forensics Practicum PRA** (3 crs.) The application of digital forensics acquisition, analysis and law to real world scenarios. (Practicum 3) Pre: CSC 586.

**CSC 591 Directed Study in Computer Science** (1-4 crs.) Advanced work in computer science conducted as supervised individual projects. (Independent Study) Pre: permission of instructor. S/U credit.

**CSC 592 Special Topics in Computer Science** (1-4 crs.) Advanced topics of current interest in computer science. (Lec. 1-4, Project 1-3) Pre: permission of instructor. May be taken more than once.

**CSC 599 Master's Thesis Research** (1-8 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**CSC 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## CSC | Digital Forensics and Cyber Security

**CSF 102 Fundamentals for Cyber Security ONL** (4 crs.) This course provides an overview of the technical background required to provide solutions to many cyber security

problems. This background includes: binary/hex number systems, operating systems concepts, file systems, OSI model, network topologies and protocols, and wireless standards and implementations. (Online)

**CSF 410 Digital Forensics I ONL** (4 crs.) The science, technology, procedures, and law of acquiring and analyzing digital evidence from computers and devices. (Online 4) Pre: CSF 102 or permission of instructor.

**CSF 412 Digital Forensics II ONL** (4 crs.) Selected focused topics on acquiring and analyzing evidence from digital devices. Details on analysis of specific operating system artifacts. (Online) Pre: CSF 410. Not for graduate credit.

**CSF 414 Digital Forensics Analysis ONL** (4 crs.) Digital forensics analysis of evidence using the leading industrial tools. Key word searching, filtering, and report generation. (Online 4) Pre: CSF 410.

**CSF 424 Live Forensics and Incident Response ONL** (4 crs.) Introduces concepts and skills necessary to conduct investigations of compromised workstations and servers. Presents techniques to determine necessary steps to take for proper containment, evidence collection, analysis and restoration. (Online) Pre: CSF 432 or CSF 410.

**CSF 430 Introduction to Information Assurance ONL** (4 crs.) Fundamental concepts to understand threats to security; various defenses against those threats. Planning for security; technology used to defend computer systems; implementing security measures and technology. (Online 4) Pre: CSF 102 or permission of instructor.

**CSF 432 Introduction to Network and Systems Security ONL** (4 crs.) This course provides an overview of network and systems security. It provides the underlying theory of computer security. It further introduces hands-on skills and techniques that are essential to effectively secure the networks and systems of large and small organizations. (Online 4) Pre: CSF 102 or permission of instructor.

**CSF 434 Network and Systems Security ONL** (4 crs.) Advanced security topics including intrusion detection, penetration testing, incident response, malware analysis, and risk management. (Online) Pre: CSF 432. Not for graduate credit.

**CSF 512 Advanced Digital Forensics ONL** (4 crs.) New and emerging techniques for identifying, acquiring, and analyzing new and emerging sources of digital evidence. Current research in Digital Forensics. (Online 4) Pre: CSF 410.

**CSF 516 File System Analysis ONL** (4 crs.) The structure and implementation of computing device file systems. Forensic analysis and reconstruction of digital evidence found in modern file systems. (Online 4) Pre: CSF 410.



**CSF 524 Advanced Incident Response ONL** (4 crs.) Presents advanced techniques and research for incident response and live forensics. Topics may include live forensics in cloud environments, visualization of security incidents, and live forensics in the smart grid. (Online) Pre: CSF 432 or CSF 410.

**CSF 534 Advanced Topics in Network and System Security ONL** (4 crs.) Advanced topics in network security including intrusion detection, penetration testing, incident response, malware analysis, and risk management. Students will learn relevant skills and research emerging solutions to these problems. (Online 4) Pre: CSF 432.

**CSF 536 Advanced Intrusion Detection and Defense ONL** (4 crs.) Presents advanced techniques and research on intrusion detection and network defense. Topics may include network traffic analysis, intrusion analysis, machine learning techniques for intrusion detection, data mining for intrusion detection, advanced persistent threats. (Online 4) Pre: CSF 432.

**CSF 538 Penetration Testing ONL** (4 crs.) Advanced techniques used in assessing the security of networks and identifying vulnerabilities. Network traffic analysis; session hijacking; social engineering; application exploitation; rootkits; network sniffers; developing threats. (Online 4) Pre: CSF 432

## CSV | Community Service

**CSV 301 Course-based Community Service PRA** (1-3 crs.) Learning through a community service experience related to course content. Experience defined by a job description and learning contract; includes orientation and reflection. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. Concurrent enrollment in a course that offers community service experience. May be repeated for a maximum of 6 credits. S/U only.

**CSV 302 Community Service at URI PRA** (1-4 crs.) Learning through a community service project that addresses a specific community need at the University. Project proposed and supervised by an instructor, and varies each semester. Includes mandatory seminar. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. May be repeated for a maximum of 9 credits.

**CSV 302H Honors Section of CSV 302: Community Service at URI PRA** (1-4 crs.) Honors Section of CSV 302: Community Service at URI. (Prac. 3) Pre: Must have a 3.30 overall GPA.

**CSV 303 Service In The Community PRA** (1-4 crs.) Learning through a community service project that addresses a specific need in the off-campus community. Project proposed and supervised by an instructor and varies each semester. (Practi-

cum) Service learning. Pre: junior standing or above, or permission of instructor. May be repeated for a maximum of 8 credits. S/U only.

## CVE | Civil and Environmental Engineering

**CVE 205 Introduction to Civil Engineering Tools** (2 crs.) This course focuses on field measurement using conventional survey techniques and the implementation of computer-aided design for the preparation of mapping and base site plans. (Lec. 1, Lab. 3) Pre: EGR 106 and MTH 142.

**CVE 220 Mechanics of Materials** (3 crs.) Mechanical properties of materials; analysis of members under axial, torsional, and transverse loads; stress and strain; beam deflections, and introduction to statically-indeterminate beams and buckling of columns. (Lec. 3) Pre: MCE 262.

**CVE 230 Mechanics of Materials Laboratory** (1 cr.) Introduction to the physical and mechanical properties of civil engineering construction materials including steel, wood, and Portland cement concrete. Cement properties, mix design, testing of fresh and hardened concrete. (Lab. 3) Pre: credit or concurrent enrollment in CVE 220. Required for civil engineering students only.

**CVE 250 CADD for Civil Engineers** (3 crs.) Operating system issues, basic elements of Computer-Aided Design and Drafting (CADD): creation of 2-D and 3-D models, solid modeling, rendering and animation, applications of CADD in civil engineering design. (Lec. 3) Pre: EGR 106. Preference given to students enrolled in the CVE undergraduate degree program.

**CVE 323 Sustainable Solutions for Developing Communities** (3 crs.) Focuses on creating awareness about the global challenges our society is facing and how to potentially solve them using appropriate and sustainable technologies. (Lec. 3) Pre: EGR 106 and MTH 243 and permission of instructor.

**CVE 323H Honors Sections of CVE 323: Sustainable Solutions for Developing Communities** (3 crs.) Honors Section of CVE 323: Sustainable Solutions for Developing Communities. (Lec. 3) Pre: 3.30 overall GPA and EGR 106 and MTH 243 and permission of instructor.

**CVE 334 Construction Management** (3 crs.) Introduction to construction planning; procedures involved in construction activities with major emphasis on heavy construction. (Lec. 3) Pre: CVE 220.

**CVE 340 Geomatics** (3 crs.) Technologies to obtain measurement data using level, transit, EDM, total station, and GPS instrument. Data collection, sorting, storage, analysis and presentation of data for civil engineering purposes. Practical surveying experiences. (Lec. 2, Lab. 3) Pre: MTH 141 and permission of instructor.

**CVE 346 Transportation Engineering** (3 crs.) Concepts of transportation planning and design as well as traffic analysis techniques are covered with respect to Multi-Mode travel within transportation systems. (Lec. 3) Pre: At least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**CVE 347 Highway Engineering** (3 crs.) Design of modern highways and streets including planning, location, geometric layout, drainage structures, bituminous materials, pavement structure, construction, operation, maintenance and rehabilitation. (Lec. 3) Pre: CVE 346.

**CVE 348 Highway Engineering Laboratory** (1 cr.) Highway capacity analysis, computer applications of geometric design, soil resilient modulus test, L. A. abrasion test, asphalt viscosity test, Marshall and Superpave mix-design, pavement management lab, and field trip. (Lab. 3) Pre: credit or concurrent enrollment in 347.

**CVE 354 Structural Engineering** (3 crs.) Loads and load paths; analysis of statically determinate beams, trusses, frames; deflections of beams and trusses; influence lines; and indeterminate beams and trusses. (Lec. 3) Pre: CVE 220 with C or better and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**CVE 355 Structural Engineering Laboratory** (1 cr.) Introduction to plane stress under combined loading, gravity and lateral loads, structural analysis and design software, structural instrumentation, and dynamics of structures. (Lab. 3) Pre: credit or concurrent enrollment in CVE 354.

**CVE 370 Hydraulic Engineering** (3 crs.) Applied hydraulics of flow in closed conduits and open channels: river and groundwater hydraulics. Analysis of hydraulic structures. Reservoir design. Principles of hydrology. (Lec. 3) Pre: MCE 354 and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**CVE 374 Environmental Engineering** (3 crs.) Water supply and treatment systems, sewerage treatment of municipal and industrial waste waters, stream pollution, groundwater analysis, air pollution and disposal of solid waste materials. (Lec. 3) Pre: MTH 243 or permission of chairperson and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**CVE 375 Environmental Engineering Laboratory** (1 cr.) Laboratory studies in environmental engineering and water resources. Measurement of environmental contaminants, closed conduit flow, and open channel flow. Treatment processes, pipe networks, and centrifugal pump characteristics. Computer implementation for design. (Lab. 3) Pre: MCE 354, CVE 374, and credit or concurrent enrollment in CVE 370.

**CVE 381 Geotechnical Engineering** (3 crs.) Engineering properties of soils, seepage, consolidation theory, calculation of stresses,

failure theories, shear strength of sand, shear strength of clay. (Lec. 3) Pre: CVE 220 and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**CVE 382 Geotechnical Engineering Laboratory** (1 cr.) Laboratory studies of physical properties and behavior of soils: index properties, compaction, consolidation, and shear strength. Interpretation, evaluation, and engineering applications of test data. (Lab. 3) Pre: credit or concurrent enrollment in 381.

**CVE 400 Civil Engineering Professional Licensure** (1 cr.) Preparation of students to take the civil engineering oriented Fundamentals of Engineering examination. Overview of the civil engineering licensure process and importance. (Lec. 1) Pre: Civil engineering major with senior standing. Not for graduate credit. S/U only.

**CVE 422 Offshore Structure Design** (3 crs.) Cross-listed as (OCE), CVE 422. Introduction to offshore structures, structural modeling, structural dynamic analysis, structural design for storms, structural design against fatigue failure. (Lec. 3) Pre: OCE 421. Not for graduate credit.

**CVE 442 Traffic Engineering Highway traffic characteristics and methods of providing for an effective, free, and rapid flow of traffic. Types of studies, regulations, control devices and aids, planning and administration.** (Lec. 2, Lab. 3) Pre: CVE 347 or permission of instructor.

**CVE 443 Intelligent Transportation Systems** (3 crs.) Traffic systems operations/planning strategies; Advanced Transportation Management Systems; Detection Devices; Benefits and Evaluation; In-Vehicle Navigation Theory; Real-Time Dynamic Routing Issues. (Lec. 3) Pre: CVE 346 or permission of instructor.

**CVE 450 Simulation Based Design For Civil Engineers** (4 crs.) Advanced concepts of Computer-Aided Design and Drafting (CADD) as they pertain to a) Digital Prototyping, b) Concurrent Engineering, and c) Continuous Acquisition and Lifecycle Support, Global standards, and file exchange formats. (Lec. 3, Lab. 3) Pre: CVE 220 and 250.

**CVE 453 Computer Analysis of Structures** (3 crs.) Introduction to matrix methods of structural analysis. Solutions of planar structures using a digital computer. (Lec. 3) Pre: CVE 354 or equivalent.

**CVE 460 Steel Structures** (3 crs.) Theory of steel structures including beams, columns, beam-columns, composite construction and connections. Material properties, environmental loads, state of construction practice, fabrication and economic aspects. (Lec. 3) Pre: CVE 354 or permission of instructor.

**CVE 465 Analysis And Design Of Concrete Structures** (3 crs.) Current criteria and practice for design of reinforced and prestressed concrete structures. Elastic and ultimate strength analysis of beams, slabs, columns, and frames. Comprehensive design

problems. (Lec. 3) Pre: CVE 354 or concurrent enrollment. Not for graduate credit in civil engineering.

**CVE 470 Water And Wastewater Transport Systems** (3 crs.) Computer analysis of water storage and transmission. Design of water distribution and wastewater collection systems. (Lec. 2, Lab. 3) Pre: CVE 370 or 374 or permission of instructor.

**CVE 471 Water and Wastewater Treatment Systems** (3 crs.) Development of water quality standards. Design and analysis of physical, chemical, and biological treatment processes and their application to water and wastewater purification systems. (Lec. 2, Lab. 3) Pre: CVE 374 or permission of instructor.

**CVE 474 Water Quality Sampling And Analysis** (3 crs.) Laboratory and field work including sampling of surface and groundwater, chemical and biological analyses for water, monitoring, treated effluent quality control, and detection of hazardous contaminants. (Lec. 1, Lab. 6) Pre: CVE 374 or permission of instructor.

**CVE 475 Water in the Environment** (3 crs.) Evaluation of water as a resource and its relation to the environment: hydrologic cycle, water budgets, water uses, drought, flood, current water problems. (Lec. 3) Pre: CVE 370 or permission of instructor.

**CVE 477 Environmental Sustainability and Green Engineering** (3 crs.) Provides an overview of the impacts in aquatic, terrestrial, atmospheric and built environment created by engineering decisions. Understand the physical, chemical, and biological principles that describe interactions between engineering and the environment. (Lec. 3) Pre: senior standing undergraduate from any engineering program or permission of instructor. Not for graduate credit.

**CVE 478 Hazardous Waste Disposal and Solid Waste Management** (3 crs.) Sources, collection, treatment, and disposal of hazardous wastes and solid wastes. Conservation, recovery, and reuse of material. Economics of waste treatment, disposal, and reuse. (Lec. 3) Pre: permission of instructor.

**CVE 482 Innovative Subsurface Remediation Technologies** (4 crs.) Cross-listed as (GEO), NRS, EVS, CVE 482. Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. (Lec. 4) Pre: permission of instructor. In alternate years. Not for graduate credit.

**CVE 483 Shallow Foundations** (3 crs.) Cross-listed as (CVE), OCE 483. Applications of geotechnical engineering principles to analysis and design of shallow foundations. Foundation types, lateral earth pressures, bearing capacity, settlement, gravity retaining walls, cantilever sheet pile walls. (Lec. 3) Pre: CVE 381.

**CVE 484 Environmental Hydrogeology** (4 crs.) Cross-listed as (GEO), NRS, EVS,

CVE 484. Physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab. 2) Pre: GEO 483 or CVE 588 or NRS 510, or permission of instructor. Not for graduate credit. Offered every other year.

**CVE 491 Special Problems** (1-6 crs.) Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits. Not for graduate credit in civil engineering.

**CVE 492 Special Problems** (1-6 crs.) Advanced work under supervision of a member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits. Not for graduate credit in civil engineering.

**CVE 493 Civil Engineering Design Studies** (1-6 crs.) Off campus civil and environmental engineering design studies. Must include significant hands-on (laboratory or field) experience, use of engineering design tools, and the design, development, test, and evaluation of hardware/software systems. (Independent Study) Pre: junior standing in civil engineering and permission of the department chair. Not for graduate credit in civil engineering.

**CVE 497 Civil Engineering Design I** (2 crs.) Detailed project planning, conceptual design and layout, and environmental impact for the civil engineering integrated capstone design project. Speakers on ethics, professionalism, and professional practice. (Lab. 4) Pre: credit or concurrent enrollment in CVE 346, 354, 374, and 381. Must be taken immediately prior to 498. Required of all seniors in civil engineering. Not for graduate credit in civil engineering.

**CVE 498 Civil Engineering Design II** (3 crs.) Elements of planning, analysis and design of a civil engineering project integrating the principles learned in previous courses; a group integrated capstone design project involving all major aspects of civil engineering design. (Lec. 1, Lab. 6) Pre: Credit or concurrent enrollment in CVE 370, and 497. Required for all seniors in civil engineering. Not for graduate credit in civil engineering.

**CVE 519 Marine Environmental Organic Chemistry** (3 crs.) Cross-coded with (OCG), GEO, CVE 519. Physico-chemical properties of organic compounds, their transformations and environmental fluxes with a focus on marine topics. Offered alternate years. (Lec. 3) Pre: graduate standing or permission of instructor.

**CVE 540 Public Transportation Systems** (3 crs.) Bus and rail modes; technological characteristics on capacity, service quality, costs; analysis, evaluation; performance monitoring, route and network design; frequency determination; vehicle scheduling; advanced operations strategies. (Lec. 3) Pre: CVE 346 or

permission of instructor.

**CVE 542 Traffic Systems Operations** (3 crs.) Signalized and unsignalized intersection treatments; coordination concepts; arterial and freeway management, operating strategies, and design issues; simulation and optimization; performance evaluation. (Lec. 3) Pre: CVE 442 or permission of instructor.

**CVE 545 Pavement Design** (3 crs.) Pavement types; pavement system components; stresses in the pavement structure. Design factors and criteria, pavement stabilization, structural design of flexible and rigid pavements for highways and airports, pavement maintenance and overlay design. (Lec. 3) Pre: CVE 347 or equivalent.

**CVE 546 Urban and Rural Transportation** (3 crs.) Cross-listed as (CPL), CVE 546. Issues confronting planning for urban and rural transportation systems; the variety of policies that governments pursue in addressing issues and problems; technical and political constraints, transportation studies, and demand analysis techniques. (Lec. 3) Pre: CPL 410 or 501 or permission of instructor. In alternate years.

**CVE 547 Geometric Design of Highways** (3 crs.) Evaluation of alternative designs. Criteria and practices of geometric design; at grade intersections, interchanges, channelization, weaving parking facilities, and road appurtenances; safety considerations, lane balancing, ramps, and terminals. (Lec. 3) Pre: CVE 347 or equivalent.

**CVE 548 Bituminous Transportation Materials and Mix-Design** (3 crs.) Asphalt binder, bituminous mixtures, conventional and superpave mix-design methods, material characterization and testing, fracture, fatigue, and permanent deformation, novel pavement materials and additives, and pavement recycling. (Lec. 2, Lab. 3) Pre: 347 or equivalent.

**CVE 549 Transportation Soils and Materials** (3 crs.) Surficial and subgrade soils, mineral aggregates, Portland Cement Concretes, mix-design methods, material characterization and testing, fracture, fatigue, and modern transportation materials. (Lec. 2, Lab. 3) Pre: CVE 347 or equivalent.

**CVE 551 Finite Element Analysis in Civil Engineering I** (3 crs.) Direct stiffness method. Rayleigh-Ritz and Galerkin methods. Iso-parametric elements. Frames, trusses, plane stress and strain. Bending of thin plates. (Lec. 3) Pre: CVE 453 or permission of instructor.

**CVE 552 Structural Timber Design** (3 crs.) Study of wood properties and design considerations. Design and behavior of beams, columns, beam-columns, and wood fasteners. Analysis and design of structural diaphragms, shear walls, and box beams. (Lec. 3) Pre: CVE 354 or equivalent.

**CVE 561 Advanced Steel Design** (3 crs.) Selected topics in structural steel design following the LRFD specification, including plate buckling and postbuckling, torsion,

plate girders, plastic design, frame stability, tall buildings, composite design, and earthquake-resistant design. (Lec. 3) Pre: CVE 460 or permission of instructor.

**CVE 562 Management of Highway Bridges** (3 crs.) Comprehensive systems approach to management of highway bridges. Needs assessment, in-service monitoring and evaluation of bridges. Condition forecasting models and failure analysis. Life-cycle cost and benefit analysis, prioritization and optimization. (Lec. 3) Pre: permission of instructor.

**CVE 563 Prestressed Concrete** (3 crs.) Theory of prestressed concrete including partial losses of prestress and long-term effects due to creep, shrinkage and steel relaxation. Service and ultimate load evaluation of pre-tensioned and post-tensioned beam elements in flexure, shear and torsion. Deflection, camber and crack control evaluation. (Lec. 3) Pre: CVE 465 or equivalent.

**CVE 564 Advanced Reinforced Concrete** (3 crs.) Elastic and ultimate strength theory in flexure, shear, torsion, compression and serviceability. Behavior and analysis of deep beams, corbels, slender and non-slender columns, biaxial bending, two-way slabs and plates. (Lec. 3) Pre: CVE 465 or equivalent.

**CVE 565 Structural Dynamics** (3 crs.) Simplified models and their equations of motion; analytical solution methods; Fourier analysis; Duhamel integral; nonlinearities; computer-oriented solution algorithms and their implementation. Applications. (Lec. 3) Pre: CVE 453.

**CVE 568 Theory of Plates** (3 crs.) Cross-listed as (MCE), CVE 568. Development of basic plate equations. Classical solution examples of rectangular and circular plates. Additional topics selected from orthotropic plates, large deflections, finite element, and numerical solutions. (Lec. 3) Pre: CVE 220 and MTH 244.

**CVE 570 Water Chemistry for Engineers** (3 crs.) Chemical principles applied to problems in environmental engineering, including water and wastewater treatment, contaminant hydrology, and hazardous waste management. (Lec. 3) Pre: permission of instructor.

**CVE 572 Biosystems in Sanitary Engineering** (3 crs.) Microorganisms that constitute the biological systems in water pollution, water purification, and wastewater treatment. Application of principles of microbiology and biochemistry to analysis and design in fields of sanitary engineering and water resources. (Lec. 3) Pre: permission of instructor.

**CVE 573 Theory of Water Purification and Treatment** (3 crs.) Principles of modern water purification and engineering practices. Aeration, deodorization, sterilization, coagulation, filtration, water softening, iron removal, disinfection, and corrosion control. (Lec. 3) Pre: permission of instructor.

**CVE 575 Open-Channel Hydraulics** (3 crs.) Analysis of uniform, critical, varied, and unsteady flow in open channels. Principles will be applied to open-channel design. (Lec. 3) Pre: CVE 370.

**CVE 577 Environmental Sustainability and Green Engineering** (3 crs.) Provides the conceptual, methodological, and scientific basis to understand and reduce the impact of engineering decisions on the environment. Designed for an interdisciplinary audience of engineering graduate students and will provide students with the background and tools necessary to reduce the impacts of design. (Lec. 3) Pre: permission of instructor. Not open to students with credit in CVE 477.

**CVE 579 Advanced Soil Mechanics** (3 crs.) Physico-chemical properties of soils, hydraulic conductivity, consolidation, and shear strength. (Lec. 3) Pre: CVE 381 or equivalent and graduate standing.

**CVE 581 Experimental Geomechanics** (3 crs.) Cross-listed as (CVE), OCE 581. Advanced methods and techniques of geotechnical testing. Behavior of granular and cohesive soils with determination of engineering properties. Interpretation, evaluation, and engineering applications of test data. Emphasis on shearing strength, consolidation, bearing capacity, earth pressures, seepage, and slope stability. (Lec. 3) Pre: CVE 381 or equivalent.

**CVE 582 Seabed Geotechnics** (3 crs.) Cross-listed as (OCE), CVE 582. Geotechnical engineering principles as applied to submarine slope stability, bearing capacity, anchoring; emphasis on effective stress principle, compressibility, and shear strength of marine sediments. (Lec. 3) Pre: CVE 381 or equivalent or OCE 311, or permission of instructor.

**CVE 583 Deep Foundations** (3 crs.) Cross-listed as (CVE), OCE 583. Applications of soil mechanics principles to analysis and design of piles and drilled shafts under vertical and lateral loading. Static and dynamic load testing. Introduction to ground improvement technologies. (Lec. 3) Pre: CVE 381 or equivalent.

**CVE 584 Designing with Geosynthetics** (3 crs.) Overview of geosynthetic materials, properties, test methods, and current standards. Design methods involving geotextiles, geogrids, geonets, geomembranes, and geocomposites. Applications to problems in geomechanics, geoenvironmental engineering, and transportation-related fields. (Lec. 3) Pre: CVE 381 or equivalent.

**CVE 586 Earth Retaining Structures** (3 crs.) Analysis and design of earth retaining structures. Advanced seepage analysis. Mechanically stabilized earth walls, anchored bulkheads, braced excavations, and cofferdams. Slope stability analysis and slope stabilization. Pre: CVE 381 or equivalent. (Lec. 3)

**CVE 588 Groundwater Hydrology** (3 crs.) Quantitative methods of groundwater hydrology including determination of aquifer

properties and yield. Modeling of ground-water systems for management quantity of water, movement of contaminants, and well design. Field and laboratory measurements. (Lec. 3) Pre: CVE 370 and CVE 381 or equivalent.

**CVE 591 Special Problems** (1-6 crs.) Advanced work under supervision of a faculty member arranged to suit individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**CVE 592 Special Problems** (1-6 crs.) Advanced work under supervision of a faculty member arranged to suit individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**CVE 594 Special Topics in Civil and Environmental Engineering** (1-3 crs.) Intensive inquiry into a certain important field of current interest in civil and environmental engineering. (Lec. 1-3) Pre: permission of instructor.

**CVE 596 Numerical Methods in Structural Engineering** (3 crs.) Methods of successive approximations and numerical procedures in the solution of stress, vibration, and stability problems in structural members. Nonuniform members, elastic supports, plates, torsion. (Lec. 3) Pre: permission of instructor.

**CVE 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**CVE 601 Graduate Seminar** (1 cr.) Presentations by researchers and practicing professionals covering topics in various areas of civil engineering and related fields. Presentations and discussions of research by graduate students. (Seminar) S/U credit.

**CVE 602 Graduate Seminar** (1 cr.) Presentations by researchers and practicing professionals covering topics in various areas of civil engineering and related fields. Presentations and discussions of research by graduate students. (Seminar) Required of all full-time graduate students. May be repeated for a maximum of 2 credits. Pre: graduate standing. S/U credit.

**CVE 641 Pavement Evaluation and Rehabilitation** (3 crs.) Pavement performance concepts. Criteria for pavement evaluation. Measurement of pavement distress and structural capacity. Analysis and interpretation of pavement evaluation data. Correlation of data with performance ratings. Formulation and evaluation of maintenance and rehabilitation alternatives. (Lec. 3) Pre: CVE 545 or equivalent.

**CVE 651 Design of Highway Bridges** (3 crs.) Design specifications and analysis methods for highway bridges. Loads. Design of steel I-beam bridges, reinforced concrete bridges, and plate girders. Orthotropic analysis. Bridge details and substructure. (Lec. 3) Pre: CVE 561, 465, and 453.

**CVE 652 Advanced Topics in Bridge Engineering** (3 crs.) Load and resistance factor design of prestressed concrete bridges. Analysis and design of segmental concrete bridges using the span-by-span and the cantilever methods of construction. Time dependent effects. Long span bridges. Bridge condition assessment and rating. (Lec. 3) Pre: CVE 651 or permission of instructor

**CVE 657 Structural Stability** (3 crs.) Introduction; principal forms of equilibrium paths and their stability; conservative elastic systems; buckling of prismatic members; imperfections; plastic deformations; post-buckling of frames and reticulated structures; numerical methods; catastrophe theory. (Lec. 3) Pre: permission of instructor.

**CVE 667 Structural Reliability** (3 crs.) Probabilistic applications in structural analysis and design. Statistical models for forces and material strengths. Component and system structural reliability. Random vibration applications in structural engineering. (Lec. 3) Pre: permission of instructor.

**CVE 672 Water Pollution Control and Treatment of Wastewater** (3 crs.) Wastewater characteristics, effects, and purification in natural water, government control strategies and impacts, cost of control, theory and mathematical concepts of secondary and tertiary treatment process, their limitations, and late developments. (Lec. 3) Pre: one year of chemistry and biology, MTH 243 and CVE 572 or their equivalents, and permission of instructor.

**CVE 677 Stream and Estuarine Analysis** (3 crs.) Fundamentals and mathematical concepts of physical and biological factors applied to the evaluation of the pollution capacity of streams and estuaries. (Lec. 3) Pre: MTH 244.

**CVE 687 Geotechnical Earthquake Engineering** (3 crs.) Introduction to the geotechnical aspects of earthquake engineering. Geology of earthquakes, response of single degree of freedom systems, strong ground motion, dynamic soil properties, site response analysis, liquefaction, and seismic earth pressures for retaining wall design. (Lec. 3) Pre: credit or concurrent enrollment in CVE/OCE 483 and graduate standing.

**CVE 688 Marine Geomechanics** (3 crs.) Cross-listed as (OCE), CVE 688. Integrated study of marine geotechnics and marine geology. Topics include sedimentary processes, acoustic characteristics, slope stability, consolidation and stress history, engineering properties and other subjects related to seabed utilization. (Lec. 3) Pre: CVE 381 or permission of instructor.

**CVE 691 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits.

**CVE 692 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits.

**CVE 694 Advanced Special Topics in Civil and Environmental Engineering** (1-3 crs.) Intensive inquiry into a certain important field of current interest in civil and environmental engineering, requiring advanced sophistication of a 600 level course. (Lec. 1-3) Pre: permission of instructor.

**CVE 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## ECN | Economics

**ECN 100 Introduction to Economics** (3 crs.) General overview of concepts economists employ to address issues of public policy. Description of major institutions of present-day American economy. Historical approach to subject matter. (Lec. 3/Online) (S) [D]

**ECN 100H Honors Section of ECN 100: Introduction to Economics** (3 crs.) Honors Section of ECN 100: Introduction to Economics. (Lec 3/Online) (S), [D] Pre: Must have a 3.30 overall GPA.

**ECN 108 Spaceship Earth: An Introduction to Systems** (4 crs.) Cross-listed as (COM), ECN, SUS 108. Through in-depth study of films, readings and web sites, students will explore the economic and ecological principles of sustainability and the rhetorical strands linking scientific evidence, public policies and individual behavior. (Lec. 3, Rec. 1) (EC) (S)

**ECN 201 Principles of Economics: Microeconomics** (3 crs.) Principles underlying resource allocation, production, and income distribution in a market economy. Topics include demand and supply, consumer behavior, firm behavior, market structure, and elementary welfare analysis. Institutional foundations explored. (Lec. 3/Online) (S)

**ECN 201H Honors Section of ECN 201: Principles of Economics: Microeconomics** (3 crs.) Honors Section of ECN 201: Principles of Economics: Microeconomics. (Lec. 3/Online) Pre: overall gpa of 3.30. (S) [D]

**ECN 202 Principles of Economics: Macroeconomics** (3 crs.) Principles underlying aggregate demand and aggregate supply in a market economy. Topics include national income determination, inflation, unemployment, economic growth, and international trade. Institutional foundations explored. (Lec. 3/Online) Pre: ECN 201 or equivalent. (S)

**ECN 305 Competing Traditions in Economics** (3 crs.) Introductory exposure to

the history of economic thought and also to competing schools of thought within modern economics. Connections between present-day controversies and competing traditions are explored. (Lec. 3/Online) Pre: ECN 201, 202. May be taken concurrently with 202.

**ECN 306 Introduction to Economic Research Methods** (3 crs.) Development of supplementary skills needed to carry out economic research. Topics include: 1) widely used computer operating systems, 2) economic data sources, 3) elementary mathematical and statistical techniques, and 4) library research methods. Pre: ECN 201, 202. May be taken concurrently with ECN 202. (S)

**ECN 310 Economics of Sports** (3 crs.) Economic analysis of professional sports. Topics include sports and television, the collegiate foundation, franchise finance, athletes' compensation, and impact upon local public finance. (Lec. 3) Pre: ECN 100, 201, an equivalent course, or permission of instructor.

**ECN 323 Intermediate Microeconomics** (3 crs.) Theory of consumer behavior, the firm, market equilibrium, general equilibrium, imperfect competition, optimization over time, and linear models. Models of microeconomics are developed using calculus and linear algebra. (Lec. 3) Pre: ECN 201, 202 and MTH 131 or 141.

**ECN 324 Intermediate Macroeconomics** (3 crs.) Theory of consumption, investment, monetary and fiscal policy, static and dynamic models, economic growth, unemployment, and inflation. Macroeconomics developed using calculus and linear algebra. (Lec. 3) Pre: ECN 201, 202 and MTH 131 or 141.

**ECN 327 Intermediate Economic Theory: Income and Employment** (3 crs.) Measurement of national income. Theory of the determination of the general level of income, employment, and prices. Business fluctuations. (Lec. 3) Pre: ECN 202 or 590 or permission of instructor. Not available for credit for students who have taken ECN 324.

**ECN 328 Intermediate Economic Theory: Pricing and Distribution** (3 crs.) Market conditions and forces affecting the pricing and production of goods and services, the allocation of resources, and the distribution of income. (Lec. 3) Pre: ECN 201 or permission of instructor. Not available for credit for students who have taken ECN 323.

**ECN 333 Economics and the Law** (4 crs.) Cross-listed as (ECN), PSC 333. Explores the different approaches of the economic analysis of law, and the history of how economics came to influence on the field of law. (Lec. 4) Pre: ECN 201.

**ECN 334 Money, Financial Markets, and Monetary Policy** (3 crs.) Structure and functioning of monetary institutions. Analyses of monetary theories. The role of monetary policy. U.S. banking structure: its operations and functioning. (Lec. 3) Pre: ECN 201 and 202 or permission of instructor.

**ECN 335 Intermarket Economic Analysis** (3 crs.) Analyzes the basic functioning of markets using microeconomics generalizing to basic macroeconomic models. Emphasis on analyzing macroeconomic behavior through the interrelationships between the stock, bond, currency, and commodity markets. (Lec. 3) Pre: ECN 201 and 202 or equivalent; these may not be taken concurrently.

**ECN 337 Industrial Organization and Public Policy** (3 crs.) Historical and present attitudes and policies of various levels of government toward the changing structure of American business. Emphasis on legal and economic concepts of business activity. (Lec. 3) Pre: ECN 201 or 202 or permission of instructor.

**ECN 338 International Economics** (3 crs.) Theory and evidence on international trade and finance. Includes determinants and welfare effects of foreign trade, international investment, migration, exchange rates, and the balance of payments. (Lec. 3) Pre: ECN 100 or 201 or permission of instructor.

**ECN 342 Public Finance** (3 crs.) Examination of the theory and practice of public expenditures, revenues, and fiscal policy with major emphasis on federal fiscal affairs. (Lec. 3) Pre: ECN 201 or 202 or permission of instructor.

**ECN 344 Political Economy of Global Finance** (3 crs.) Cross-listed as (ECN), PSC 344. History, theory, and politics of the global financial system. Topics include the foreign exchange market, international banking, macroeconomic problems of open economies, and global financial crises. (Lec. 3) Pre: ECN 100 or 202 or permission of instructor.

**ECN 351 Assigned Work** (3 crs.) Special work in economics when it can be arranged to meet the needs of individual students who desire independent work. (Independent Study) Pre: ECN 201 or 202 or permission of instructor. S/U credit.

**ECN 352 Assigned Work** (3 crs.) Special work in economics when it can be arranged to meet the needs of individual students who desire independent work. (Independent Study) Pre: ECN 201 or 202 or permission of instructor. S/U credit.

**ECN 360 Health Economics** (3 crs.) Economic analysis of health services. Topics include demand and supply in markets for health care and insurance, government regulations, and performance of national health systems. (Lec. 3) Pre: ECN 201

**ECN 363 Economic Growth and Development** (3 crs.) Basic problems in economic growth and development of so-called backward or preindustrial countries. Emphasis on population trends, agrarian reforms, capital formation, international aid programs, respective roles of private and public enterprise. (Lec. 3) Pre: ECN 201 or 202 or permission of instructor.

**ECN 368 Labor Economics** (3 crs.) Impact of industrialization on workers; survey of the

basic principles of labor market organization and operation; unemployment and remedies; wage determination under union and nonunion conditions. (Lec. 3) Pre: ECN 201 and 202.

**ECN 371 Economics in Islamic Societies** (3 crs.) Principles of Islamic economic systems, private property and the market. Freedom of enterprise and role of the state. Comparison with capitalism and socialism. (Lec. 3) Pre: ECN 201, 202 or permission of instructor.

**ECN 375 Introduction to Quantitative Methods I** (3 crs.) Mathematical techniques used in modern economic theory. Linear algebra, the calculus of several variables, constrained maximization, and differential equations. Application to economic problems. (Lec. 3) Pre: ECN 201 and 202 and MTH 131 or 141, or permission of instructor.

**ECN 376 Introduction To Econometrics** (4 crs.) Application of econometric methods to economic problems. Econometric tools applied to micro- and macroeconomic problems. (Lec. 3, Lab. 2) Pre: ECN 201 or permission of instructor.

**ECN 381 Radical Critiques of Contemporary Political Economy** (3 crs.) Radical right and radical left critiques. Radical views on values, methodology, production planning, income distribution, economic power, the military-industrial complex, imperialism, and racial and sexual discrimination. (Lec. 3) Pre: 202 or permission of instructor. (S) [D]

**ECN 381H Honors Section of ECN 381: Radical Critiques of Contemporary Political Economics** (3 crs.) Honors Section of ECN 381: Radical Critiques of Contemporary Political Economics. (Lec. 3) Pre: ECN 202, 3.30 overall GPA, or permission of instructor. (S) [D]

**ECN 386 The Economics of Race, Gender, and Class** (3 crs.) Cross-listed as (ECN), GWS 386. An economic examination of the historical interrelations of race, class, and gender issues. (Lec. 3) Pre: ECN 100 or 201 or permission of instructor.

**ECN 390 Topics in Economics** (3-4 crs.) In-depth treatment of a topic in economics. May be repeated with different topics. (Lec. 3-4) Pre: ECN 201 or permission of instructor.

**ECN 445 Senior Research Seminar** (3 crs.) Collaborative group research on topic(s) selected by instructor. Written report and/or oral presentation required. (Independent Study) Pre: For economics majors only. Must have completed 90 credits and ECN 201, 202, 305, 306 or 376, 324 or 327, 323 or 328, or permission of instructor. Not for graduate credit.

**ECN 480 Seminar In Labor Studies** (3 crs.) Cross-listed as (ECN), LRS 480. Intensive studies examining various important topics in labor studies. Class discussion of assigned readings and student reports. (Lec. 3) Pre: permission of instructor. Not for graduate credit.

**ECN 515 Economic Research** (1-3 crs.) Independent research. (Independent Study) S/U credit.

**ECN 516 Economic Research** (1-3 crs.) Independent research. (Independent Study) S/U credit.

**ECN 526 Economics of Labor Markets** (3 crs.) Cross-listed as (LRS), ECN. The theory of labor market behavior, and application of theory for public policy analysis in areas such as discrimination, unemployment, and education. (Lec. 3) Pre: ECN 201 and 202 or 590 or equivalent.

**ECN 527 Macroeconomic Theory** (3 crs.) Cross-listed as (EEC), ECN 527. Static and dynamic models of aggregate economic behavior developed and analyzed. (Lec. 3) Pre: ECN 327 and 375 or equivalent, or permission of instructor.

**ECN 528 Microeconomic Theory** (4 crs.) Cross-listed as (EEC), ECN 528. Analytic tools of optimization. Neoclassical price and production theory. Neoclassical theory of consumer and producer behavior, price and distribution, partial and general equilibrium and welfare economics. (Lec. 4) Pre: ECN 328 and 375 or equivalent and concurrent registration in EEC 518, or permission of instructor.

**ECN 576 Econometrics** (4 crs.) Cross-listed as (EEC), ECN, STA 576. Application of statistics and mathematics to economic analysis. Implication of assumption required by statistical methods for testing economic hypotheses. Current econometric methods examined and discussed. (Lec. 3, Lab. 2) Pre: ECN 575 or equivalent, STA 308 or equivalent, or permission of instructor.

**ECN 590 Principles of Economics** (3 crs.) Survey of micro- and macroeconomic theory. (Lec. 3) Pre: graduate standing in accounting, labor and industrial relations, or M.B.A. program.

**ECN 628 Advanced Microeconomic Theory I** (3 crs.) Cross-listed as (EEC), ECN 628. Neoclassical value and distribution theory. Theories of imperfect competition, general equilibrium theory, and dynamic analysis. (Lec. 3) Pre: EEC 528 or permission of instructor.

**ECN 676 Advanced Econometrics** (4 crs.) Cross-listed as (EEC), ECN 676. A course covering the tools necessary for professional research in resource economics. Reviews the general linear model, but emphasis is on simultaneous equation models. Assumes a knowledge of introductory econometrics, statistical theory, and matrix algebra. (Lec. 4) Pre: EEC 576 or its equivalent.

## EDC | Education

**EDC 102 Introduction To American Education** (3 crs.) Introduction to the fundamental structure, functions, and problems of American education. Emphasis on education

as both a sociocultural phenomenon and an embodiment of philosophical commitments. Diversity, writing and speaking focus. (Lec. 2, Rec. 1) Not for major credit in elementary or secondary education. (S) [D]

**EDC 102H Honors Section of EDC 102: Introduction to American Education** (3 crs.) Honors Section of EDC 102: Introduction to American Education. Not for major credit in elementary or secondary education. (Lec. 2, Rec. 1) Pre: Must have a 3.30 overall GPA. (S) [D]

**EDC 250 Supervised Preprofessional Field Experience PRA** (1 cr.) Supervised early field experience and seminar for students wishing to explore one or more possible career choices in education. (Practicum) May be repeated for credit. S/U only.

**EDC 279 Career Development Seminar** (1 cr.) Individualized approach to career concerns, skill identification, self-awareness, career development theory, decision making. Emphasis on understanding long- and short-term goals. (Seminar)

**EDC 306 Education Policy and Public Service Internship-MTI@URI PRA** (4 crs.) Cross-listed as (PSC), EDC 306. Internship in a Rhode Island public school accompanied by an introduction to the problems and politics of education policy viewed from an interdisciplinary approach. (Rec. 1, Prac. 1, Online 2)

**EDC 312 The Psychology of Learning** (3 crs.) An analysis of learning with emphasis on principles and procedures applicable to any human teaching and learning situation. (Lec. 3) Pre: PSY 113.

**EDC 331 Clinical Experiences for Secondary Education I PRA** (1 cr.) Secondary school clinical experience. Student applies content learned in the measurement course (EDC 371) and prior course work in classroom settings. (Practicum) Pre: EDC 312 or 512 and concurrent enrollment in EDC 371. Open only to students accepted into the School of Education or permission of instructor. (S/U)

**EDC 332 Clinical Experiences for Secondary Education II PRA** (1 cr.) Secondary school clinical experience. Student applies content learned in EDC 448 and EDC402 and prior course work in classroom settings. (Practicum) Pre: EDC 371, 331, and concurrent enrollment in 448 and 402. Acceptance to the School of Education or permission of instructor. S/U credit.

**EDC 350 Primary School Practicum PRA** (1 cr.) Students apply methodology in a public school setting for grades K-2 for three hours each week for 10 weeks. Lessons are taught and principles of classroom management, individualized instruction, and integrated curriculum are applied. (Practicum) Pre: HDF 200 and acceptance into the early childhood education program. S/U only.

**EDC 371 Educational Measurements** (3 crs.) An analysis of concepts and procedures involved in creating, selecting, summarizing, and using tests and other measurement

devices in educational settings. (Lec. 3) Pre: EDC 312 or 512, and concurrent enrollment in EDC 331 or 400. Open only to students accepted into the School of Education or permission of instructor.

**EDC 400 Middle School Curriculum Assessment and Methods** (3 crs.) Seminar addressing contemporary middle school curriculum, assessment, methods, and research-based models are emphasized. Focus is on adolescents; teaming; thematic, integrated, interdisciplinary, standards-based instruction; differentiated instruction; and multiple intelligences. (Lec. 3 and 30 hours of field experience) Pre: EDC 312 or 512 and concurrent enrollment in EDC 371 and 331 for secondary education students; EDC 312 or 512 and concurrent enrollment in EDC 453, 454, and 331 for elementary education students. Open only to students accepted into the School of Education or by permission of instructor.

**EDC 402 The Education of Special Needs Students** (3 crs.) Legislative, judicial, social and psychological issues related to assessment, identification, and education of students with special needs in general education classrooms. (Lec. 3) Pre: acceptance into a teacher preparation program or teacher certification.

**EDC 403 Observation in a Middle Level Classroom** (1 cr.) Seminar and practicum (minimum of 30 hours) to observe teaching practices and adolescent behavior in middle school. Completion of a shadow study of an adolescent. Pre: concurrent enrollment in EDC 569 or permission of instructor.

**EDC 415 Adolescents and Classroom Management** (3 crs.) Seminar addressing issues of adolescent development manifested in the classroom, emphasizing management strategies for learning and adolescent developmental needs. (Seminar 3 and 30 hours of field experience) Pre: EDC 448, 402, 332, and concurrent enrollment in 430 and 431 for secondary education students; concurrent enrollment in 460 for elementary education students. Open only to students accepted into the School of Education or by permission of instructor.

**EDC 422 Technology Applications in Education and Training** (3 crs.) Introduction to the use of microcomputers in pre-K through adult education settings. Current use and techniques will be explored for evaluating hardware and software, implementation issues, and future developments. (Lec. 3) Pre: senior standing. Not for graduate credit.

**EDC 423 Teaching Comprehension and Response in the Elementary School** (3 crs.) Analysis of narrative and expository text; strategies for teaching literacy in elementary grades using these texts, specifically focusing on vocabulary, comprehension, response, and integrating these literacy practices throughout the curriculum. (Lec. 3) Pre: Acceptance into a teacher preparation program or teacher certification, and prior or

concurrent enrollment in EDC 312 or 512; or permission of instructor.

**EDC 424 Teaching Literacy in the Primary Grades** (3 crs.) Fundamental knowledge base in literacy development and primary grade literacy instruction. Bridges theory and practice through exposure to a variety of methods and materials used to create a comprehensive primary literacy curriculum. (Lec. 3) Pre: Elementary education majors: EDC 312 or 512, and 423; Early childhood education majors: HDF 302 or EDC 423; Non elementary or early childhood education majors: graduate standing or permission of instructor.

**EDC 425 Web Site Technology in Education and Training** (3 crs.) Focus on designing web-based curriculum. Topics include incorporating multimedia technologies into a web site, appropriate androgogical and pedagogical strategies, and web site design and development. (Lec. 3) Pre: senior standing or permission of instructor. Not for graduate credit.

**EDC 426 Curriculum III: Integrated Language Arts & Social** (3 crs.) Principles and practices of developing knowledge, skills, and activities in language arts and social studies for grades prek-2. (Lec. 3) Pre: HDF 301, HDF 303, HDF 420, and acceptance into the Early Childhood Certification Program. Not for graduate credit in education.

**EDC 429 Storytelling and Emergent Literacy** (3 crs.) Theoretical foundations and applications of storytelling and emergent literacy including provisions for diverse populations. Field-based storytelling at early childhood and elementary sites. Focuses on children birth to seven years. (Lec.3) Pre: Sophomore or higher standing; also open to graduate students. Open to all students in the summer.

**EDC 430 Methods and Materials in Secondary Education** (3 crs.) Principles of education as related to curricular materials and classroom situations. Sectioned by academic major: English, mathematics, modern language, science, social studies. (Lec. 3) Pre: EDC 448, 402, 332 and concurrent enrollment in EDC 431. Open only to students accepted into the School of Education or Permission of Instructor. Not for graduate credit in education.

**EDC 431 Clinical Experiences for Secondary Education PRA** (1 cr.) Secondary school clinical experience, taken concurrently with secondary methods course (430) during semester prior to student teaching. Student applies content learned in methods course and prior course work to peer teaching and classroom settings. Restricted to majors. (Practicum) Not for graduate credit. S/U only.

**EDC 435 The Teaching of Composition** (3 crs.) Cross-listed as (WRT), EDC 435. Philosophy, materials, and methods underlying the teaching of writing with emphasis on current approaches including the application of linguistics. Offers practice in writing

workshop techniques, marking, constructing assignment sequences, and individualized instruction. (Seminar) Pre: junior standing or permission of instructor.

**EDC 448 Literacy Practices for Content Subjects** (3 crs.) Emphasis on the development of specialized vocabulary, textbook reading techniques, and other study skills needed to read math, science, social studies, business, and other content area materials. (Lec. 3) Pre: 331 or 400, 371 and concurrent enrollment in 332 and 402. Open only to students accepted into the School of Education or permission of instructor.

**EDC 449 Teaching Adolescent Literature** (3 crs.) The current canon of adolescent literature will be reviewed and expanded, and methodologies for literature instruction will be explored. (Lec. 3) Pre: acceptance into the English education program or permission of instructor. Not open to students who have taken LSC 531.

**EDC 452 Evaluation of Elementary and Middle School Students** (2 crs.) Purposes and means of evaluating elementary and middle school children will be critically analyzed. Types of tests and measurement tools will be examined, such as observation checklists, sociograms, rating scales, and portfolios. (Seminar) Pre: EDC 424, 456, 457, 458, 459; acceptance into the elementary education program and concurrent enrollment in EDC 402, 455 and 460. Not for graduate credit.

**EDC 453 Individual Differences** (3 crs.) Analyzing the needs of various student populations with attention given to the concomitant values, resources, and curriculum modifications necessary for success in learning. (Lec. 3) Pre: EDC 102, 250 and 312/512 or concurrent enrollment; acceptance in the elementary education program and concurrent enrollment in EDC 423 and 454. Not for graduate credit.

**EDC 454 Individual Differences Field Component PRA** (1 cr.) Supervised field experience related to EDC 453 consisting of special education, language minority, compensatory education, gifted and talented, and at-risk students. (Practicum) Pre: EDC 102, 250, and 312/512 or concurrent enrollment; acceptance in the elementary education program; concurrent enrollment in EDC 423 and 453. Not for graduate credit.

**EDC 455 Language Arts Methods in Elementary and Middle School Teaching** (2 crs.) Language arts and reading principles and practices of guiding children in the skillful use of basic means of communication (speaking, listening, writing, and reading) in the elementary and middle school classroom. (Lec. 2) Pre: EDC 424, 456, 457, 458, 459, acceptance into the elementary education program, and concurrent enrollment in 402, 452 and 460. Not for graduate credit.

**EDC 456 Mathematics Methods in Elementary and Middle School Teaching** (2 crs.) Principles and practices of developing knowledge and skills in mathematics with

elementary and middle school children. Service Learning. (Lec. 2) Pre: EDC 423, 453, 454; acceptance into the elementary education program. Concurrent enrollment in EDC 424, 457 and 458. Not for graduate credit.

**EDC 457 Science Methods in Elementary and Middle School Teaching** (2 crs.) Principles and practices of developing knowledge and skills in science with elementary school children. (Lec. 2) Pre: Pre: EDC 423, 453, 454, acceptance into the elementary education program and concurrent enrollment in EDC 424, 456, 458 and 459. Not for graduate credit.

**EDC 458 Social Studies Methods in Elementary and Middle School Teaching** (2 crs.) Principles and practices of developing knowledge and skills in social studies with elementary and middle school children. (Lec. 2) Pre: EDC 423, 453, 454, acceptance into the elementary education program and concurrent enrollment in EDC 424, 456, 457 and 459. Not for graduate credit.

**EDC 459 Supervised Elementary Methods Practicum I PRA** (1 cr.) Supervised field experience related to evaluation of elementary students and methods courses: assessment, mathematics, and science. Students will observe and teach. (Practicum) Pre: EDC 453, 454, acceptance into the elementary education program, and concurrent enrollment in 456, 457, and 458. Not for graduate credit.

**EDC 460 Supervised Elementary Methods Practicum II PRA** (2 crs.) Supervised field experience related to evaluation of elementary students and methods courses: teaching special needs students, social studies, and language arts. Students will observe and teach. Students meet periodically throughout the semester to focus on issues of classroom management. (Practicum) Pre: EDC 424, 456, 457, 458, 459, acceptance into the elementary education program, and concurrent enrollment in 402, 452, and 455. Not for graduate credit.

**EDC 478 Problems in Education** (0-3 crs.) Advanced work in education conducted as seminars, supervised individual projects, or supervised field experiences. Topics include: Heads Up! Reading, NBPTS: Pre-candidates. (Independent Study) Students in seminars and supervised individual projects will be graded using standard grades (A-F); students in supervised field experiences will be graded using S/U grades only.

**EDC 479 Problems in Education** (1-3 crs. each) Advanced work in education conducted as seminars, supervised individual projects, or supervised field experiences. Topics include: NBPTS, Literacy-Based Early Childhood Education Curriculum. (Independent Study) Students in seminars and supervised individual projects will be graded using standard grades (A-F); students in supervised field experiences will be graded using S/U grades only.

**EDC 484 Supervised Student Teaching PRA** (6-12 crs.) Under approved critic teachers, students participate in classroom teaching and other school activities for a period determined by credit to be earned. Areas include: secondary educational, middle level education, elementary education, early childhood education and music. (Practicum) Pre: methods course(s) of department involved. Not for graduate credit in education. S/U credit except for music.

**EDC 485 Seminar In Teaching** (3 crs.) Seminar associated with student teaching. Classroom issues, resource materials, and teaching models are addressed. Course work from throughout the undergraduate program and student teaching is integrated into a professional portfolio. Capstone. Areas include secondary nonvocational, elementary early childhood education, home economics, resource development, business, music, physical education (S/U only), theatre. (Seminar) Pre: Concurrent enrollment in EDC 484 or permission of director. Not for graduate credit in education.

**EDC 486 Student Teaching In Elementary Physical Education PRA** (6 crs.) Under selected and approved critic teachers, students participate in classroom teaching and other school activities. (Practicum) Pre: methods courses of department. Not for graduate credit in education.

**EDC 487 Student Teaching In Secondary Physical Education PRA** (6 crs.) Under selected and approved critic teachers, students participate in classroom teaching and other school activities. (Practicum) Pre: methods courses of department. Not for graduate credit in education.

**EDC 500 Foundations of Adult Education** (3 crs.) Examination of fundamental structure, functions, problems, and history of adult education in America. Focus on socio-economic factors and philosophical commitments that have shaped various programs. (Lec. 3) Pre: graduate or senior standing and permission of instructor.

**EDC 502 Foundations of Curriculum** (3 crs.) History and analysis of foundational ideas and schools of thought about curriculum and how they shape modern practices in curriculum development, implementation, evaluation, and change in the United States. (Lec. 3)

**EDC 503 Education in Contemporary Society** Leading educators' responses to issues and challenges confronting American education. Emphasis on identification and analysis of contemporary theories and practices reflecting the relationship between characteristics of society and educational values. (Lec. 3)

**EDC 504 Adult Basic Education** (3 crs.) Teaching of adults whose educational level is below high school completion. Physical, social, and psychological characteristics of disadvantaged adults and various techniques and materials useful in motivating and

teaching them. (Lec. 3) Pre: permission of instructor.

**EDC 505 Leadership Development in Adult Programs** (3 crs.) Discussion of leadership concepts, styles, and implications. Discussion and practice in the use of several adult education methods and techniques for increasing the effectiveness of groups and organizations. (Lec. 3) Pre: permission of instructor.

**EDC 508 Interdisciplinary Curriculum Development** (3 crs.) Curriculum development of interdisciplinary units for schools. Focus is on grade-level units which incorporate multiple subject areas. Both individual and group projects required. (Lec. 3) Pre: permission of instructor.

**EDC 510 Reading Instruction** (3 crs.) Examines research in beginning reading and best practices for primary (K-2) literacy instruction, and links these to the Rhode Island Reading Policy and the Tri-State GLEs. (Lec. 3) Pre: teaching certification.

**EDC 512 Educational Psychology/classroom Learning** (3 crs.) Survey and analysis of classroom learning literature. Particular attention paid to interaction of theory and research for instructional practice. Introduces relevant measurement, statistical, and research concepts. (Seminar) Pre: previous course in psychology, or permission of instructor.

**EDC 516 Teaching English as a Second Language** (3 crs.) Methods and materials for those who plan to teach English as a second language. Students develop and implement appropriate strategies and techniques for teaching of ESL. (Lec. 3) Pre: permission of instructor.

**EDC 517 Teaching Social Studies in the Elementary School** (3 crs.) Intensive research in various cross-subject topics within the social studies. Systematic analyses of learning theories and methods as they relate to the teaching of social studies in the elementary grades. (Lec. 3) Pre: graduate or postgraduate standing.

**EDC 518 Teaching Science in the Elementary School** (3 crs.) Emphasis on methods and materials for use in the teaching of science in technology, life, earth, space and physical science topics. (Lec. 3) Pre: permission of instructor.

**EDC 520 Teaching of Mathematics** (3 crs.) For the experienced teacher, examination of the principles underlying the teaching of mathematics in the elementary school; comprehensive survey of materials and methods available for the classroom teacher of mathematics. (Lec. 3) Pre: senior or graduate standing. In alternate years.

**EDC 521 Teaching Basic Reading to Adults** (3 crs.) Techniques for teaching basic reading skills to illiterate adults; diagnosis, methods, and materials. (Lec. 3) Pre: EDC 504 or permission of instructor.

**EDC 522 Using Technology to Teach Adult Learners** (3 crs.) The use of web-based and social networking tools will be explored and used for effectively teaching and training adult learners in a variety of settings. (Lec. 3) Pre: senior or graduate standing.

**EDC 525 Web Site Technology in Education and Training** (3 crs.) Focus on designing web-based curriculum. Topics include incorporating multimedia technologies into a web site, appropriate androgical and pedagogical strategies, and web site design and development. (Lec. 3) Pre: EDC 522 or permission of instructor.

**EDC 527 Language Study for Teachers of Reading** (3 crs.) Cross-listed as (EDC), PSY 527. Focuses on the structure of language at the sound, syllable, and word level. Applies concepts to reading and spelling development, teaching phoneme awareness, interpreting student errors, and planning instruction. (Seminar)

**EDC 529 Foundations of Educational Research** (3 crs.) Analysis of the current major research approaches to educational problems with emphasis on interpreting published research involving the language of statistics. Functional skills in basic descriptive statistics needed prior to enrolling. (Lec. 3)

**EDC 531 Teaching and Learning with Digital Technologies** (3 crs.) This course engages students in project-based inquiry using a variety of digital tools to create challenging and engaging learning opportunities for others. (Lec. 1, Workshop 2)

**EDC 534 Seminar in Digital Authorship ONL** (3 crs.) This course includes a range of hands-on dynamic learning experiences that integrate digital media, technologies, and best practice strategies for teaching composition and authorship in a Web 2.0 world. (Online 3)

**EDC 539 Evaluation and Monitoring of Occupational Training Programs** (3 crs.) Evaluation and monitoring theory and practice for education and training programs. Focus on development of evaluations for programs in job training, public education and private sector programs. (Lec. 3) Pre: EDC 529 or permission of instructor.

**EDC 540 Learning Disabilities: Assessment and Intervention** (3 crs.) Cross-listed as (PSY), EDC 540. Applications of early screening batteries; remedial programs for various disabilities, including behavioral programs and methods for older children and adolescents. Emphasis on pragmatic application of skills for detection and treatment. (Lec. 3) Pre: permission of instructor. May be repeated for a maximum of 6 credits.

**EDC 544 Reading Acquisition and Reading Disability: Research and Implications for Practice** (3 crs.) Cross-listed as (PSY), EDC 544. Examination of research on the language, cognitive, and reading characteristics of children who successfully learn to read and of those who encounter difficulty. Addi-



tional focus on the implications and use of the research for assessment and instruction. (Lec. 3) Pre: graduate standing or permission of instructor.

**EDC 555 Quantitative Thinking and Applications for Education** (3 crs.) Basic logic and techniques of quantitative data analysis. For Education Ph.D. students planning to conduct applied research in educational settings, this course provides foundations of receptive and expressive literacy. This course satisfies the prerequisite for EDP 625, but cannot be used for program credit. (Lec. 3) Pre: admission to joint URI-RIC Ph.D. in Education program. (Spans both summer sessions.)

**EDC 562 Methods of Intervention for Literacy Difficulties** (3 crs.) Teachers will explore methods and materials used for developing phonological awareness, sound/symbol knowledge, word reading skills, fluency, comprehension, and vocabulary through readings, discussions, application, and reflection. (Lec. 3) Pre: Restricted to students accepted to teacher education, or graduate standing, or permission of instructor.

**EDC 563 Teaching Reading to Multicultural Populations** (3 crs.) Identification of the strengths of learners whose cultural and socioeconomic backgrounds vary, and the implications for teaching reading. Special emphasis on the selection and development of appropriate materials and teaching strategies. (Lec. 3) Pre: EDC 424 or permission of instructor.

**EDC 564 Diagnosis of Literacy Difficulties** (4 crs.) Use informal and formal techniques to assess students' reading and writing skills, evaluate contextual factors, and evaluate the match between learner and context. Culminates in case report and plan for instruction. (Lec./Lab. 4) Pre: admission to reading master's program or permission of reading program.

**EDC 565 Advanced Literacy Research Seminar** (3 crs.) In-depth review of literacy research and theory from a variety of perspectives. Analysis of the relationships among research, theory, and political/instructional decisions. Includes development of a proposal to conduct literacy research. (Seminar 3) Pre: acceptance into reading master's program or permission of reading program.

**EDC 566 Intervention in Reading and Writing Difficulties PRA** (3 crs.) Supervised clinical experience in reading and writing difficulties. Students work directly with struggling readers and writers to diagnose reading/writing difficulties and plan and implement an appropriate program of instruction. (Practicum) Pre: EDC 564 and 565.

**EDC 567 Field Study in Literacy PRA** (3 crs.) Supervised clinical experience in reading and writing difficulties. Students work directly with struggling readers and writers to diagnose reading/writing difficulties and plan and implement an appropriate program of instruction. (Practicum) Pre: EDC 565.

**EDC 568 Differentiation of Instruction** (3 crs.) Strategies for differentiating instruction to meet diverse student needs in a heterogeneous classroom are addressed. Development of lessons using integrated differentiated instruction and assessment strategies is required. (Lec. 3) Pre: EDC 400 or 424 or 448 or 569 or permission of instructor

**EDC 569 Best Practices in the Middle Level Classroom** (3 crs.) Examination of state and school improvement data at the middle level to improve curriculum, instruction, and assessment practices. Action research is performed with an emphasis on designs, processes, and models. (Lec. 3) Pre: graduate standing or permission of instructor.

**EDC 570 Elementary School Curriculum** (3 crs.) Modern curriculum in the elementary school with emphasis on the needs of children. Covers language arts, social studies, science, arithmetic, and special subjects. (Lec. 3) Pre: EDC 529 or equivalent. In alternate years.

**EDC 574 Current Trends in Secondary Education** (3 crs.) Effective use of instructional materials, media of communication, and organization of personnel and current research. (Lec. 3) Pre: EDC 529 or permission of director.

**EDC 575 Supervised Field Study/Practicum and Seminar In Education PRA** (3 crs.) For nonthesis candidates. Lectures, seminars, and field work. Candidates plan and conduct a field study/practicum project approved by the instructor and the student's professor. A formal proposal is developed, submitted, and approved, the project completed, and a formal paper defended. (Practicum) Pre: admission to a master's program in education and permission of instructor. May be repeated for a maximum of 6 credits.

**EDC 579 Labor Relations and Collective Bargaining in Education** (3 crs.) Cross-listed as (LRS), EDC 579. Collective bargaining in public and private educational sectors, K-12, higher education; literature, theory, practice, and legal foundations in education. Comprehensive case studies will be used. (Lec. 3)

**EDC 581 Administering Adult Programs** (3 crs.) Administration, personnel management, resource management, recruitment, development, and supervision within programs dealing with adults as learners. (Lec. 3) Pre: EDC 505 or permission of instructor.

**EDC 582 Instructional Systems Development for Adult Programs** (3 crs.) Designing and implementing instructional systems. Discussion of the basic tenets underlying theories of instructional technology, curriculum development, and curriculum change as they apply to adult learners in a variety of settings. (Lec. 3) Pre: EDC 581 or permission of instructor.

**EDC 583 Planning, Design, and Development of Adult Learning Systems** (3 crs.) Overview of the program planning process

including goal setting, needs analysis, program planning, and implementing change strategies. Discussion of effective functioning in the role of change agent within an organization. (Lec. 3) Pre: permission of instructor.

**EDC 584 The Adult and the Learning Process** (3 crs.) Examination of the adult as a learner with emphasis on the factors that affect adult learning and learning processes related to instruction. (Lec. 3) Pre: permission of instructor.

**EDC 586 Problems in Education** (1-3 crs.) Advanced work for graduate students in education. Courses conducted as seminars or as supervised individual projects. Topics include: Consortium on Reading Excellence, Hosting a SALT visit, Instructional Strategies for Diversified Classrooms, Orton-Gillingham Reading Instruction, Orton, Gillingham Reading Practicum, Reflective Practitioner-Using Data to Inform Instruction, SALT visit, Schools Attuned, Using Blogs & Wikis to Facilitate Learning, 4 Roles of Leadership, Using the Internet for Teaching, Learning, & Practical Applications, Seven Habits of Highly Effective People, Teaching the 'Write Traits', Thinking Math II, and Building Teams & Leading Change. (Independent Study) Pre: permission of director. May be repeated for credit with different topic.

**EDC 587 Problems in Education** (1-3 crs.) Advanced work for graduate students in education. Courses conducted as seminars or as supervised individual projects. Topics include: Disciplinary Literacy. (Independent Study) Pre: permission of director. May be repeated for credit with different topic.

**EDC 594 Organization and Supervision of Literacy Programs** (3 crs.) Field experience in the roles/responsibilities of a reading specialist. Requires shadowing reading professionals, visiting schools, involvement in professional groups, developing action plans, and developing and presenting professional development sessions. (Lec./Lab. 3) Pre: EDC 565 or permission of reading program. In alternate years.

**EDC 599 Master's Thesis Research** (1-3 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**EDC 683 Psychology of the Exceptional Child** (3 crs.) Cross-listed as (PSY), EDC 683. Social, psychological, and educational factors that constitute the matrix of concerns with the exceptional individual in the school and community. Recent innovations in public and private education and rehabilitation. Research issues and legislation discussed evolve into student studies. (Lec. 3)

**EDC 920 Workshop for Teachers WRK** (1-3 crs.) Current issues in education. Specific topics offered for in-service teachers and administrators. May be repeated with different topic. (Workshop) Topics include: Using the Internet for Teaching, Learning, and Practical Applications, RITES

1 and Immersion Program for Teachers of Spanish. Pre: teacher certification.

**EDC 921 Workshop for Teachers WRK** (1-3 crs.) Current issues in education. Specific topics offered for in-service teachers and administrators. Topics include: Using Blogs & Wikis to Foster Literacy, SMILE I. (Workshop/Online) Pre: certified teacher.

**EDC 922 Workshop for Teachers WRK** (1-3 crs.) Current issues in education. Specific topics offered for in-service teachers and administrators. Topics include: SMILE II. (Workshop/Online) Pre: certified teacher.

**EDC 923 Workshop for Teachers WRK** (1-3 crs.) Current issues in education. Specific topics offered for in-service teachers and administrators. Topics include: SMILE III. (Workshop/Online) Pre: certified teacher.

## EDP | Ph.D. in Education

**EDP 610 Core Seminar I: Issues and Problems in Educational Inquiry and Foundations** (3 crs.) Examination of issues and problems related to philosophical and historical aspects of educational thought and the role of society. Empirical analysis of classroom settings is emphasized. (Seminar) Pre: admission to the Ph.D. program in education.

**EDP 611 Core Seminar I: Issues and Problems in Educational Inquiry and Foundations** (3 crs.) Examination of issues and problems related to philosophical and historical aspects of educational thought and the role of society. Empirical analysis of classroom setting is emphasized. (Seminar) Pre: EDP 610.

**EDP 612 Qualitative Research Methods in Education** (3 crs.) Survey of qualitative methods of educational research: terminology, historical development, assumptions, and models of inquiry. Pre: Current enrollment in the URI/RIC Joint Ph.D. Program.

**EDP 613 Introduction to Quantitative Research** (4 crs.) Educational research data are quantitatively analyzed. Data collected during Core Seminar I are analyzed and interpreted. Applications of the general linear model to a variety of research designs and analytic strategies are emphasized. (Lec. 3, Rec. 1) Pre: EDP 610, 611, 623, and a course in introductory statistics, or permission of instructor.

**EDP 620 Core Seminar II: Issues and Problems in Human Development, Learning, and Teaching** (3 crs.) Issues and problems related to human development, curriculum, teaching, and learning are examined. Ways of gathering and evaluating evidence about school and curriculum effectiveness are emphasized. (Seminar) Pre: EDP 610, 611, and 623.

**EDP 621 Core Seminar II: Issues and Problems in Human Development, Learning, and Teaching** (3 crs.) Issues and problems related to human development, curriculum, teaching, and learning are examined. Ways of gathering and evaluating evidence about school and curriculum effectiveness are emphasized. (Seminar) Pre: EDP 620.

**EDP 623 Research Design** (3 crs.) Research design process including developing problem statements, research questions, hypotheses and appropriate methods (i.e., qualitative, quantitative, or mixed). Course considers philosophical worldviews, literature reviews, theory use, and research ethics. (Lec. 3) Pre: EDP 610, 611, 612, and 613.

**EDP 630 Core Seminar III: Issues and Problems in Organizational Theory, Leadership, and Policy Analysis** (3 crs.) Issues and problems related to applications of organizational theory, leadership theory, and policy analysis are studied. Core seminar examines cases related to district, state, and/or regional educational offices and agencies. (Seminar) Pre: EDP 620, 621.

**EDP 631 Core Seminar III: Issues and Problems in Organizational Theory, Leadership, and Policy Analysis** (3 crs.) Issues and problems related to applications of organizational theory, leadership theory, and policy analysis are studied. Core seminar examines cases related to district, state, and/or regional educational offices and agencies. (Seminar)

**EDP 641 Field Research Seminar** (1 cr.) Bi-weekly forums present first-, second-, and third-year students' evolving research questions and empirical designs. Discussion and feedback refine individuals' research plan, enhancing the methodological perspectives and tools of all participants. (Seminar) Pre: admission to joint (URI-RIC) Ph.D. in Education. May be repeated up to a maximum of 6 semesters (a total of 6 credits).

**EDP 665 Social Justice in Higher Education** (3 crs.) This course provides a broad overview of historical and contemporary issues of social justice in higher education. Pre: Permission of instructor.

**EDP 692 Directed Readings and Research Problems** (3-6 crs.) Directed readings and advanced research work under the supervision of a member of the graduate faculty, arranged to suit the individual requirements of the students. (Independent Study) May be repeated for a maximum of 12 credits. Pre: EDP 611 and permission of instructor; or permission of co-directors of PhD in Education program and instructor.

**EDP 693 Directed Readings and Research Problems** (3-6 crs.) Directed readings and advanced research work under the supervision of a member of the Graduate Faculty, arranged to suit the individual requirements of the students. (Independent Study) May be repeated for a maximum of 12 credits. Pre: EDP 611 and permission of instructor; or permission of co-directors of PhD in Education program and instructor.

**EDP 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U only.

## EDS | Special Education

**EDS 500 Inclusive Educational Practices** (2 crs.) Historical, sociological, and legal factors that shape education for students with disabilities. Definitions of disabilities and educational implications, focusing on the role of the special educator in inclusive education. (Lec. 2) Pre: Acceptance into the master's degree program in special education. To be taken concurrently with EDS 502, 503, 505, and 510 for students seeking elementary/middle certification. To be taken concurrently with EDS 503, 507, 513, and 516 for students seeking secondary/middle certification.

**EDS 501 Collaboration and Co-Teaching** (2 crs.) Provides future special educators with knowledge and skills to implement culturally responsive collaboration with family members, and school based professionals. (Lec. 2) Pre: Acceptance into master's degree program in special education. EDS 500, 502, 503, 505, and 510 for students earning elementary/middle certification. To be taken concurrently with EDS 504, 506, 509, and 511 for for elementary/middle certification. EDS 500, 503, 507, 513, and 516 for students earning secondary/middle certification. To be taken concurrently with EDS 504, 508, 511, and 517 for students seeking secondary/middle certification.

**EDS 502 Assessment for Elementary Special Educators** (3 crs.) Provides future special educators with knowledge and skills to assess students using standardized and curriculum-based measures and to implement the response to intervention model. (Lec. 3) Pre: Acceptance into the master's degree program in special education. To be taken concurrently with EDS 500, 503, 505, and 510.

**EDS 503 Positive Behavior Supports** (3 crs.) Provides future special educators with the knowledge and skills to examine causes of behaviors, to teach pro-social behaviors and to develop individualized positive behavioral supports. (Lec. 3) Pre: acceptance into the Master's degree program in special education. To be taken concurrently with EDS 500, 502, 505, and 510 for students seeking elementary/middle certification. To be taken concurrently with EDS 500, 507, 513, and 516 for students seeking secondary/middle certification.

**EDS 504 Research in Special Education** (3 crs.) Critical analysis of research publications in special education, the translations of research findings into practical instructional applications, and the identification of an area of proposed study in special education. (Lec. 3) Pre: Acceptance into the master's de-

gree program in special education. EDS 500, 502, 503, 505, and 510 for students earning elementary/middle certification. To be taken concurrently with EDS 501, 506, 509, and 511 for students seeking elementary/middle certification. EDS 500, 503, 507, 513, and 516 for students earning secondary/middle certification. To be taken concurrently with EDS 501, 508, 511, and 517 for students seeking secondary/middle certification.

**EDS 505 Supervised Practicum: Elementary and Middle Level PRA** (1 cr.) Provides future special educators with opportunities to assess students and instruct students with disabilities under the supervision of a certified special educator. Students will be observed once by University instructor. (Practicum, 1) Pre: Acceptance into the master's degree program in special education. To be taken concurrently with EDS 500, 502, 503, and 510. (S/U only)

**EDS 506 Supervised Practicum: Elementary and Middle Level PRA** (1 cr.) Provides future special educators with opportunities to collaborate with other professionals to provide instruction under supervision of a certified special educator. One observation by University instructor. (Practicum, 1) Pre: Acceptance into the master's degree program in special education; EDS 500, 502, 503, 505, and 510. To be taken concurrently with EDS 501, 504, 509, and 511. (S/U only)

**EDS 507 Supervised Practicum: Secondary and Middle Level PRA** (1 cr.) Provides future special educators with opportunities to assess and instruct students with disabilities under the supervision of a certified special educator. One observation by university supervisor. (Practicum, 1) Pre: Acceptance into the master's degree program for special education. To be taken concurrently with EDS 500, 503, 513, and 516. (S/U only)

**EDS 508 Supervised Practicum: Secondary/Middle Level PRA** (1 cr.) Provide future special educators opportunities to collaborate with other professionals to plan and implement instruction under a certified special educator. One observation by a University supervisor. (Practicum, 1) Pre: Acceptance into the master's degree program in special education. EDS 500, 503, 507, 513, and 516. To be taken concurrently with EDS 501, 504, 511, and 517. (S/U only)

**EDS 509 Teaching Students with Severe Disabilities** (3 crs.) Provides the knowledge and skills future special educators need to plan individualized instruction for students with moderate or severe disabilities in general education classes. (Lec. 3) Pre: Acceptance into the master's degree program in special education; EDS 500, 502, 503, 505, and 510. To be taken concurrently with EDS 501, 504, 506, and 511.

**EDS 510 Teaching Elementary Students with Mild Disabilities** (3 crs.) Provides future special educators with the knowledge and skills to plan individualized instruction for students with mild disabilities based

on assessment data and current research on effective instructional practices. (Lec. 3) Pre: Acceptance into the Master's degree program in special education. To be taken concurrently with EDS 500, 502, 503, and 505 for students seeking elementary/middle certification.

**EDS 511 Literacy and Language Instruction** (3 crs.) Provides future special educators with the knowledge and skills to plan instruction in literacy and language for students with disabilities. (Lec./Lab. 3) Pre: Acceptance into the master's degree program in Special Education. For elementary/middle certification EDS 500, 502, 503, 505, and 510. To be taken concurrently with EDS 501, 504, 506, and 509. For middle/secondary certification EDS 500, 503, 507, 513, and 516. To be taken concurrently with EDS 501, 504, 508, and 517.

**EDS 512 Leadership and Elementary Program Management** (3 crs.) Future special educators acquire knowledge and skills to coordinate their students' schedules, train and supervise paraprofessionals, conduct action research, and restructure service delivery models in special education. (Lec. 3) Pre: Acceptance into the master's degree program in special education. EDS 500, 501, 502, 503, 504, 505, 506, 509, 510, and EDS 511. To be taken concurrently with EDS 518.

**EDS 513 Assessment for Secondary Special Educators** (3 crs.) Provides future special educators with knowledge and skills to assess students using standardized and curriculum-based measures, to implement the response to intervention model, and to plan for transition. (Lec. 3) Pre: Acceptance into the master's degree program in special education. To be taken concurrently with EDS 500, 503, 507, and 516.

**EDS 516 Teaching Secondary Students with Mild Disabilities** (3 crs.) Provides future special educators with knowledge and skills to plan instruction for adolescents with mild or moderate disabilities, including literacy skills, language skills and content strategy instruction. (Lec. 3) Pre: acceptance into the master's degree program in special education. To be taken concurrently with EDS 500, 503, 507, and 513.

**EDS 517 Transition Planning for Post-School Outcomes** (3 crs.) Provides future special educators with knowledge and skills to implement transitions for secondary students to work or other post-secondary options. (Lec. 3) Pre: Acceptance into the master's degree program in special education. EDS 500, 503, 507, 513, and 516. To be taken concurrently with EDS 501, 504, 508, and 511.

**EDS 518 Supervised Internship PRA** (9 crs.) Under the supervision of a certified special educator, students teach in general education classes which include students with special needs, for ten (10) weeks. (Practicum, 9) Pre: Acceptance into the master's degree program in special education. EDS 500, 501,

502, 503, 504, 505, 506, 509, 510, 511 for students seeking elementary certification. To be taken concurrently with EDS 512 for elementary students. EDS 500, 501, 503, 504, 507, 508, 513, 516, 517, and EDC 568 for student seeking secondary certification. To be taken concurrently with EDS 520 for secondary students. (S/U only)

**EDS 520 Leadership and Secondary Program Management** (3 crs.) Future special educators acquire knowledge and skills to coordinate their students' programs, develop effective schedules, train and supervise paraprofessionals, conduct action research, and restructure existing service delivery models. (Lec. 3) Pre: Acceptance into the Master's degree program in special education. EDS 500, 501, 503, 504, 507, 508, 513, 516, 517, and EDC 586. To be taken concurrently with EDS 518.

## EEC | Environmental Economics

**EEC 101 Freshman Inquiry into Environmental and Natural Resource Economics** (1 cr.) Introduction for freshmen to the opportunities, careers, research activities, applied outreach, and educational programs in the Department of Environmental and Natural Resource Economics. Interact weekly with faculty. Explore hands-on modules. (Lec. 1) S/U credit.

**EEC 105 Introduction to Resource Economics** (3 crs.) Application of micro-economic principles to selected resource problem areas. The market mechanism and its alternatives are examined as methods of resolving contemporary resource use problems. (Lec. 3) (S)

**EEC 110 Multimedia Presentation Of Environmental Issues** (3 crs.) Research pressing environmental issues and create multimedia presentations using computer technologies to combine slides, video, audio, and computer graphics. No technical knowledge or computer skills are necessary. (Lec. 2, Lab. 2)

**EEC 205 Resource Management and Conservation** (3 crs.) Introduction to economically efficient resource management, the development of management regimes that support a sustainable economy; valuation, property rights, market structure, dynamic resource management. (Lec. 3) Pre: EEC 105.

**EEC 310 Economics of Natural Resource Management and Policy** (3 crs.) Explores economic approaches to natural resource management, and policies for sustainable management of fisheries, forests, water, and minerals. (Lec. 3) Pre: EEC 105 or ECN 201. (S)

**EEC 325 Planning and Managing a Small Natural Resources Firm** (3 crs.) Directed toward students with an interest in managing a small marine, agricultural, or other natural resources firm. (Lec. 3) Pre: EEC 105 or ECN 100 or 201 or permission of instructor.

**EEC 345 Sustainable Development, Trade, and the Environment** (3 crs.) To understand the relationship between economic development, international trade and the environment. Topics include sustainable development, trade policies and the environment, climate change and development, and institutions for managing the commons. (Lec. 3) Pre: EEC 105 or ECN 201 or permission of instructor.

**EEC 350 Sustainable Energy Economics and Policy** (3 crs.) Energy production, consumption, and environmental impacts. Energy markets, policy, and the transition from a fossil fuel-based energy economy to an economy based on sustainable energy and renewable energy sources. (Lec. 3) Pre: EEC 105 or ECN 201 or permission of instructor.

**EEC 355 The Economics of Climate Change** (3 crs.) Assessment of the economic and policy issues associated with climate change, including the causes of climate change, the economic and social effects, and alternative policy options to reduce carbon emissions. (Lec. 3) Pre: EEC 105 or ECN 201, or permission of instructor.

**EEC 356 Tourism Economics** (3 crs.) Application of economic principles and research methods to tourist and tourism industry behavior. Practical research methods for assessing economic, social and environmental benefits and costs of tourism development are examined. (Lec. 3) Pre: EEC 105 or permission of instructor. (S)

**EEC 410 Fish and Wildlife Economics** (3 crs.) Institutional, biological, and economic factors affecting the use of fish and wildlife resources. Economic analysis is applied to problems of fish and wildlife management in both marine and terrestrial ecosystems. (Lec. 3) Pre: EEC 310 or ECN 328 or ECN 323 or permission of instructor.

**EEC 432 Environmental and Resource Economics and Policy** (3 crs.) Economic analysis of policies that address environmental and natural resource problems. Topics include pollution-control policies, economic incentives, and the optimal use of renewable and nonrenewable natural resources. (Lec. 3) Pre: EEC 205 or ECN 201.

**EEC 435 Aquacultural Economics** (3 crs.) Economics of international and domestic development of aquaculture, environmental and resource regulations on aquaculture, and management of and decision making in aquacultural enterprises. Analysis of public and private aquaculture production and marketing. (Lec. 3) Pre: EEC 105 or ECN 201 or permission of instructor.

**EEC 440 Benefit-Cost Analysis** (3 crs.) Basic concepts in benefit-cost analysis. Measurement, comparison of benefits and costs over time, and criteria for evaluation of projects and public policies. Problems and case studies in evaluation of current natural resources issues. (Lec. 3) Pre: EEC 105 or permission of instructor.

**EEC 441 Markets, Trade, and Natural Resources** (3 crs.) Analysis of the role of markets in the valuation, management, and distribution of natural resources (esp. fish); price analysis; international trade; channels of distribution; commodity futures and options markets; marketing information; regulations and controls; cooperative marketing. (Lec) Pre: EEC 105 or ECN 201 or permission of instructor.

**EEC 491 Special Projects** (1-3 crs.) Workshop for advanced students where individuals or small groups are assigned projects requiring the analysis of natural resource and allocation problems with particular emphasis on marine resources. (Independent Study) Pre: permission of chairperson.

**EEC 492 Special Projects** (1-3 crs.) Workshop for advanced students where individuals or small groups are assigned projects requiring the analysis of natural resource and allocation problems with particular emphasis on marine resources. (Independent Study) Pre: permission of chairperson.

**EEC 497 Internship in Environmental Economics PRA** (1-3 crs.) Supervised work experience in environmental and natural resource economics or related areas with a governmental agency, nongovernmental organization, or in the private sector. (Practicum) Pre: EEC 105. Can be repeated for up to 9 credits. Not for graduate credit.

**EEC 501 Graduate Seminar In Natural Resource Economics** (1 cr.) Presentation of research and discussion of current issues and methodologies in environmental and natural resource economics. (Seminar) Enrollment is required of all full-time graduate students in residence; exceptions made with permission from chairperson. No more than one credit may be taken for program credit. S/U credit.

**EEC 502 Research Methodology in Environmental and Natural Resource Economics** (3 crs.) Practice and methods of applied research in environmental and natural resource economics. Topics include philosophical foundations, research project design, reporting research results, and criticism of proposals and research papers. (Lec. 3) Pre: EEC 528 and 576 or permission of instructor.

**EEC 514 Economics of Marine Resources** (3 crs.) Role of economics in management of estuarine and marine resources. Particular attention to resource valuation, environmental issues, and management of renewable and nonrenewable resources. (Lec. 3) Not for graduate credit in resource economics.

**EEC 518 Mathematics for Economists** (2 or 4 crs.) Introduction to mathematical methods in economics and business. Economic applications of constrained and unconstrained optimization, matrix algebra, primal and dual functions, eigen roots, with illustrations from economics, finance, and environmental and natural resource economics. (Lec. 2 or 4) Pre: ECN 328 and MTH 131 or equivalent or permission of instructor.

**EEC 520 Production Economics** (2 crs.) Production in natural resource economics. The formulation and estimation of production functions. Technological change in economic growth and its measures. New directions in production theory and applications. (Lec. 2) Pre: at least two credits of 518, or MTH 131.

**EEC 522 Computer Intensive Methods In Resource Economics** (3 crs.) Use of selected software packages to analyze topics and numerical problems in environmental and natural resource economics, including GAMS/MINOS, spreadsheets, Crystal Ball, Matlab, GIS, and SAS. (Lec. 2, Lab. 2) Pre: EEC 518 or equivalent (may be taken concurrently).

**EEC 524 Quantitative Techniques in Natural Resource Research** (3 crs.) Cross-listed as (NRS), EEC 520. Research design, database management, and analysis and interpretation of natural resource data. Emphasis on hands-on experience of quantitative and computerized techniques commonly used by natural resource scientists. (Lec. 2, Lab 2) Pre: STA 308 and permission of instructor.

**EEC 527 Macroeconomic Theory** (3 crs.) Cross-listed as (EEC), ECN 527. Static and dynamic models of aggregate economic behavior developed and analyzed. (Lec. 3) Pre: ECN 327 and 375 or equivalent, or permission of instructor.

**EEC 528 Microeconomic Theory** (4 crs.) Cross-listed as (EEC), ECN 528. Analytic tools of optimization. Neoclassical price and production theory. Neoclassical theory of consumer and producer behavior, price and distribution, partial and general equilibrium and welfare economics. (Lec. 4) Pre: ECN 328 and 375 or equivalent and concurrent registration in EEC 518, or permission of instructor.

**EEC 529 Game Theory** (3 crs.) Analysis of situations of conflict and cooperation, with economics and business applications. Introduction to cooperative and noncooperative games, including the extensive and strategic forms, Nash equilibrium, repeated games and bargaining. (Lec. 3) Pre: EEC 528 or permission of instructor.

**EEC 532 Land Resource Economics** (3 crs.) Cross-listed as (CPL), EEC 532. The study of economic relationships of human and scarce natural and human-made resources. Supply and demand, rent theory, resources conservation, and the impact of public policy and law. (Lec. 3)

**EEC 534 Economics of Natural Resources** (4 crs.) Microeconomic theory applied to problems of natural resource allocation. The rationale for government intervention in the market's provision of natural resources and alternative techniques for optimally allocated natural resources are investigated. (Lec. 4) Pre: EEC 528 or permission of instructor.

**EEC 535 Environmental Economics** (3 crs.) Theory of externalities; incentive-based and regulatory policy instruments for ad-

dressing market failure; theory and methods for valuing natural resource and environmental services; other environmental topics. (Lec. 3) Pre: EEC 528 or equivalent.

**EEC 540 Applied Resource Economics** (3 crs.) Examines issues in agricultural and natural resource policy through applications of theoretical and empirical tools. Applications include pollution control, fisheries management, water, and agricultural policy. (Lec. 3) Pre: EEC 528 or permission of instructor.

**EEC 542 Conservation Biology And Resource Economics** (2 crs.) Cross-listed as (NRS), EEC 542. Examination of different components of conservation of biological diversity. Topics include minimum viable populations, ecology and economics of reserve design, reintroductions, causes of extinction, and the ecosystem conservation strategies. (Seminar) Pre: BIO 262, EEC 105 or permission of instructor.

**EEC 543 Economic Structure of the Fishing Industry** (3 crs.) Analysis of fishing industries from the standpoint of activity and efficiency. Problems related to common property resources, government policy, labor, and legal and institutional factors. (Lec. 3) Pre: 514 or permission of instructor. In alternate years.

**EEC 570 Experimental Economics** (3 crs.) Controlled laboratory experiments to study economic theories, institutions, and policies. Provides an overview of experiment design and nonparametric data analysis. Applications include game theory, markets, public goods, and uncertainty. (Lec. 3) Pre: EEC 528 or permission of instructor.

**EEC 576 Econometrics** (4 crs.) Cross-listed as (EEC), ECN, STA 576. Application of statistics and mathematics to economic analysis. Implication of assumption required by statistical methods for testing economic hypotheses. Current econometric methods examined and discussed. (Lec. 3, Lab. 2) Pre: ECN 575 or equivalent, STA 308 or equivalent, or permission of instructor.

**EEC 591 Special Projects** (1-3 crs.) Advanced work under supervision arranged to suit the individual requirement of the student. (Independent Study) Pre: permission of chairperson.

**EEC 592 Special Projects** (1-3 crs.) Advanced work under supervision arranged to suit the individual requirement of the student. (Independent Study) Pre: permission of chairperson.

**EEC 595 Environment and Development Economics** (3 crs.) Cross-listed as (EEC), MAF, PSC, SOC 595. Application of economic principles and research methods to understand the economics of environmental and natural resource management and poverty alleviation. (Lec. 3) Pre: EEC 528 or permission of instructor.

**EEC 598 Master's Nonthesis Research** (1-3 crs.) Credit for completion of major paper. (Independent Study) Pre:

enrollment in nonthesis master's program in resource economics.

**EEC 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**EEC 602 Research Methodology** (1 cr.) Practice and methods of research in environmental and natural resource economics. Philosophical foundations, competing views on methodology, project design, execution and communication of results to different audiences. (Lec. 1) Pre: EEC 528 and 576 and concurrent registration in 502. In alternate years.

**EEC 610 Advanced Studies** (1-3 crs.) Advanced topics in resource economics. Mathematical models in resource management. (Independent Study) May be repeated with different topics.

**EEC 624 Dynamic Economic Models** (3 crs.) Fundamentals of dynamic economic theory. Dynamic optimization techniques applied to environmental and natural resource economics. (Lec. 3) Pre: EEC 528 or permission of instructor.

**EEC 628 Advanced Microeconomic Theory I** (3 crs.) Cross-listed as (EEC), ECN 628. Neoclassical value and distribution theory. Theories of imperfect competition, general equilibrium theory, and dynamic analysis. (Lec. 3) Pre: EEC 528 or permission of instructor.

**EEC 630 Advanced Microeconomic Theory II** (3 crs.) Development and application of welfare theory to natural resource use. Welfare concepts such as consumer surplus, producer surplus, and marginal cost pricing in policy decisions for agriculture and natural resources. (Lec. 3) Pre: EEC 628 or permission of instructor. In alternate years.

**EEC 634 Advanced Economics of Natural and Environmental Resources** (4 crs.) Concepts of economic efficiency applied to natural resources with emphasis on intertemporal allocation of nonrenewable and renewable resources. Application of welfare and institutional economics to resource management and development; analysis of optimum allocation among users. (Lec. 4) Pre: EEC 534 and 624 or permission of instructor.

**EEC 635 Marine Resources Policy** (3 crs.) Analysis of public policy problems relating to estuarine and marine resources, including natural resource damage assessment, environmental issues, coastal zone concerns, and other selected topics. (Lec. 3) Pre: EEC 534. In alternate years.

**EEC 676 Advanced Econometrics** (4 crs.) Cross-listed as (EEC), ECN 676. A course covering the tools necessary for professional research in resource economics. Reviews the general linear model, but emphasis is on simultaneous equation models. Assumes a knowledge of introductory econometrics, statistical theory, and matrix algebra. (Lec. 4)

Pre: EEC 576 or its equivalent.

**EEC 677 Econometric Applications in Resource Economics** (3 crs.) Special topics in econometrics as applied to agriculture and natural resources. Topics include time series models. Bayesian analysis and dichotomous dependent variables. (Lec. 3) Pre: EEC 676. In alternate years.

**EEC 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## EGR | Engineering

**EGR 105 Foundations of Engineering I** (1 cr.) Introduction to engineering. Problem solving. (Lec. .5/Rec. .5)

**EGR 105H Honors Section of EGR 105: Foundations of Engineering I** (1 cr.) Honors Section of EGR 105: Foundations of Engineering I. (Lec. 0.5/Rec. 0.5) Pre: Must have a 3.30 overall GPA.

**EGR 106 Foundations Of Engineering II** (2 crs.) Engineering problem solving. (Lec. 1, Lab. 2) Pre: MTH 141 or concurrent registration in MTH 141.

**EGR 106H Honors Section of EGR 106: Foundations of Engineering II** (2 crs.) Honors Section of EGR 106: Foundations of Engineering II. (Lec. 2) Pre: Must have a 3.30 overall GPA. MTH 141 or concurrent registration in MTH 141.

**EGR 109 Engineering in Everyday Life** (3 crs.) Introduction to a variety of careers in engineering. Overview of the history of engineering. Inspection of the process of engineering design and manufacturing by using objects encountered in everyday life. (Lec. 2, Lab.3) (N)

**EGR 110 Introduction to Robotics** (3 crs.) Introduction to robots and their components; actuators, sensors, microcontrollers, communication, and power sources. Integration of robots to complete specific tasks such as pick-and-place, obstacle course navigation, robot races, etc. (Lec. 2, Lab. 3) Pre: MTH 099 or equivalent.

**EGR 133 Artifacts in Modern Society** (3 crs.) Materials Science will be introduced to non-science and non-engineering freshman using a case study approach. (Lec. 3) Not open to engineering or science majors. (N)

**EGR 316 Engineering Ethics** (3 crs.) Cross-listed as (PHL), EGR 316. A broad introduction to moral theory and its application to engineering, professionalism, and moral responsibility as an engineer. An understanding of engineering in a societal context. (Lec. 3) Pre: sophomore standing. (L) [D]

**EGR 316H Honors Section of EGR 316: Engineering Ethics** (3 crs.) Cross-listed as (EGR), PHL 316H. Honors Section of EGR 316: Engineering Ethics. (Lec. 3) Pre: must have a 3.30 overall GPA. Sophomore standing. (L) [D]

**EGR 411 Advanced Technical German** (3 crs.) Cross-listed as (EGR), GER 411. Seminar on advanced scientific and engineering topics in an international context. All reading, discussion, and associated writing is conducted in German. (Lec. 3) Pre: any 400-level course in German and senior standing in an approved engineering program. Not for graduate credit.

**EGR 412 Advanced Technical Spanish** (3 crs.) Cross-listed as (EGR), SPA 412. Seminar on advanced scientific and engineering topics in an international context. All reading, writing and discussion will be conducted in Spanish. (Seminar) Pre: any 400-level course in Spanish and senior standing in an approved engineering program. Not for graduate credit.

**EGR 515 Hydrodynamics** (3 crs.) Hydrodynamics of fixed and floating structures. Transport theory, viscous, inviscid, and ideal fluid flows based on continuum mechanics. Specific topics include lifting surfaces, added mass, and boundary layer theory, turbulence, linear wave theory, forces on a submerged body. (Lec. 3) Pre: MCE 354 or equivalent or permission of instructor.

## ELE | Electrical Engineering

**ELE 101 Introduction to Electrical Engineering** (1 cr.) Seminar series given by instructor, invited experts, and students with a focus on electrical engineering applications and professional practice. (Seminar) Pre: (credit or concurrent enrollment in MTH 111 or 141) or permission of instructor.

**ELE 201 Digital Circuit Design** (3 crs.) Digital concepts. Combinational logic: gates, Boolean algebra, K-maps, standard implementations. Sequential circuits: flip-flops, timing diagrams, state diagrams, counters and registers, design methods. MSI devices, memory, and programmable devices. (Lec. 3) Pre: (credit or concurrent enrollment in MTH 141) or permission of instructor.

**ELE 202 Digital Circuit Design Laboratory** (1 cr.) Laboratory experience in digital electronics. Logic design projects using standard SSI and MSI integrated circuits. (Lab. 3) Pre: credit or concurrent enrollment in 201.

**ELE 205 Microprocessors** (2 crs.) Hands-on familiarization with computer and microprocessor software and hardware. Computer architecture and interfacing with input and output devices. (Lec. 2) Pre: (credit or concurrent enrollment in ELE 206 and MTH 141) or permission of instructor.

**ELE 206 Microprocessor Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 205. (Lab. 3) Pre: credit or concurrent enrollment in ELE 205.

**ELE 208 Introduction to Computer Systems** (2 crs.) Bits, binary representations, digital logic structures, the von Neumann computing model, the machine and assembly language, interrupt and traps, input and

output, subroutines, stack and high-level programming in computing systems. (Lec. 2) Pre: (credit or concurrent enrollment in ELE 209 and MTH 141) or permission of instructor.

**ELE 209 Introduction to Computer Systems Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 208. (Lab. 3) Pre: credit or concurrent enrollment in ELE 208.

**ELE 212 Linear Circuit Theory** (3 crs.) Kirchhoff's Laws, DC-resistive networks, dependent sources, natural and forced response of first- and second-order circuits, sinusoidal steady-state response, phasors, AC power. (Lec. 3) Pre: (ELE 201, PHY 204, (credit or concurrent enrollment in MTH 244 or 362), and (at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, and PHY 204)) or permission of instructor.

**ELE 215 Linear Circuits Laboratory** (2 crs.) DC measurements, natural and step response of first- and second-order circuits, AC measurements, impulse and frequency response, operational amplifier circuits. (Lec. 1, Lab. 3) Pre: ELE 202, credit or concurrent enrollment in 212.

**ELE 220 Passive and Active Circuits** (3 crs.) Electrical circuit laws and theorems, transient and steady-state response, phasors, frequency response, resonance. Diode and transistor circuits, digital logic devices. (Lec. 3) Pre: PHY 204 or permission of instructor. Not open to electrical engineering majors.

**ELE 301 Electronic Design Automation** (3 crs.) Digital design, simulation, synthesis and verification using electronic design automation tools. IEEE VHDL hardware description language and rapid prototyping with FPGAs. Register transfer level design with reusable modules and cores. (Lec. 3) Pre: (ELE 201 and 202 and 212 and 215 and (credit or concurrent enrollment in 302)) or permission of instructor.

**ELE 302 Electronic Design Automation Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 301. (Lab. 3) Pre: credit or concurrent enrollment in ELE 301.

**ELE 305 Introduction to Computer Architecture** (3 crs.) Introduction to CPU, instruction set architecture, instruction pipeline, hazard avoidance and branch prediction. Concept and evaluation of cache memory and memory management. Bus architecture and input and output interfaces. (Lec. 3) Pre: (ELE 201 and ELE 212 and (ELE 205 or ELE 208)) or permission of instructor.

**ELE 313 Linear Systems** (3 crs.) Fourier series, Fourier transforms, transfer functions of continuous and discrete-time systems, transient and steady-state response, natural response and stability, convolution. (Lec. 3) Pre: (ELE 212, EGR 106, (MTH 244 or 362), and ((at least a 2.00 (C) average in 212, (MTH 244 or 362), and PHY 204)) or permission of instructor.

**ELE 314 Linear Systems and Signals** (3 crs.) Continuous-time and discrete-time

systems, frequency response, stability criteria, Laplace transforms, z-transforms, filters, sampling, feedback, and applications. (Lec. 3) Pre: ELE 313 or permission of instructor.

**ELE 322 Electromagnetic Fields I** (4 crs.) Electrostatics and magnetostatics, forces on charged particles. Analysis employs vector algebra and vector calculus in orthogonal coordinates. Simple applications to engineering problems. (Lec. 3, Rec. 1) Pre: (ELE 212 and MTH 243 and PHY 204) or permission of instructor.

**ELE 325 Electrical Power Distribution Systems Theory of 3-phase power systems, introduction to per unit system of analysis, distribution system components** (transformers, lines, switch-gear, loads), system layout, analysis of unbalanced systems with symmetrical components. (Lec. 3) Pre: (ELE 212 and PHY 204 and MTH 362) or permission of instructor.

**ELE 331 Introduction to Solid State Devices** (4 crs.) Electrical and optical properties of semiconductors. Characteristics of p-n and metal semiconductor junctions. Application to diodes, transistors and light emitting and absorbing devices. Fabrication technology is introduced. (Lec. 3, Rec.1) Pre: (ELE 212 and MTH 243) or permission of instructor.

**ELE 338 Electronics I** (3 crs.) Review of linear circuit theory, operational amplifiers, diode and transistor circuits, computer-aided design, linear and nonlinear circuit applications, CMOS logic (Lec. 3, Lab. 3) Pre: ELE 201, 212, 215, (EGR 106 or permission of instructor), (credit or concurrent enrollment in ELE 339), and ((at least a 2.00 (C) average in 201, 212, 215, MTH 142, and PHY 204) or permission of instructor.

**ELE 339 Electronics I Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 338. (Lab. 3) Pre: (credit or concurrent enrollment in ELE 338).

**ELE 343 Electronics II** (3 crs.) Bipolar and MOS transistor biasing, small signal amplifiers, amplifier frequency response, operational amplifiers, SPICE, nonlinear circuits, statistical circuit simulation. (Lec. 3) Pre: (((ELE 338 and 339) or 342) and (credit or concurrent enrollment in 344)) or permission of instructor.

**ELE 344 Electronics II Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 343. (Lab. 3) Pre: Credit or concurrent enrollment in ELE 343.

**ELE 391 Special Problems** (1-4 crs.) Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. (Independent Study) Pre: permission of instructor.

**ELE 392 Special Problems** (1-4 crs.) Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. (Independent Study) Pre: permission of instructor.

**ELE 393 Special Problems** (1-4 crs.) Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. (Independent Study) Pre: permission of instructor. S/U credit.

**ELE 400 Introduction To Professional Practice** (1 cr.) Discussions with faculty, visiting engineers, and invited speakers on ethical, social, economic, and safety considerations in engineering practice; career planning; graduate study. (Lec. 1) Pre: ((ELE 205 or 208 or BME 207) and ELE 212) or permission of instructor. Not for graduate credit.

**ELE 401 Lasers, Optical Fibers, and Communication Systems** (3 crs.) Introduction to lasers, LEDs optical fibers and detectors. Properties of Gaussian beams, optical resonators, and diffraction of Gaussian beams. Properties of Fabry-Perot cavities. Introduction to fiber optical communications systems. (Lec. 3) Pre: ((ELE 205 or 208), and 313 and 322 and 331 and ((338 and 339) or 342), and (credit or concurrent enrollment in 402)) or permission of instructor.

**ELE 402 Lasers, Optical Fibers, and Communication Systems Lab** (1 cr.) Laboratory exercises related to topics in ELE 401. (Lab. 3) Pre: Credit or concurrent enrollment in ELE 401.

**ELE 405 Digital Computer Design** (3 crs.) Hardware implementation of digital computers. Arithmetic circuits, memory types and uses, control logic, basic computer organization, microprogramming, input/output circuits, microcomputers. (Lec. 3) Pre: (ELE 301, 305 and (credit or concurrent enrollment in ELE 406)), or permission of instructor.

**ELE 406 Digital Computer Design Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 405. (Lab. 3) Pre: Credit or concurrent enrollment in ELE 405.

**ELE 408 Computer Organization** (3 crs.) Engineering design problems involving hardware, software and interface of computer and embedded systems. Students will apply skills and knowledge accumulated through the curriculum in a group senior design project. (Lec. 3) Pre: (ELE 305 and 313, ((338 and 339) or 342) and (credit or concurrent enrollment in ELE 409)), or permission of instructor.

**ELE 409 Computer Organization Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 408. (Lab. 3). Pre: Credit or concurrent enrollment in 408.

**ELE 423 Electromagnetic Fields II** (4 crs.) Transmission lines, Maxwell's equations, wave equation, reflection and refraction phenomena, polarization effects waveguides and antennas. Design project requiring application of electromagnetic theory and use of numerical methods. (Lec. 4) Pre: (ELE 313 and 322 and ((338 and 339) or 342)) or permission of instructor. Not for graduate credit.

**ELE 425 Renewable and Efficient Electric Power Systems** (3 crs.) This course intro-

duces students to renewable and efficient electric power systems, ranging from the basic concepts of electric power engineering to renewable energy systems such as wind and solar systems. (Lec. 3) Pre: ((ELE 212 or 220 or OCE 206) and PHY204 and MTH (244 or 362)) or permission of instructor.

**ELE 427 Electromechanical Systems** (3 crs.) State-variable models. Electromechanical devices and systems in translation and rotation. Design of sensors, actuators, and systems as used in control applications. (Lec. 3) Pre: (ELE 313 and 322 and 331 and ((338 and 339) or 342) and (credit or concurrent enrollment in 428)) or permission of instructor.

**ELE 428 Electromechanical Systems Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 427. (Lab. 3) Pre: Credit or concurrent enrollment in 427.

**ELE 432 Electrical Engineering Materials** (4 crs.) Continuation of 331. Electronic and optical properties of materials, mainly semiconductors, applied to the performance and design of electronic devices. Measurements and analysis of these properties will be performed in the laboratory. (Lec. 4) Pre: (ELE 313 and 322 and 331 and ((338 and 339) or 342)) or permission of instructor.

**ELE 435 Communication Systems** (3 crs.) Representation of signals and noise. Basic principles of modulation and demodulation. Waveform and digital transmission systems. Design of a component of a communication system. (Lec. 3) Pre: ((ELE 215 or (338 and 339) or 342) and 314 and EGR 106 and (credit or concurrent enrollment in ELE 436)) or permission of instructor.

**ELE 436 Communication Systems Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 435. (Lab. 3) Pre: credit or concurrent enrollment in ELE 435.

**ELE 437 Computer Communications** (3 crs.) Cross-listed as (ELE 437), CSC 417. Computer networks, layering standards, communication fundamentals, error detection and recovery, queuing theory, delay versus throughput trade-offs in networks, multiple-access channels, design issues in wide and local area networks. (Lec. 3) Pre: ((ELE 205 or 208 or CSC 211), and (ELE 436 or MTH 451 or ISE 411)), or permission of instructor.

**ELE 438 Information and Network Security** (4 crs.) Cross-listed as (ELE), CSC 418. Elementary cryptography, public key, private key, symmetric key, authentication protocols, firewalls, virtual private networks, transport layer security, and wireless network security. (Lec. 3, Project 3) Pre: ELE 208 or MTH 362 or MTH 451 or ISE 411 or junior or senior standing in computer engineering or computer science or permission of instructor.

**ELE 444 Advanced Electronic Design** (3 crs.) Review of number systems, combinational and sequential logic, state machine. Design capture tools, hardware/software design, system implementation using PC's,

MSI circuits and FPGAs. (Lec. 3) Pre: ((ELE 205 or 208) and 313 and ((338 and 339 or 342) and (credit or concurrent enrollment in 445)) or permission of instructor.

**ELE 445 Advanced Electronic Design Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 444. (Lab. 3) Pre: credit or concurrent enrollment in ELE 444.

**ELE 447 Digital Integrated Circuit Design I** (3 crs.) Introduction to full custom digital integrated circuit design. Analysis of logic functions and timing at the transistor level. Realization of logic functions via hand crafted transistor layout. Design project. (Lec. 3) Pre: (ELE 202 and ((338 and 339) or 342) and 313 and PHY 204 and (credit or concurrent enrollment in ELE 448)) or permission of instructor.

**ELE 448 Digital Integrated Circuit Design I Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 447. (Lab. 3) Pre: credit or concurrent enrollment in ELE 447.

**ELE 457 Feedback Control Systems** (3 crs.) Fundamental techniques for the analysis and design of linear feedback systems. Stability, sensitivity, performance criteria, steady-state error, Nyquist criterion, root locus techniques, and compensation methods. (Lec. 3) Pre: ((ELE 205 or 208 or BME 207) and ELE 314) or permission of instructor.

**ELE 458 Digital Control Systems** (3 crs.) Analysis and design of digital control systems using state-space techniques. State feedback and observers. Laboratory includes computer simulation and hardware implementation of control laws for electromechanical systems. (Lec. 3) Pre: ((205 or 208 or BME 207) and (314 or 461 or BME 461) and ((338 and 339) or 342) and (credit or concurrent enrollment in 459)) or permission of instructor.

**ELE 459 Digital Control Systems Laboratory** (1 cr.) Laboratory exercises related to topics in ELE 458. (Lab. 3) Pre: credit or concurrent enrollment in 458.

**ELE 461 Physiological Modeling and Control** (3 crs.) Cross-listed as (BME), ELE 461. Principles of physiological modeling and control of linear and nonlinear systems, stability analysis, root locus, Bode plots, linearization. (Lec. 3) Pre: ELE 314, or permission of instructor. Not for graduate credit.

**ELE 470 Mobile Computing** (3 crs.) Application of modern mobile computing platforms, user interface, software application development, hardware interface; view controllers; data interaction; application distribution. (Lec. 2, Lab. 3) Pre: basic course in C programming; basic course in microcomputers; at least junior standing; permission of instructor.

**ELE 480 Capstone Design I** (3 crs.) Application of engineering skills; teams focus on the design and communication of solutions to problems with real-world constraints (may include aspects of other engineering disciplines). First of a two-course sequence. (Lec. 2, Lab. 3) Pre: (ELE 205 or 208) and ELE

313 and ((338 and 339) or 342) and ((at least a 2.0 (C) average in 212, 313, and 338)) and permission on instructor. Not for graduate credit.

**ELE 481 Capstone Design II** (3 crs.) Application of engineering skills; teams focus on the design and communication of solutions to problems with real-world constraints (may include aspects of other engineering disciplines). Second of a two-course sequence. (Lec. 2, Lab. 3) Pre: (ELE 205 or 208) and 313 and ((338 and 339) or 342) and ((at least a 2.0 (C) average in 212, 313, and 338)) and permission of instructor. Not for graduate credit.

**ELE 491 Special Problems** (1-4 crs.) Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. Pre: permission of instructor. Not for graduate credit.

**ELE 492 Special Problems** (1-4 crs.) Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. Pre: permission of instructor. Not for graduate credit.

**ELE 493 Special Problems** (1-4 crs.) Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. Pre: permission of instructor. S/U credit. Not for graduate credit.

**ELE 501 Linear Transform Analysis** (3 crs.) Transform analysis (including Fourier, Laplace, and z-transforms) of continuous- and discrete-time systems and signals. Properties of transforms, computational efficiency, and applications such as compact representations of video and sound. (Lec. 3) Pre: vectors, matrices, calculus with real and complex variables.

**ELE 502 Nonlinear Control Systems** (3 crs.) Analysis of nonlinear systems: phase-plane analysis, Lyapunov theory, advanced stability theory, describing functions. Design of nonlinear control systems: feedback linearization, sliding control. (Lec. 3) Pre: ELE 503 or permission of instructor.

**ELE 503 Linear Control Systems** (4 crs.) Cross-listed as (ELE), MCE 503. State-variable description of continuous-time and discrete-time systems, matrices and linear spaces, controllability and observability, pole-placement methods, observer theory and state reconstruction, MATLAB exercises for simulation and design. (Lec. 4) Pre: ELE 314 or MCE 366 or equivalent and MTH 215 or equivalent.

**ELE 504 Optimal Control Theory** (3 crs.) Cross-listed as (ELE), MCE 504. Quadratic performance indices and optimal linear control, frequency response properties of optimal feedback regulators, state estimation, separation theorem, optimal control of nonlinear systems, Pontryagin's minimum principle. (Lec. 3) Pre: ELE 503.

**ELE 506 Digital Signal Processing** (4 crs.) Review of z-transform, frequency response of LTI systems, digital filter structures, sampling theorem, spectral analysis, DFT and FFT algorithms, windows, periodogram, introduction to design of FIR and IIR filters. (Lec. 4) Pre: ELE 501 or permission of instructor.

**ELE 509 Introduction to Random Processes** (4 crs.) Probability and random variables; random process characterizations and techniques. Useful models. Discrete and continuous systems with random inputs. Applications to detection, and filtering problems. (Lec. 4) Pre: MTH 451 or equivalent and knowledge of calculus, linear systems, and transform methods.

**ELE 510 Communication Theory** (4 crs.) Communication theory for discrete and continuous channels. Optimum-receiver principles and signal design. Fundamentals of information theory. Channel models, modulation techniques, source encoding, error control coding, decoding algorithms. (Lec. 4) Pre: ELE 509.

**ELE 511 Engineering Electromagnetics** (3 crs.) Review of electrostatics and magnetostatics. Maxwell's equations, wave propagation in dielectric and conducting media. Boundary phenomena. Radiation from simple structures. Relations between circuit and field theory. (Lec. 3)

**ELE 515 Systems Simulation** (3 crs.) Cross-listed as (ISE), CSC 525, ELE 515. Simulation of random processes and systems. Continuous and discrete simulation models. Data structures and algorithms for simulation. Generation of random variates, design of simulation experiments for optimization and validation of models and results. Selected engineering applications. (Lec. 3) Pre: CSC 212 or ISE 325, ISE 433 or ELE 509, or permission of instructor.

**ELE 525 Fiber Optic Communication Systems** (3 crs.) Survey of important topics in optical communication devices and systems. The physical principles and operation of lasers, LEDs, fibers, and detectors are covered. (Lec. 3) Pre: ELE 423, 331, 401 or equivalent.

**ELE 527 Current Topics in Lightwave Technology** (3 crs.) Current topics of importance in lightwave technology including coherent fiber optical communication systems, optical amplifiers, active and passive single-mode devices, infrared optical fibers. Material will be taken from recent literature. (Lec. 3) Pre: ELE 525 or equivalent.

**ELE 531 Solid State Engineering I** (3 crs.) Review of quantum mechanics, crystal properties, energy-band theory, introduction to scattering, generation-recombination processes, Boltzmann's transport equation, semiconductor junctions, devices. (Lec. 3) Pre: ELE 331 or permission of instructor.

**ELE 532 Solid State Engineering II** (3 crs.) Properties of insulators, semiconductors, conductors and superconductors from quantum mechanical principles. Semiconductor

physics and band theory of solids as applied to current semiconductor and optoelectronic devices. (Lec. 3) Pre: ELE 531 or equivalent.

**ELE 534 MOS Devices** (3 crs.) Device physics and computer modeling of MOS devices, capacitors, metal semiconductor contacts, PMOS, NMOS, and DMOS transistors, short channel effects, modeling, small signal equivalent circuits. (Lec. 3) Pre: ELE 331 or permission of instructor.

**ELE 537 Digital Integrated Circuit Design II** (4 crs.) Device physics for CMOS technology, design techniques for static and dynamic logic families and arithmetic elements, design capture tools, synthesis strategies, scaling and next generation CMOS technologies, design project. (Lec. 3, Lab. 3) Pre: ELE 447 and 501.

**ELE 542 Fault-Tolerant Computing** (3 crs.) Fault and error modeling, reliability modeling and evaluation, fault-tolerant computer systems, digital and mixed analog/digital VLSI testing, concurrent error detection, and design for VLSI yield enhancement. (Lec. 3) Pre: ELE 405 or equivalent or permission of instructor.

**ELE 543 Computer Networks** (4 crs.) Cross-listed as (ELE 543), CSC 519. Computer network architectures, data link control and access protocols for LANs, internet protocols and applications, software and hardware issues in computer communication, delay analysis, and current research in computer networking. (Lec. 4) Pre: ELE 437 or equivalent or CSC 412 or equivalent.

**ELE 544 Arithmetic Algorithms and Hardware Designs** (4 crs.) Hardware algorithms and implementations of fixed and floating-point adders, multipliers, and dividers. Error and time complexity analysis. Applications to DSP algorithms. Circuit design in VHDL and prototype with FPGA. Pre: ELE 301 or equivalent or permission of instructor.

**ELE 545 Advanced Digital Circuits and Systems** (4 crs.) Advanced topics in Boolean algebra and digital designs. Arithmetic circuits, low-power designs, cryptography, communications, concurrent error detection/correction, SoC, and quantum computing. Project in design and implementation of complex digital systems. (Lec. 3, Proj. 3) Pre: ELE 301 or equivalent or permission of instructor.

**ELE 546 Design of Computer-Based Instrumentation** (3 crs.) Design of memory systems, input-output techniques, direct memory access controllers, instrument buses, video displays, multiprocessors-coprocessors, real-time operations, device handler integration into high-level language and mass storage. (Lec. 2, Lab. 3) Pre: ELE 205, 314, and concurrent enrollment in 405.

**ELE 547 Embedded Computer Systems and Applications** (4 crs.) Principles of embedded computer system designs; CPU, memory, I/O, interfacing of embedded computers; modern hardware/software tools



for embedded computing, and design of advanced systems including wired/wireless networking, image acquisition/processing, controls, medical equipment, or consumer electronics. (Lec. 3, Lab. 3)

**ELE 548 Computer Architecture** (4 crs.) Classification and taxonomy of computer architectures. RISC vs. CISC. Cache and virtual memory systems. Pipeline and vector processors. Multi-processor and multi-computer systems. Interprocessor communication networks. Dataflow machines. Parallel processing languages. (Lec. 4) Pre: ELE 305 or equivalent or permission of instructor.

**ELE 549 Computer System Modeling** (4 crs.) Basic techniques used in computer system modeling, queuing theory, stochastic processes, Petri net, product form networks, approximation techniques, solution algorithms and complexity, computer simulation, performance studies of modern computer systems. (Lec. 4) Pre: ELE 548 and 509 or MTH 451.

**ELE 550 Ocean Systems Engineering** (3 crs.) Cross-listed as (OCE), ELE 550. Introduction to the design of systems for use in the ocean environment with emphasis on interaction of various subsystem disciplines to achieve total system performance characteristics. Introduction to detection, localization, classification and time measurement strategies including Global Positioning system, underwater Acoustics Positioning and control, wireless acoustic and electromagnetic communication, and remote time transfer. Examples will include mobile, fixed, autonomous, distributed and networked sensors. Pre: MTH 451 or equivalent.

**ELE 561 Physiological Modeling and Control** (3 crs.) Principles of physiological modeling and control of linear and nonlinear systems, stability analysis, root locus, Bode plots, linearization. Not for undergraduate credit. Not open to students who have credit in ELE 461 or BME 461. Pre: graduate standing in electrical engineering or permission of instructor.

**ELE 562 Biomedical Instrumentation Design** (3 crs.) Fundamentals of biomedical instrumentation, biocompatibility, medical device materials; safety, noise rejection, biomedical signal processing; measuring, recording, monitoring, and therapeutic devices. Not for undergraduate credit. Not open to students who have credit in ELE 489 or BME 461. (Lec. 3) Pre: graduate standing in electrical engineering or permission of instructor.

**ELE 563 Biomedical Instrumentation Laboratory** (1 cr.) Development of a portable heart function monitor that measures the electrocardiogram and photoplethysmogram; Embedded system design using instrumentation amplifier, op-amp, graphic LCD module, and PIC microprocessor with C programming. Not for undergraduate credit. Not open to students who have credit in 489 or BME 463. (Lab. 3) Pre: BME 462 or ELE 489

and graduate standing in electrical engineering or permission of instructor.

**ELE 564 Medical Imaging** (3 crs.) Engineering and clinical applications of medical imaging systems including X-ray, computed tomography, radioisotope imaging, ultrasound, magnetic resonance imaging; picture archiving and communications system and medical image processing. Term paper required. May not be taken by students who have credit in BME 464. (Lec. 3) Pre: Senior standing in electrical or computer engineering or permission of instructor.

**ELE 565 Medical Image Processing Laboratory** (1 cr.) Development of medical image processing algorithms with graphical user interface in C++ under the Windows operating system: smoothing and sharpening filters, morphological filters, area measurement and edge tracer. Projects involving advanced algorithms. May not be taken by students who have credit in BME 465. (Lab. 3) Pre: Senior standing in biomedical engineering or permission of instructor.

**ELE 568 Neural Engineering** (3 crs.) Principles and technologies of neuroengineering and clinical applications; brain stimulator, spinal cord stimulation, functional electrical stimulation (FES), neural-machine interface for motor prosthesis control, artificial visual/auditory devices for augmented sensory perception. Pre: Graduate standing in Electrical Engineering or permission of instructor.

**ELE 571 Underwater Acoustics I** (3 crs.) Cross-listed as (OCE), ELE 571. Introduction to sound generation, transmission, and reception, including vibration of mechanical systems, acoustic waves in fluids, acoustic transducers and arrays, acoustic propagation in the ocean, and sonar systems. (Lec. 3)

**ELE 581 Special Topics in Artificial Intelligence** (3 crs.) Cross-listed as (CSC), ELE 581. Topics of specialized or current interest, which may change. Topics may include expert systems, natural language processing, neural network models, machine learning. AI applications in remote sensing. (Lec. 3) Pre: CSC 481 or permission of instructor. May be repeated with permission. In alternate years.

**ELE 583 Computer Vision** (3 crs.) Cross-listed as (ELE), CSC 583. Algorithms used to extract information from two-dimensional images. Picture functions. Template matching. Region analysis. Contour following. Line and shape descriptions. Perspective transformations. Three-dimensional reconstruction. Image sensors. Interfacing. Applications. (Lec. 3) Pre: MTH 362 or equivalent.

**ELE 584 Pattern Recognition** (3 crs.) Cross-listed as (ELE), STA 584. Random variables, vectors, transformations, hypothesis testing, and errors. Classifier design: linear, nonparametric, approximation procedures. Feature selection and extraction: dimensionality reduction, linear and nonlinear mappings, clustering, and unsupervised clas-

sification. (Lec. 3) Pre: ELE 509 or introductory probability and statistics, and knowledge of computer programming.

**ELE 591 Special Problems** (1-3 crs.) Advanced work under supervision of a faculty member arranged to suit individual requirements of student. (Independent Study) Pre: graduate standing. May be repeated for a maximum of 6 credits.

**ELE 592 Special Problems** (1-3 crs.) Advanced work under supervision of a faculty member arranged to suit individual requirements of student. (Independent Study) Pre: graduate standing. May be repeated for a maximum of 6 credits. S/U credit.

**ELE 594 Special Topics in Electrical Engineering** (1-3 crs.) Intensive inquiry into a certain important field of current interest in electrical engineering. (Lec. 1-3) Pre: permission of instructor.

**ELE 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**ELE 601 Graduate Seminar** (1 cr.) Seminar discussions presented by faculty and outside speakers on topics of current research interest. (Seminar) S/U credit.

**ELE 602 Graduate Seminar** (1 cr.) Student seminars including the presentation of research results and detailed literature surveys. May be repeated for a total of 2 credits. S/U credit. Pre: permission of instructor.

**ELE 610 Applications of Information Theory** (3 crs.) Information theoretic underpinnings and practical techniques for data compression, channel coding for error control, and encryption and cryptography for secure information transmission. (Lec. 3) Pre: ELE 509 or permission of instructor.

**ELE 648 Advanced Topics in Computer Architectures** (3 crs.) Modern high-performance computer structures, parallel and distributed hardwares and softwares, instruction level parallelism, memory hierarchy, fault tolerant computing, and future generation computers. (Lec. 3) Pre: ELE 548.

**ELE 661 Estimation Theory** (3 crs.) Extraction of information from discrete and continuous data, best linear estimation, recursive estimation, optimal linear filtering, smoothing and prediction, nonlinear state and parameter estimation, design and evaluation of practical estimators. (Lec. 3) Pre: ELE 503 and 509.

**ELE 665 Modulation and Detection** (3 crs.) Advanced treatment of modulation and detection theory. Minimum meansquare error, maximum likelihood, and maximum posterior probability estimators. Applications to communications systems and to radar and sonar systems. (Lec. 3) Pre: ELE 510.

**ELE 670 Advanced Topics in Signal Processing** (3 crs.) Seminar for advanced students. Selected topics of current research

interest. Material will be drawn primarily from recent literature. (Lec. 3) Pre: ELE 506 and 606.

**ELE 672 Underwater Acoustics II** (3 crs.) Cross-listed as (OCE), ELE 672. Sound transmission in ocean, transducers, active signal design for range and Doppler resolution, ambient and platform noise, classical and wave vector-frequency methods of beamforming, adaptive beamforming, characteristics of targets, and active/passive sonar systems. (Lec. 3) Pre: OCE 571.

**ELE 677 Statistical Sonar Signal Processing** (3 crs.) Cross-listed as (ELE), OCE 677. Basic results in probability and statistics, signal processing, and underwater acoustics are applied to the design of detection, estimation, and tracking in active sonar, passive sonar, and underwater acoustic communication. (Lec. 3) Pre: MTH 451 or ELE 509, ELE 506, and ELE 571 (or OCE 571), or equivalents. ELE 510 is useful and closely related, but not required.

**ELE 691 Special Problems** (1-3 crs.) Advanced work under supervision of a faculty member arranged to suit individual requirements of a student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 6 credits. S/U credit.

**ELE 692 Special Problems** (1-3 crs.) Advanced work under supervision of a faculty member arranged to suit individual requirements of a student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 6 credits. S/U credit.

**ELE 694 Advanced Special Topics in Electrical Engineering** (1-3 crs.) Intensive inquiry into a certain important field of current interest in electrical engineering, requiring advanced sophistication of a 600-level course. (Lec. 1-3) Pre: permission of instructor.

**ELE 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## ELS | English Language Studies

**ELS 112 Expository Writing in English** (3 crs.) Equivalent to WRT 104 but restricted to students whose first language is not English. Varieties and strategies of expository writing for different audiences and situations. (Lec. 3) (ECw)

**ELS 122 Academic Writing in English** (3 crs.) Practice in writing assignments for introductory and general education courses across the curriculum. Restricted to students whose first language is not English. (Lec. 3) (ECw)

**ELS 312 Oral English Skills for the Public Spere** (3 crs.) Focus on pronunciation, listening and speaking skills, and a variety

of speaking projects. Special emphasis on speaking freely in academic and social situations. (Lec. 3)

**ELS 322 Oral English Skills for the Academic Sphere** (3 crs.) Intensive focus on pronunciation, listening and speaking skills, and a variety of communicative projects. Develop oral presentation skills. (Lec. 3)

**ELS 512 Oral Communication Skills for International Teaching Assistants** (3 crs.) Intensive focus on pronunciation, listening and speaking skills, and awareness of colloquial American speech. (Lec. 3) Pre: graduate standing and permission of instructor. May be repeated until oral proficiency requirement is met.

**ELS 612 Advanced Communication Skills for International Teaching Assistants** (3 crs.) Focus on pronunciation, teaching skills, and cross-cultural differences in education. Priority given to international teaching assistants. (Lec. 3) Pre: graduate standing. May be repeated until oral proficiency requirement is met.

## ENG | English

**ENG 110 Introduction to Literature** (4 crs.) Analysis of literature through reading and discussion of a number of genres derived from a variety of literary cultures. (Lec. 3, Online 1) Not available for English major credit. (A) (L) [D]

**ENG 160 Literatures of the World** (4 crs.) Cross-listed as (ENG), CLS 160. Introduction to significant works of world literature. (Lec. 3, Online 1) (A) (L) [D]

**ENG 201 Principles of Literary Study** (4 crs.) Introduction to the study of literature through reading and discussion of major methodologies, analytical approaches, and perspectives in literary study. Students will also participate in a series of faculty presentations reflecting current critical and creative practices in the discipline. Restricted to English majors. (Lec. 3, Rec. 1)

**ENG 205A Creative Writing: Poetry** (4 crs.) Writing and analysis of works written by class members and professional writers. (Lec. 3, Project 3/Online) ENG 205A may be offered online. Students may repeat ENG 205 for a total of 16 credits but may not repeat the same letter (A, B, C, D).

**ENG 205B Creative Writing: Fiction** (4 crs.) Writing and analysis of works written by class members and professional writers. (Lec. 3, Project 3/Online) ENG 205B may be offered online. Students may repeat ENG 205 for a total of 16 credits but may not repeat the same letter (A, B, C, D).

**ENG 205C Creative Writing: Nonfiction** (4 crs.) Writing and analysis of works written by class members and professional writers. Type of writing varies with instructor. (Lec. 3, Project 3) Students may repeat ENG 205 for a total of 16 credits but may not repeat the

same letter (A, B, C, D).

**ENG 205D Creative Writing: Screen Writing** (4 crs.) Writing and analysis of works written by class members and professional writers. (Lec. 3, Project 3) Students may repeat ENG 205 for a total of 16 credits but may not repeat the same letter (A, B, C, D).

**ENG 241 U.S. Literature I** (4 crs.) Selections from U.S. literature, beginnings to the mid-19th century. (Lec. 3, Project 3) (A) [D]

**ENG 242 U.S. Literature II** (4 crs.) Selections from U.S. literature, mid-19th century to the present. (Lec. 3, Project 3) ENG 241 not required for 242. (A) [D]

**ENG 243 The Short Story** (4 crs.) Critical study of the short story from the early 19th century to the present. (Lec. 3, Project 3) (A) (L) [D]

**ENG 245 Introduction to Film Decades** (4 crs.) Introduction to study of film in cultural context over an historical decade, e.g., Modernism and the Silent Era of the Twenties; Cinema of Wartime in the Forties; Vietnam, Nixon, and the Seventies Blockbuster. May be repeated once with a different emphasis. (Lec. 3, Project 3) (A)

**ENG 247 Introduction to Literature of the African Diaspora** (4 crs.) Cross-listed as (ENG), AAF 247. Major themes, genres, and motifs of the literatures of Africa and the Americas. Focus on one or more of these regions. Study of black oral and written literatures with emphasis on cultural, historical, political, and socioeconomic contexts. (Lec. 3, Project 3) (A) [D]

**ENG 248 African-American Literature from 1900 to the Present** (4 crs.) Cross-listed as (ENG), AAF 248. Twentieth-century African-American literature, with emphasis on major issues, movements, and trends, including the study of W.E.B. DuBois, the Harlem Renaissance, the civil rights movement, and the black arts movement. (Lec. 3, Project 3) (A) [D]

**ENG 250 Themes And Myths** (3 crs.) Intensive study of the evolution and transformation of a myth or theme in several national literatures. An introduction to a comparative and interdisciplinary approach. (Lec. 3, Project 3) May be repeated for credit as often as topic changes. May be taken once for General Education credit.

**ENG 251 British Literature I** (4 crs.) Selections from British literature, beginnings to 1798. (Lec. 3, Project 3) (A) (L) [D]

**ENG 252 British Literature II** (4 crs.) Selections from British literature, 1798 to the present. (Lec. 3, Project 3) ENG 251 not required for 252. (A) (L) [D]

**ENG 260 Women and Literature** (4 crs.) Critical study of selected topics. (Lec. 3, Project 3) (A) [D]

**ENG 262 Introduction to Literary Genres: Non-fiction** (4 crs.) Introduction to the study of various types of non-fiction prose. (Lec. 3, Project 3) (A) [D]

**ENG 263 Introduction to Literary Genres: The Poem** (4 crs.) Introduction to the study of the poem. (Lec. 3, Project 3) Professor Stein's section is Writing Intensive [WI]. (A) [D]

**ENG 263H Honors Section of ENG 263-Introduction to Literary Genres-The Poem** (4 crs.) Honors Section of ENG 263 - Introduction to Literary Genres - The Poem (Lec. 3, Project 3) Pre: 3.30 or better overall GPA. (A) [D]

**ENG 264 Introduction to Literary Genres: The Drama** (4 crs.) Introduction to the study of the drama. (Lec. 3, Project 3) (A) [D]

**ENG 265 Introduction to Literary Genres: The Novel** (4 crs.) Introduction to the study of the novel. (Lec. 3, Project 3) (A) [D]

**ENG 265H Honors section of ENG 265: Introduction to Literary Genres: The Novel** (4 crs.) Honors section of ENG 265: Introduction to Literary Genres: The Novel (Violence and the Novel). (Lec. 3, Project 3) Pre: must have a 3.30 overall GPA. (A) [D]

**ENG 280 Introduction to Shakespeare** (4 crs.) Introduction to the major plays and poetry of Shakespeare. (Lec. 3, Project 3) (A) (L) [D]

**ENG 300A Literature into Film: Drama** (4 crs.) Analysis of themes, techniques, printed and film narratives. (Lec. 3, Project 3)

**ENG 300B Literature into Film: Narrative** (4 crs.) Analysis of themes, techniques, printed and film narratives. (Lec. 3)

**ENG 302 Topics in Film Theory and Criticism** (4 crs.) Introduction to film theory and criticism. Emphasis on semiotics, auteur theory, psychoanalysis, genre studies, feminist theory, materialist critique, or cultural studies, with focus on range of popular, experimental, and documentary film traditions. May be repeated for credit when taken with different emphasis. (Lec. 3, Lab. 2)

**ENG 303 Cinematic Auteurs** (4 crs.) Literary study of one or more major directors with a substantial body of work exhibiting recurrent themes and distinctive style (e.g. Hitchcock, Kubrick, Kurasawa). Emphasis will vary. May be repeated once with different director. (Lec. 3, Lab. 2)

**ENG 304 Film Genres** (4 crs.) Literary study of the particular conventions and evolution of one or more film genres (e.g. Romantic Comedy, Science Fiction, Western). Emphasis will vary. (Lec. 3, Lab. 2) May be repeated once with a different genre.

**ENG 305A Advanced Creative Writing - Poetry** (4 crs.) Intensive writing and reading workshop for students at the advanced level who have preferably taken at least one previous class in creative writing. (Lec. 3, Project 3/Online) Student may repeat ENG 305 for a total of 16 credits but may not repeat the same letter (A, B, C, D).

**ENG 305B Advanced Creative Writing - Fiction** (4 crs.) Intensive writing and reading workshop for students at the advanced level who have preferably taken at least one pre-

vious class in creative writing. (Lec. 3, Project 3/Online) Student may repeat ENG 305 for a total of 16 credits but may not repeat the same letter (A, B, C, D).

**ENG 305C Advanced Creative Writing - Nonfiction** (4 crs.) Intensive writing and reading workshop for students at the advanced level who have preferably taken at least one previous class in creative writing. Type of writing varies with instructor. (Lec. 3, Project 3) Student may repeat ENG 305 for a total of 16 credits but may not repeat the same letter (A, B, C, D).

**ENG 305D Advanced Creative Writing - Screen Writing** (4 crs.) Intensive writing and reading workshop for students at the advanced level who have preferably taken at least one previous class in creative writing. (Lec. 3, Project 3) Student may repeat ENG 305 for a total of 16 credits but may not repeat the same letter (A, B, C, D).

**ENG 317 Contemporary Women Novelists of the Americas** (3 crs.) Cross-listed as (GWS), ENG 31. Novels by contemporary women writers from the American continents. Topics include construction of the female body, sexuality and desire, motherhood, exile and immigration, women and work. (Lec. 3) (A) (L) [D]

**ENG 330 The Structure of American English** (4 crs.) Introduction to the phonology, morphology, and syntax of American English. Emphasis on skills needed to understand the prescriptive rules of grammarians and the descriptive rules of critics and teachers. (Lec. 3, Project 3)

**ENG 332 The Evolution of the English Language** (4 crs.) History of English from a minor dialect of the North Sea to a major language of the Renaissance. Focus on the languages and cultures of Beowulf, Chaucer, and Shakespeare. (Lec. 3, Project 3)

**ENG 335 Interdisciplinary Studies in Comparative Literature** (3 crs.) Cross-listed as (ENG), CLS 335. Study of the interrelationships of two or more national literatures (in translation) with another discipline. (Lec. 3) May be repeated for credit as often as topic changes.

**ENG 335H Honors Section of CLS/ENG 335: Interdisciplinary Studies in Comparative Literature** (3 crs.) Cross-listed as (CLS), ENG 335H. Honors Section of CLS/ENG 335: Interdisciplinary Studies in Comparative Literature. (Lec. 3) May be repeated for credit as often as topic changes. Must have a 3.30 overall GPA.

**ENG 336 The Language of Children's Literature** (4 crs.) Introduction to stylistic analysis using children's literature. Focus on sound patterns, word choice, and sentence structure to discuss appropriateness, interpretation, and evaluation. Emphasis on one writer or work. (Lec. 3, Project 3)

**ENG 337 Varieties of American English** (4 crs.) Study of regional and social dialects of American English. Emphasis on variations

in pronunciation and word choice and on New England varieties. Includes independent or group field projects. Course contains language that may be offensive to some students. (Lec. 3, Project 3)

**ENG 338 Native American Literature** (4 crs.) Study of literature written by Native Americans. This course may consider early texts and traditions as well as contemporary works. (Lec. 3, Project 3)

**ENG 339 Literary Nonfiction** (4 crs.) Intensive study in one or more forms of non-fiction narrative (memoir, nature meditation, medical narrative, extended journalistic account, true crime, science narrative, historical account). (Lec. 3, Project 3) May be repeated once for a total of 8 credits when taken with different emphasis.

**ENG 345 Topics in American Colonial Literatures** (4 crs.) Studies in the literature and culture of the New World. Topics include discovery, exploration, early modern empire, settlement of the Americas. May include fictional and non-fictional prose, poetry, or dramatic works by major authors and their contemporaries. (Lec. 3, Project 3) May be repeated once for a total of 8 credits, barring duplication of topics.

**ENG 347 Antebellum U.S. Literature and Culture** (4 crs.) Study of literature and culture in the United States during the decades leading to the Civil War (the period also known as the American Renaissance/American Romanticism). (Lec. 3, Project 3)

**ENG 348 U.S. Literature and Culture from 1865 to 1914** (4 crs.) Study of post-Civil War poetry and prose. Readings may include Chesnut, Chopin, Crane, DuBois, James, Twain, Wharton, and others. (Lec. 3, Project 3)

**ENG 350 Literary Theory and Criticism** (4 crs.) Introduction to theories of literature and their application in the analysis of selected texts. Topics may include representation as problematized in works selected from classical to contemporary thought. (Lec. 3, Project 3) May be repeated for credit as often as topic changes.

**ENG 352 Black Images in Film** (3 crs.) Cross-listed as (AAF), ENG 352. Exploration of the cultural, economic, political, and ideological motivations behind the standard representation of people of the African diaspora in cinema in the U.S. and other areas of the world, while examining film as a genre with a vocabulary and idiom of its own. (Lec. 3)

**ENG 355 Literature and the Sciences** (4 crs.) Study of the representation of scientific themes in literature and/or the relationship between literature and the sciences. (Lec. 3, Project 3) Pre: Junior or senior standing. Enrollment priority given to students majoring in the sciences. (A) (L) [D]

**ENG 356 Literature and the Law** (4 crs.) Study of the representation of legal themes in literature and/or the relationship between literature and the law. (Lec. 3, Project 3) Pre: Junior or senior standing. Enrollment priority

given to students with career interests in law. (L) [D]

**ENG 357 Literature and Medicine** (4 crs.) Study of the representation of medical themes in literature and/or the relationship between literature and medicine. (Lec. 3, Project 3) Pre: Junior or senior standing. Enrollment priority given to students with interest in medical careers. (A) [D]

**ENG 357H Honors Section of ENG 375: Literature and Medicine** (4 crs.) Honors Section of ENG 375: Literature and Medicine. (Lec. 3, Project 3) Pre: junior or senior standing and 3.30 or better overall GPA. Enrollment priority given to students with interest in medical careers. (A) [D]

**ENG 360 Africana Folk Life** (3 crs.) Examination of the process of creativity, context, and form in the oral literary tradition of peoples of African descent throughout the world. (Lec. 3) In alternate years.

**ENG 362 African-American Literary Genres** (4 crs.) Cross-listed as (ENG), AAF 362. Study of drama and poetry in the continued oral and written heritage of Africa and America, excepting short story and the novel. Focus on Baraka, Bullins, Dunbar, Giovanni, Hughes, and Walker. (Lec. 3, Project 3)

**ENG 363 African-American Fiction** (4 crs.) Cross-listed as (ENG), AAF 363. Study of formal and thematic developments in the African-American novel and short story. Focus on Baldwin, Chesnut, Ellison, Gaines, Hurston, Jacobs, Marshall, Morrison, Naylor, Reed, Walker, Wideman, Wilson, and Wright. (Lec. 3, Project 3)

**ENG 364 Contemporary African Literature** (4 crs.) Cross-listed as (ENG), AAF 364. Study of contemporary African literature by genre, region, or theme, with emphasis on literary traditions, issues, and socio-cultural contexts. (Lec. 3, Project 3)

**ENG 367 The Epic** (4 crs.) Studies in epic literature from Homer to the modern period. Historical emphasis will vary with instructor. (Lec. 3, Project 3)

**ENG 368 The Bible** (4 crs.) Introduction to poetry and narrative in the Old Testament and the Apocrypha, primarily in the Authorized (King James) Version. (Lec. 3, Project 3)

**ENG 374 British Literature: 1660-1800** (4 crs.) Study of major trends in late 17th- and 18th-century verse, prose, drama, and fiction by such writers as Milton, Dryden, Behn, Congreve, Pope, Finch, Swift, and Johnson. (Lec. 3, Project 3)

**ENG 376 Topics in Victorian Literature and Culture** (4 crs.) Notable literary and cultural movements and motifs of the Victorian era. May include prose, poetry, or dramatic works by major authors and their contemporaries. May be repeated once with a different topic. (Lec. 3, Project 3)

**ENG 377 Topics in Romanticism** (4 crs.) Notable literary and cultural movements and motifs of Romantic literature and culture.

May include prose, poetry, or dramatic works by major Romantic authors and their contemporaries. May be repeated once with a different topic. (Lec. 3, Project 3)

**ENG 378 Aspects of Postmodernism** (4 crs.) Introduction to major issues and theories of Postmodern Literature and Culture, emphases may include temporality, borders, cyberspace, theories of the image and constructions of subjectivity. (Lec. 3, Project 3)

**ENG 379 Contemporary Literature** (4 crs.) Studies in contemporary literature with an emphasis on cultural and interdisciplinary issues. Movements and emphases may include multiculturalism, culture and technology, globalization, and politics of the body. (Lec. 3, Project 3)

**ENG 381 Topics in Medieval Literature** (4 crs.) Emphasis on cultural and interdisciplinary issues. (Lec. 3, Project 3) May be repeated once with a different topic.

**ENG 382 Topics in Renaissance Literature** (4 crs.) Emphasis on cultural and interdisciplinary issues. (Lec. 3, Project 3) May be repeated once with a different topic.

**ENG 383 Modernist Literature, 1900-1945** (4 crs.) Poetry, drama, fiction, and/or nonfiction prose with an emphasis on writers such as Eliot, Faulkner, Hurston, Joyce, Stevens, Yeats, Woolf, and Wright. (Lec. 3, Project 3)

**ENG 385 Women Writers** (4 crs.) Cross-listed as (ENG), GWS 385. Analysis of the poetry, drama, or fiction of women writers. Emphasis on 18th-century, 19th-century, 20th-century, or contemporary authors. May be repeated for credit when taken with different emphasis. (Lec. 3, Project 3)

**ENG 387 Foundational Texts in Modern Gay and Lesbian Culture** (4 crs.) Study of literary works that trace the origins and ongoing definitions of modern homo/heterosexual identities. Selections from writers such as Whitman, Wilde, Proust, Woolf, Lawrence, Gide, Mann, Cather, and Baldwin. (Lec. 3, Project 3)

**ENG 394 Independent Study** (1-4 crs.) Extensive individual study and research, culminating in a substantial essay. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 8 credits.

**ENG 395 Independent Study** (1-4 crs.) Extensive individual study and research, culminating in a substantial essay. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 8 credits.

**ENG 396 Literature of the Sea: The Rumowicz Seminar** (4 crs.) Studies of maritime literature and culture. Guest lecturers and field trips. (Seminar)

**ENG 399 Special Topics in Literature** (4 crs.) Specialized topics in the study of literature offered by specialists in the field. (Lec. 3, Project 3)

**ENG 432 Cultural History of the English Language** (4 crs.) Studies in the history of

the English language with a focus on cultural and social context. Attention to the relation between linguistic change and the role of language in cultural and political events. (Lec. 3, Project 3) Not for graduate credit.

**ENG 446 Drama** (4 crs.) Intensive studies in Drama. May include special topics in plays, performance, and playwrights. (Seminar) Not for graduate credit.

**ENG 447 Poetry** (4 crs.) Study of major contributions and movements in poetry of any period. (Seminar) Not for graduate credit.

**ENG 451 Advanced Topics in International Film Media** (4 crs.) Cross-listed as (FLM), ENG, CLS 451. Study of international film genres from one or more national, regional or diasporic cultures and traditions. Emphases on theoretical, historiographic and media research methods. (Lec. 3, Lab. 2) Pre: junior standing or permission of instructor. FLM 204 or 205 recommended. May be repeated for a maximum of 8 credits with change of emphases or topics.

**ENG 469 The Novel** (4 crs.) Focuses on generic considerations of the novel in relation to historical contexts such as national/cultural politics, philosophy, psychology. The novel is examined against the historical specificity of its production. (Seminar) Not for graduate credit.

**ENG 472 Shakespeare** (4 crs.) Studies in Shakespeare's drama and poetry. (Seminar) Not for graduate credit.

**ENG 478 Medieval Authors** (4 crs.) Studies in works by one or more major medieval authors. May be repeated once, barring duplication of writers. (Seminar)

**ENG 479 Renaissance Authors** (4 crs.) Studies in works by one or more major Renaissance authors (excepting Shakespeare). May be repeated once, barring duplication of writers. (Seminar) Not for graduate credit.

**ENG 480 British Restoration and Enlightenment Authors** (4 crs.) Studies in works by one or two major Restoration and Enlightenment authors. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

**ENG 482 American and U.S. Authors to 1820** (4 crs.) Studies in works by one or two major American and U.S. authors to 1820. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

**ENG 485 U.S. Authors after 1900** (4 crs.) Studies in works by one or two major United States authors. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

**ENG 486 British Authors: 19th Century** (4 crs.) Studies in works by one or two major British authors. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

**ENG 487 World Authors** (4 crs.) Studies in works by one or two major world authors

(excepting U.S. or British authors). (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

**ENG 489 Literature and Empire** (4 crs.) Studies of specific authors, literary movements, or comparative themes in texts reflecting the impact of colonization and imperialism. (Seminar) Not for graduate credit.

**ENG 493 Internship In English PRA** (4 crs.) Exploration of career goals and job opportunities. Participate in a variety of work situations, supervised by both faculty member and on-site personnel. 156 hours per 4 credits. (Practicum) Pre: 20 credits in English and permission of chairperson. May be taken in conjunction with ENG 494 for a total of 8 credits, only 4 of which may be used as credit toward the English major. Not for graduate credit. S/U only.

**ENG 494 Internship In English PRA** (4 crs.) Exploration of career goals and job opportunities. Participate in a variety of work situations, supervised by both faculty member and on-site personnel. 156 hours per 4 credits. (Practicum) Pre: 20 credits in English and permission of chairperson. May be taken in conjunction with ENG 493 for a total of 8 credits, only 4 of which may be used as credit toward the English major. Not for graduate credit. S/U only.

**ENG 501 Workshop in Creative Writing** (3 crs.) Close supervision and discussion of creative writing, including poetry, nonfiction, short prose forms, scripts, and novels. (Lec. 3) Pre: Graduate standing or permission of instructor.

**ENG 510 Introduction to Professional Study I** (1.5 crs.) Orientation to the major discourses, critical frameworks, and databases constituting graduate research in language and literary studies, including computer-assisted research methodologies. (Seminar 1.5) Pre: graduate standing or permission of instructor. S/U grades only.

**ENG 511 Introduction to Professional Study II** (1.5 crs.) Orientation to the major discourses, critical frameworks, and databases constituting graduate research in language and literary studies, including computer-assisted research methodologies. (Seminar) Pre: ENG 510. S/U credit.

**ENG 514 History of Critical Theories** (3 crs.) Historical survey of critical theory from antiquity to the present. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 535 Old English** (3 crs.) Introduction to the language and literature. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 540 Studies in American Texts Before 1815** (3 crs.) Cultural texts and topics of the Western Hemisphere before 1815: literary and nonliterary writings and genres; exploration and captivity narrative; African transmissions; critical theory; culture, gender, race, and class. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 543 Studies in 19-Century American Texts** (3 crs.) Literary and nonliterary cultural texts, genres, and topics of the Western Hemisphere. May include media; oral, industrial, and popular cultures; critical theory and the analysis of discourses; issues of class, gender, and race. (Lec. 3) Pre: Graduate Standing or permission of instructor.

**ENG 545 Studies in American Texts After 1900** (3 crs.) Modern, contemporary, and postmodern cultural texts, genres, and topics of the Western Hemisphere; e.g. literary and nonliterary writings, performance modes, media, theory, and cultural studies of race, genre, and class. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 553 Studies in British Texts 1700-1832** (3 crs.) Literary and nonliterary cultural texts and genres during the Restoration, Augustan, Enlightenment, and Romantic periods; e.g., drama, media, rhetoric, theory, and discourse analysis of gender, class, race, and other social relations. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 557 Studies in British Texts After 1900** (3 crs.) Modern, contemporary, and postmodern cultural texts; e.g., literary and nonliterary writings, drama, colonial and European cultural relations, film, theory, and cultural studies of institutional life and other social relations. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 560 Studies in European Texts** (3 crs.) Introduction to the study of European texts in translation. May include different historical periods; literary and nonliterary writings; theory; film; rhetoric; and issues of culture, gender, race, class, and sexuality. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 570 Studies in Postcolonial Texts** (3 crs.) Investigation of similarities and differences between nonoccidental and occidental genres; traditions and practices of postcolonial oral, written, and visual cultural forms from Africa, Australia, New Zealand, the Americas, India, Ireland, and Scotland. (Lec. 3) Pre: graduate standing or permission of instructor.

**ENG 590 Selected Topics** (1-3 crs.) Selected topics in American and British literature and topics of special interest not covered by traditional department offerings. (Lec. 1-3)

**ENG 595 Master's Project PRO** (3 crs.) Student produces MA portfolio in consultation with major professor and committee. S/U only. Pre: Graduate Standing or permission of instructor.

**ENG 599 Master's Thesis Research** (3 crs.) Student produces MA thesis in consultation with major professor and committee. (Independent Study) S/U only. Pre: Graduate Standing or permission of instructor.

**ENG 601 Seminar in Creative Writing** (3 crs.) Seminar for advanced students under supervision of a member arranged to suit individual project requirements of students.

(Seminar) Pre: graduate standing or permission of instructor.

**ENG 605 Seminar in Genres** (3 crs.) In-depth study of a single or several genres and/or subgenres, such as epic, drama, or horror film. (Seminar) Pre: graduate standing or permission of instructor.

**ENG 610 Seminar in Historical Periods** (3 crs.) Selected topics of relevance for historical periods. Periods emphasized are medieval, 16th- and 17th-century British, 18th- and 19th-century British, North American, and postcolonial. (Seminar) Pre: Graduate Standing or permission of instructor.

**ENG 615 Seminar in Authors** (3 crs.) In-depth and critical study of selected works of one or two authors from any historical period, genre, or medium; theories and traditions of authorship; authorship and gender. (Seminar) Pre: graduate standing or permission of instructor.

**ENG 620 Seminar in Culture and Discourse** (3 crs.) Contrasting theoretical conceptions of culture, discursive practices, hegemony, the public and private spheres, and related concerns; may cross any historical formation or period. (Seminar) Pre: graduate standing or permission of instructor.

**ENG 625 Seminar in Media** (3 crs.) Critical and theoretical conceptions of one or more media across any historical formation or period. (Seminar) Pre: graduate standing and permission of instructor.

**ENG 630 Seminar in Canons** (3 crs.) Critical and theoretical conceptions of canons and canonicity, including emerging or revisionist canons. (Seminar) Pre: graduate standing or permission of instructor.

**ENG 635 Seminar in Subjectivities** (3 crs.) Critically investigates class, race, gender, sexuality, and/or other subject positions as they are constructed by literary or other media. Might emphasize reading and writing communities, form and ideology, or identity politics. (Seminar) Pre: graduate standing or permission of instructor.

**ENG 650 Seminar in Critical Theory** (3 crs.) In-depth study of one or several critical theories such as psychoanalytic, feminist, postcolonial, and cultural studies. (Seminar) Pre: graduate standing or permission of instructor.

**ENG 660 Seminar in Special Topics** (3 crs.) Topics of special interest not covered by other offerings. (Seminar) Pre: graduate standing or permission of instructor.

**ENG 691 Independent Graduate Study** (3 crs.) Advanced study of an approved topic under the supervision of a faculty member. (Independent Study) Pre: permission of ENG Graduate Director. May not be repeated for credit.

**ENG 692 Independent Graduate Study** (3 crs.) Advanced study of an approved topic under the supervision of a faculty member. (Independent Study) Pre: permission of ENG

Graduate Director. May not be repeated for credit.

**ENG 695 Practicum: Teaching College English PRA** (1 cr.) Practicum for students teaching a college-level English course. Supervision of course preparation, presentation, and evaluation. (Practicum 1) S/U credit. Pre: permission of the Chair. May be repeated for a total of 3 credits with permission of the Chair.

**ENG 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit. Pre: Graduate Standing or permission of instructor.

**ENG 999 Methods of Teaching Literature** (0 crs.) Materials and various methods of teaching literature on the college level. Required of graduate students who teach English Department literature courses. (Seminar) Pre: graduate standing.

## ENT | Entomology

**ENT 286 Humans, Insects, and Disease** (3 crs.) Cross-listed as (BIO), ENT 286. Role of insects, ticks, and mites as vectors and as direct agents of diseases in humans; factors affecting the spread of these diseases and their role in our cultural development. (Lec. 3) Not for major credit for B.S. in biological sciences. (N) [D]

**ENT 385 Introductory Entomology** (3 crs.) Cross-listed as (ENT), BIO 385. Introduction to the diverse components of entomology, emphasizing basic principles of insect morphology, physiology, behavior, and ecology. Current topics in insect biodiversity and management strategies. (Lec. 3) Pre: BIO 102 and BIO 101, or permission of instructor.

**ENT 387 Insects of Turf and Ornamentals** (3 crs.) Biology, ecology, and management of insects affecting turfgrasses, trees, and ornamental plants. (Lab. 3) Pre: PLS 200 or permission of instructor.

**ENT 390 Wildlife and Human Disease** (3 crs.) Cross-listed as (AVS), ENT 390. Introduction to the important diseases of humans carried by wildlife, including surveillance, epidemiology, transmission, public health impact, and prevention. Interdisciplinary approach with emphasis on problem solving using real-life examples. (Lec. 3) Pre: BIO 101; BIO 262 or ENT 385 or equivalent.

**ENT 411 Pesticides and the Environment** (3 crs.) Review of the historical issues regarding pesticides, regulation, how they work, and costs/benefits associated with their use. Pre: BIO 102, CHM 103, 105; PLS 200, or permission of instructor. In alternate years. Not for graduate credit.

**ENT 511 Pesticides and the Environment** (3 crs.) Review of the historical issues regarding pesticides, regulation, how they work, and costs/benefits associated with

their use. Pre: BIO 102, CHM 103, 105; PLS 200, or permission of instructor.

**ENT 519 Insect Biological Control** (3 crs.) Natural regulation of pest abundance. Theoretical issues and practical experience in the use of biological controls for managing insect and weed problems. (Lec. 2, Lab. 1) Pre: ENT 385 or permission of instructor. In alternate years.

**ENT 520 Insect Morphology And Physiology** (3 crs.) An introduction to the structure and function of the insects and related arthropods. (Lec. 2, Lab. 2) Pre: ENT 385 or permission of instructor.

**ENT 544 Insect Ecology** (2 crs.) Cross-listed as (ENT), BIO 544. Ecology of insects and other terrestrial arthropods at the physiological, individual, population, community, and ecosystem levels. Pre: permission of instructor. In alternate years.

**ENT 550 Insect Taxonomy And Systematics** (3 crs.) External morphology of insects and taxonomy of major families. (Lec. 2, Lab. 2) Pre: ENT 385. In alternate years.

**ENT 555 Insect Pest Management** (3 crs.) Evaluation of past and present pest-control strategies in light of insect ecology. Development of pest-management systems emphasizing biological control, resistant plants, and ecosystem redesign. (Lec. 3) Pre: PLS 200 or ENT 385 or permission of instructor.

**ENT 561 Aquatic Entomology** (3 crs.) Biology of insects in aquatic environments, including systematics, morphology, and ecology. Field trips emphasize relations between species and habitat and the role of insects in aquatic management programs. (Lec. 2, Lab. 3) Pre: ENT 385 or permission of instructor. In alternate years.

**ENT 571 Insect Microbiology** (3 crs.) Cross-listed as (ENT), MIC 571. A two-part investigation of insect-microbe associations, concentrating on the comparative pathobiology of microbial agents in the insect host and the transmission of disease organisms by the insect vectors. (Lec. 3) Pre: ENT 385 and MIC 211, or permission of instructor. In alternate years.

**ENT 586 Medical and Veterinary Entomology** (3 crs.) Cross-listed as (BIO), ENT 586. Life history, classification, habits, and control of insects and other arthropods affecting human and animal health. Topics will include public health significance, vector-parasite interactions, and survey and research methodologies. (Lec. 3, Lab. 4) Pre: ENT 331 or 381 or equivalent. In alternate years.

**ENT 591 Special Problems in Entomology** (1-3 crs.) Advanced independent research projects supervised by members of the research staff and unrelated to thesis research. Projects developed to meet individual needs. (Independent Study) Pre: permission of instructor.

**ENT 592 Special Problems in Entomology** (1-3 crs.) Advanced independent research projects supervised by members of the research staff and unrelated to thesis research. Projects developed to meet individual needs. (Independent Study) Pre: permission of instructor.

## EVS | Environmental Sciences

**EVS 366 Communicating Environmental Research and Outreach** (2 crs.) Value and techniques of communicating scientific research and outreach efforts. Focus on technical and communication skill development. Student must be engaged in a personal research or outreach experience. (Seminar) Pre: permission of instructor; by override only.

**EVS 482 Innovative Subsurface Remediation Technologies** (4 crs.) Cross-listed as (GEO), NRS, EVS, CVE 482. Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. (Lec. 4) Pre: permission of instructor. In alternate years. Not for graduate credit.

**EVS 484 Environmental Hydrogeology** (4 crs.) Cross-listed as (GEO), NRS, EVS, CVE 484. Physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab. 2) Pre: GEO 483 or CVE 588 or NRS 510, or permission of instructor. Not for graduate credit. Offered every other year.

**EVS 501 Development of Learning Outcomes for MESM** (1 cr.) Formulate learning outcomes and develop professional internships for new MESM students through interaction with URI faculty involved in the MESM tracks, develop skills in environmental communication, leadership, and ethics. (Seminar) Pre: enrollment in MESM graduate program.

**EVS 502 Seminar in Environmental Science and Management** (1 cr.) Presentation of proposed, ongoing and completed major projects by MESM graduate students. Discussion among graduate students, faculty, and other mentors on project design, methods, analysis, and presentation. (Seminar) Pre: enrollment in MESM graduate program.

**EVS 550 Advanced Ecology** (4 crs.) This course provides a survey of physiological, population, and community ecology. It encourages thinking and learning about key ecological concepts through primary literature, discussion, analytical writing, and problem sets. (Lec. 4) Pre: graduate standing; must have completed introductory biology and ecology or courses that included significant introduction to ecology.

**EVS 582 Innovative Subsurface Remediation Technologies** (4 crs.) Cross-listed as (GEO), EVS 582, NRS 583. Innovative remedi-

ation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. Offered alternate years (Lec. 4) Pre: permission of instructor.

**EVS 584 Environmental Hydrogeology** (4 crs.) Cross-listed as (GEO), EVS, NRS 584. Develop an understanding of the physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab 2) Pre: GEO 483 or CVE 588 or NRS 510 or permission of instructor.

**EVS 597 Professional Internship in Environmental Science and Management PRA** (1-3 crs.) Supervised work performed with an environmental agency, nongovernmental organization, or private firm as part of the requirements of the Master of Environmental Science and Management degree program. (Practicum) Pre: enrollment in MESM degree program.

**EVS 598 Professional Master's Research** (3 crs.) Independent investigation to satisfy the research requirement for the Master of Environmental Science and Management degree. Substantial paper required. (Independent Study) Pre: enrollment in MESM degree program.

**EVS 599 Master's Thesis Research** (1-12 crs.) To be taken by students in the Master of Science in environmental sciences degree program. Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**EVS 601 Environmental Sciences Seminar** (1 cr.) Cross-listed as (EVS), GEO 601. Guest speakers present the results of research in the field of environmental sciences with special focus on hydrologic environments. (Seminar)

**EVS 614 White Papers in Integrated Coastal Science** (6 crs.) Preparation of a written synthesis of environmental, economic, social, and ethical dimensions of current issues in coastal ecosystem management. Project completed in collaboration with a non-academic partner institution. (Independent Study). Pre: EVS 610 and EVS 612.

**EVS 616 Field Practicum in Coastal Science PRA** (6 crs.) Science field practicum using array of investigative methods; insight into nature and scale, analytical and interpretative approaches applied to data; approaches to describe uncertainty; and ways research can inform policymakers. (Practicum)

**EVS 618 Internship in Coastal Management** (9-12 crs.) Supervised internship in an approved work setting to provide students with experience relevant to their career goals. Students work with advisors to secure internship positions and design learning contract. Pre: permission of instructor.

**EVS 699 Doctoral Dissertation Research** (1-12 crs.) To be taken by students in the Ph.D. in environmental sciences degree

program. Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## FLM | Film Media

**FLM 101 Introduction to Film Media** (3 crs.) Introduction to techniques of film practice, film history, genres, analysis of film texts, and reading of film images in their aesthetic, cultural, and literary context. (Lec. 2, Lab. 2/Online) (A) [D]

**FLM 101H Honors Section of FLM 101: Introduction to Film Media** (3 crs.) Honors Section of FLM 101: Introduction to Film Media. (Lec. 3/Online) Pre: Must have a 3.30 overall GPA. (A) [D]

**FLM 110 Introduction to Film Media Production Technologies** (4 crs.) Introduction to single-camera field production styles and aesthetics with emphasis on camera operation, lighting and editing by means of fundamental critical studies, field projects, studio supervision and experience. (Lec. 3, Lab. 2)

**FLM 203 Film Theory** (3 crs.) An introductory survey of classical and contemporary approaches to film theory and criticism (Lec. 3). (A) [D]

**FLM 204 History of Film I** (3 crs.) A survey of world cinema from its invention in the 1890's to the early 1950's, examining the production, distribution, and exhibition of narrative, documentary and experimental, among other forms of film. (Lec. 2, Lab, 2/Online) (A) [D]

**FLM 205 History of Film II** (3 crs.) A survey of world cinema from the 1950's to the present time, examining the production, distribution and exhibition of narrative, documentary and experimental among other forms of film. (Lec. 2, Lab. 2/online) (A) [D]

**FLM 312 Introduction to Video Games: Design and Development** (4 crs.) Cross-listed as (SCM), ART, COM, FLM 312. Introduces video game development through the perspective of artistic design and production. Projects include pitches, storyboards and mock-ups, narratives and scripts, and prototypes. Entails substantial collaborative work. (Lec. 3, Studio 2) Pre: sophomore standing.

**FLM 313 Introduction to Video Games: Users and Contexts** (4 crs.) Cross-listed as (SCM), ART, COM, FLM, WRT 313. Introduces video game development through the perspective of different users' experiences and contexts. Projects include critical analyses, observations, multi-media pitch presentations. Requires substantial game playing outside of class. (Sem. 3, Prac. 2) Pre: sophomore standing.

**FLM 351 Topics in Film Media Production** (4 crs.) Application of one or more production technologies in film media genres and analysis of their aesthetic implications.

(Lec. 3, Lab. 2/Online) Pre: sophomore standing or permission of instructor. FLM 110 or video or filmmaking course from ART, COM, or JOR recommended. May be repeated for a maximum of 12 credits with permission of the director and change of topic.

**FLM 352 Topics in Film Media Critical Studies** (4 crs.) Critical examination of historical, theoretical and aesthetic topics in world cinema. (Lec. 3, Lab. 2/Online) Pre: sophomore standing or permission of instructor. FLM 101, 204 or 205 recommended. May be repeated for a maximum of 12 credits with permission of the director and change of topic.

**FLM 401 Field Experience in Film Media PRA** (1-6 crs.) Structured academic work in a business, industry, educational or agency setting under the supervision of a faculty advisor. (Practicum) Pre: permission of faculty advisor.

**FLM 444 Advanced Topics in Documentary Film Media Production** (4 crs.) Critical examination and research of selected historical, theoretical or aesthetic issues in international documentary filmmaking. (Lec. 3, Lab 2) Pre: junior standing or permission of instructor; FLM 101 and 204 or 205. May be repeated once with permission of the instructor and with change of emphasis. Not for graduate credit.

**FLM 445 Advanced Topics in Film Media Production** (4 crs.) Advanced study and practice of production techniques, technologies and aesthetics through projects, studio supervision and field experience. (Lec. 3, Lab. 2) Pre: junior standing or permission of instructor, and either ART 215 or COM 341 or COM 342 or JOR 331 or FLM 351. May be repeated with change of emphasis and permission of instructor. Not for graduate credit.

**FLM 451 Advanced Topics in International Film Media** (4 crs.) Cross-listed as (FLM), ENG, CLS 451. Study of international film genres from one or more national, regional or diasporic cultures and traditions. Emphases on theoretical, historiographic and media research methods. (Lec. 3, Lab. 2) Pre: junior standing or permission of instructor. FLM 204 or 205 recommended. May be repeated for a maximum of 8 credits with change of emphases or topics.

**FLM 491 Directed Studies in Film Media** (1-6 crs.) Directed Study for students wanting to do advanced work in film media. Individual research and reports on problems of special interest (Independent Study). Pre: Acceptance of project by faculty member and approval by program director. May be repeated for a total of 6 credits.

**FLM 495 Seminar in Film Media** (3 crs.) An intensive, interdisciplinary capstone course; exploring writings and ideas about film across two or more fields of study; or examining cross-cultural themes and issues in world cinema. Topic to be announced. (Seminar) Pre: FLM 101 and 203 or ENG 302 or permission of instructor.

## FOS | Forensic Science

**FOS 392 Introduction to Criminalistics** (3 crs.) Cross-listed as (CHM), FOS 392. A class designed to introduce students to the basic areas and issues in forensic science in criminalistics. It is required for students seeking a forensic science minor. May not be repeated for credit. May not be taken in the same semester as CHM 391. (Lec. 3)

## FRN | French

**FRN 101 Beginning French I** (3 crs.) Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior French is required. Will not count toward the language requirement if the student has studied French for more than one year within the last six years. (FC) [D]

**FRN 102 Beginning French II** (3 crs.) Continuation of FRN 101. Students enrolling in this course should have taken FRN 101 or equivalent. (Lec. 3) (FC) [D]

**FRN 103 Intermediate French I** Development of facility in reading texts of moderate difficulty; supplemented by further work in grammar, conversation, and composition. Students enrolling in this course should have taken FRN 102 or equivalent. (Lec. 3) (FC) [D]

**FRN 104 Intermediate French II** (3 crs.) Continuation of FRN 103. Students enrolling in this course should have taken FRN 103 or equivalent. (Lec. 3) (FC) [D]

**FRN 201 French Pronunciation** (1 cr.) The sounds of French; relationship between spelling and pronunciation; regional variation. Practice in pronouncing French prose and poetry. (Lab. 2) Pre: FRN 104 or equivalent or permission of instructor.

**FRN 204 French Composition I** (3 crs.) Practice in writing French; topics selected from everyday events and readings in French; emphasis on vocabulary building; some grammar study, frequent compositions. Students enrolling in this course should have taken FRN 104 or equivalent. (Lec. 3) (FC) [D]

**FRN 207 French Oral Expression I** (3 crs.) Training in the spontaneous use of oral French. Students will extend the quantity and quality of spoken French that they are able to produce. Special focus on narration or storytelling in French. Students enrolling in this course should have taken FRN 104 or equivalent. (Lec. 3) (FC) [D]

**FRN 303 The French In North America** (3 crs.) Surveys the background and current status of the French diaspora in North America, including Acadians, Quebecers, French Canadians, and French Americans, with special emphasis on the literary, artistic, and other contributions of these groups to the civilization(s) of the continent. Taught in French. (Lec. 3) Pre: FRN 204 or 207 or permission of instructor.

**FRN 304 French Composition II** (3 crs.) Writing of literary French. Frequent compositions and critiques with emphasis on the stylistic devices. Recommended for those concentrating in French. (Lec. 3) Pre: FRN 204.

**FRN 307 Oral Expression II** (3 crs.) Discussion, short speech making, pronunciation, everyday vocabulary, and improvement of conversation. Matters of current interest in French selected by instructor and students. (Lec. 3) Pre: FRN 207.

**FRN 309 French Culture and Literature to 1789** (3 crs.) Survey of the significant developments in the arts, society, and literature in France from the Middle Ages to the French Revolution. (Lec. 3) Pre: FRN 204 or permission of instructor. (FC) (A) [D]

**FRN 310 Modern French Culture and Literature** (3 crs.) Survey of the significant developments in the arts, history, and literature in France from the French revolution to the present. (Lec. 3) Pre: FRN 204 or permission of instructor. (FC) (A) [D]

**FRN 315 French Internship Abroad PRA** (3 crs.) Supervised work experience in a French-speaking country for advanced language students. (Practicum) Pre: FRN 200-level French course or equivalent or permission of instructor.

**FRN 316 French Internship Abroad PRA** (3 crs.) Supervised work experience in a French-speaking country for advanced language students. (Practicum) Pre: FRN 200-level French course or equivalent or permission of instructor.

**FRN 318 French Across the Curriculum** (1 cr.) Reading and discussion of original French texts in conjunction with courses throughout the university curriculum. Designed to maintain and improve French language skills and to enrich study through exposure to texts in the original language. (Lec. 1) Pre: permission of instructor. May be repeated.

**FRN 320 Studies in French Cinema** (3 crs.) Study of major French/Francophone film genres and of prominent French/Francophone directors. Topics include Films of Luc Besson, Survey of French Cinema, and French Film Comedies. Emphasis will vary. Course taught in English. Students counting the course for a major or minor in French are required to do all written work in French and must have credit for FRN 204 and FRN 207. May be repeated with different topics for a maximum of 9 credits. (Lec. 3/Online) (A) (FC) [D]

**FRN 392 Nineteenth-Century Literature in Translation** (3 crs.) Reading in translation of selected literary works from representative 19th-century authors. (Lec. 3/Online) Not for major credit in French. (A) (L) (FC) [D]

**FRN 393 Twentieth-Century Literature in Translation** (3 crs.) Reading in translation of selected literary works from representative 20th-century authors. (Lec. 3/Online) Not for major credit in French. (A) (L) (FC) [D]

**FRN 408 The French Language: Past, Present, and Future** (3 crs.) Introduction to the history and present state of French. Study of standard and colloquial French, dialects, regional variations, language of youth and professions. Current tendencies; the Franco-phone movement. (Lec. 3) Pre: FRN 304 or permission of instructor.

**FRN 412 Topics in French Culture and Literature** (3 crs.) Topics in French literature and culture. (Lec. 3/Online) Pre: FRN 309 or 310 or permission of instructor. May be taken more than once for credit on different topics.

**FRN 473 French Canadian Literature** (3 crs.) Early historical and biographical works, but primarily the novel, poetry, and theatre of the 20th century. (Lec. 3) Pre: FRN 309 or 310 or permission of instructor.

**FRN 474 African Literature in French** (3 crs.) Authors of Africa and the Diaspora; includes Camara, Cesaire, Dadie, Senghor. (Lec. 3) Pre: FRN 309 or 310 or permission of instructor.

**FRN 480 Business French** (3 crs.) Study of concepts and terminology relating to the French business world. (Lec. 3) Pre: junior standing, credit or concurrent enrollment in at least one 300-level French language course.

**FRN 497 Directed Study** (3 crs.) For the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of a project by a faculty member and approval of section head.

**FRN 498 Directed Study** (3 crs.) For the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of a project by a faculty member and approval of section head.

## GCH | Grand Challenges

**GCH 101 Grand Challenges in Fine Arts and Literature** (3-4 crs.) Study of important global challenges (topics may include: poverty, racism and diversity, global health, global economic or environmental problems, etc.), their representation in fine arts and literature, and the role of art and artists in addressing these problems. (Lec. 3-4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (A)

**GCH 101H Honors Section of GCH 101: Grand Challenges in Fine Arts and Literature** (3-4 crs.) Honors Section of GCH 101: Grand Challenges in Fine Arts and Literature. (A) Pre: 3.30 overall gpa.

**GCH 102 Grand Challenges in Letters** (3-4 crs.) Study of important global challenges (Topics may include: poverty, racism and diversity, global health, global economic or environmental problems, etc.), their



representation in the humanities, and the role of the humanities in addressing these problems. (Lec. 3-4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (L)

**GCH 102H Honors Section of GCH 102: Grand Challenges in Letters** (3-4 crs.) Honors Section of GCH 102: Grand Challenges in Letters. (Lec. 3-4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. Pre: 3.30 overall GPA. (L)

**GCH 103 Grand Challenges in the Natural Sciences** (3-4 crs.) Study of important global challenges (Topics may include: poverty, racism and diversity, global health, global economic or environmental problems, etc.), and the role of natural sciences in addressing these problems. (Lec. 3-4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (N)

**GCH 103H Honors Sections of GCH 103: Grand Challenges in the Natural Sciences** (3-4 crs.) Honors Section of GCH 103: Grand Challenges in the Natural Sciences. (Lec. 3-4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. Pre: 3.30 overall gpa. (N)

**GCH 104 Grand Challenges in the Social Sciences** (3-4 crs.) Study of important global challenges (Topics may include: poverty, racism and diversity, global health, global economic or environmental problems, etc.), and the role of the social sciences in addressing these problems. (Lec. 3-4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (S)

**GCH 104H Honors Section of GCH 104: Grand Challenges in the Social Sciences** (3-4 crs.) Honors Section of GCH 104: Grand Challenges in the Social Sciences. (Lec. 3-4). Taken concurrently with URI 100 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. Pre: 3.30 overall GPA. (S)

## GEG | Geography

**GEG 101 World Geography** (3 crs.) An examination of major world regions. Basic geographic concepts are presented. Physiographic, political, economic, social, and cultural influences are addressed in a spatial context. (Lec. 3) (S) [D]

**GEG 104 Political Geography** (3 crs.) Pattern of political units throughout the world; special emphasis on boundaries, newly independent nations, and other aspects of political control over territory. (Lec. 3) (S) [D]

**GEG 200 Human Geography** (3 crs.) The evolution of human environments from the Stone Age to the contemporary megalopolis and the emergent world city in terms of human-earth-space-resource relationships. (Lec. 3)

**GEG 202 Introductory Urban Geography: Understanding Cities** (3 crs.) Cross-listed as (CPL), GEG 202. Introduction to urbanization processes, primarily in North America; national settlement systems; intra urban form; migration, racial, ethnic, gender, and class segregation; urban economics; environmental issues; planning and governance; urban applications of GIS. (Lec. 3/Online) (S) [D]

**GEG 475 The Revolutionary City: Cuba** (3 crs.) Cross-listed as (CPL), GEG 475. Taught in Cuba, summer session. Theory and practice of Cuban urbanization. Cities in the revolutionary relationship between city and country, morphology of Cuban cities, residential differentiation, housing, community activism and Cuban urban policy. Field trips to Cuban cities (Lec. 3) Pre: permission of instructor. Application required. Not for graduate credit.

**GEG 488 Geographic Applications in the K-12 Curricula** (3 crs.) Learning how geography interrelates with other topical curricula. Classroom teachers integrate geographic concepts, for lesson plan development using National Geographic Standards and other source materials, into their subject specialization. Emphasis on the spatial aspects of all curricula. (Lec. 3)

## GEO | Geosciences

**GEO 100 Environmental Geology** (3 crs.) Geologic processes, how they affect people and vice versa; geologic hazards, earthquake impact, shoreline development, offshore oil, waste disposal, water, energy and other resources, climate change. (Lec. 3) (N)

**GEO 102 Evolution and Extinction of the Dinosaurs** (3 crs.) General introduction to the dinosaurs. Variety, habits, warm-bloodedness, and extinction discussed. Pterosaurs and bird origins presented. (Lec. 3) (N)

**GEO 102H Honors section of GEO 102: Evolution and Extinction of the Dinosaurs** (3 crs.) Honors section of GEO 102: Evolution and Extinction of the Dinosaurs. (Lec. 3) Pre: must have a 3.30 overall GPA. (N)

**GEO 103 Understanding the Earth** Processes operating within and upon the earth. Relationship of plate tectonics to volcanism, earthquakes, and mountain building. Development and modification of landscapes by rivers, glaciers, wind, waves, and ground water. Environmental implications of geologic processes. (Lec. 3, Lab. 2) (N)

**GEO 110 The Ocean Planet** (3 crs.) Cross-listed as (OCG), GEO 110. Introduces the origin and structure of the solar system; interaction of earth's solid interior, oceans' atmosphere and biosphere with emphasis on earth science; energy resources and present environment on Earth. (Lec. 3) (N)

**GEO 113 Natural Disasters** (3 crs.) The science of natural disasters from a physical, chemical and geological perspective. Understanding of the development of and factors controlling the occurrence of natural disasters. (Lec. 3) (N)

**GEO 120 Geology of U.S. National Parks** (3 crs.) Selected parks are used to illustrate geologic processes and age relationships to understand earth history. Includes plate tectonics, volcanic and plutonic activity, glaciation, cave formation, stream and coastal processes, landscape formation. (Lec. 3) (N)

**GEO 204 Problem Solving in Earth History** (4 crs.) Geological problem solving, emphasizing questions in Earth history. Time, plate movements, ancient environments, climates, and the fossil record introduced in a historical context. (Lec. 3, Lab. 2). Pre: GEO 103 or equivalent or permission of instructor.

**GEO 210 Landforms: Origin and Evolution** (4 crs.) Development, distribution, and geologic significance of landforms produced by rivers, glaciers, coastal processes, weathering, and other geomorphic agents. Interpretation of landforms through field studies, topographic maps, and aerial photographs. (Lec. 3, Lab. 2) Pre: GEO 103 or permission of instructor.

**GEO 272 Introduction to Evolution** (4 crs.) Cross-listed as (BIO), GEO 272. Introduction to evolution as the unifying thread in the biosphere. Processes and patterns discussed, including microevolution and macroevolution. Social impact of evolution discussed from a biological perspective. Pre: GEO 102 or one semester of biological sciences, or permission of instructors.

**GEO 305 Global Climate Change** (4 crs.) Scientific treatment of climate change during the last 100,000 years. Implications for earth systems in context of past climates and future projections. (Lec. 3, Lab. 1) Pre: GEO 100 or 103 or OCG 110 or permission of instructor.

**GEO 320 Earth Materials** (4 crs.) Hand-sample identification and characterization of minerals and rocks, including crystallography, composition, classification, origin, and relationship to geological occurrence; also includes aspects of soil-forming minerals, ore deposits, and other mineral resources. (Lec. 3, Lab. 2) Pre: GEO 103, credit or concurrent enrollment in CHM 101 or 103.

**GEO 370 Structure of the Earth** Stress and strain relationships as they pertain to rocks. Manifestations of these phenomena in geologic structures and criteria for recognizing them. (Lec. 3, Lab. 2) Pre: PHY 213 and 285 or 111 and 185 or permission of instructor.

**GEO 397 Geosciences Internship PRA** (1-6 crs.) Supervised work or research experience in geosciences. (Practicum) Pre: GEO 103, 320, GEO major, approval of department chair.

**GEO 450 Introduction to Sedimentary Geology** (4 crs.) Principles underlying formation and composition of lithofacies and sedimentary environments. Methods, procedures, and techniques used to study sedimentary processes, depositional environments, sediment and rock sequences, and paleogeography. (Lec. 3, Lab. 2) Pre: graduate or advanced undergraduate standing in environmental, resource, or engineering major.

**GEO 465 Geophysics** (4 crs.) Physical properties and exploration of the Earth's solid interior through geophysical techniques with application toward plate tectonics and subsurface imaging. Topics include gravity, magnetics, seismology, heat-flow, and plate tectonics. (Lec. 3, Lab. 1) Pre: GEO 103, PHY 112 or 204, and MTH 132 or 142; or consent of instructor.

**GEO 468 Groundwater Chemistry** (4 crs.) Introduction to the chemical processes controlling water chemistry in low-temperature environments. Chemical weathering, ion exchange, redox, mineral equilibrium, isotopes, and chemical modeling of aqueous systems. (Lec. 3, Lab. 2) Pre: CHM 101, 102, 112, 114; GEO 103, 320. Offered in odd-numbered years.

**GEO 480 Summer Field Camp PRA** (4-8 crs.) Geologic field mapping and principles. (Practicum) Pre: GEO 210, 320, 370, and 450 recommended. Course not offered through URI; prior approval of selected camp required by the Department of Geology. Recommended between junior and senior years. Not for graduate credit in geology.

**GEO 482 Innovative Subsurface Remediation Technologies** (4 crs.) Cross-listed as (GEO), NRS, EVS, CVE 482. Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. (Lec. 4) Pre: permission of instructor. In alternate years. Not for graduate credit.

**GEO 483 Hydrogeology** (4 crs.) Study and interpretation of groundwater flow systems and the interaction between groundwater and the geologic framework, including: groundwater flow, aqueous geochemistry, groundwater resource evaluation, and groundwater in geologic processes. (Lec. 3, Lab. 2) Pre: GEO 103, 210, and MTH 131 or 141, or permission of instructor.

**GEO 484 Environmental Hydrogeology** (4 crs.) Cross-listed as (GEO), NRS, EVS, CVE 484. Physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab. 2) Pre: GEO 483 or CVE 588 or NRS 510, or permission of instructor. Not for graduate credit. Offered every other year.

**GEO 491 Special Topics** (1-3 crs.) Advanced work for undergraduates under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. Not for graduate credit in geology.

**GEO 497 Field Experience in the Geological Sciences** (4 crs.) Capstone field trip. (Lec. 2, field trip) Pre: GEO103, declared GEO major or minor, and permission of instructor. Extended field trip required. May be repeated for credit.

**GEO 499 Senior Thesis** (3 crs.) Independent research. Student selects an area of study and works in close conjunction with a faculty member of his or her choice. (Independent Study) Pre: senior standing and permission of instructor. Not for graduate credit in geology.

**GEO 500 Graduate Seminar** (1 cr.) Weekly seminar series featuring oral presentations of the results of ongoing, topical research. (Seminar) S/U.

**GEO 501 Vertebrate Paleontology** (1-3 crs.) Advanced work in vertebrate paleontology under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**GEO 502 Readings In Paleontology** (1-3 crs.) Advanced readings in paleontology under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. S/U.

**GEO 510 Glacial Sedimentation Research** (1-3 crs.) Advanced research in glacial sedimentation under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**GEO 511 Quaternary Paleoclimates** (1-3 crs.) Advanced work in quaternary paleoclimates under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**GEO 512 Seismology** (4 crs.) Concepts in modern day and classical seismology. Topics covered: theories of wave propagation, instrumentation, Earth's structure and tomography, seismic source theory, earthquake physics. Emphasis on quantitative, mathematical, and physical methods. (Lec. 3, Lab. 1) Pre: permission of instructor.

**GEO 515 Glacial Geology Investigation of glacial environments and processes including areas with presently existing glaciers. Emphasis on the development of glacial landscapes and deposits. Field trips in New England area.** (Lec. 2, Lab. 3) Pre: graduate or advanced undergraduate standing in environmental, resource, or engineering major.

**GEO 519 Marine Environmental Organic Chemistry** (3 crs.) Cross-coded with (OCG), GEO, CVE 519. Physico-chemical properties of organic compounds, their transformations and environmental fluxes with a focus on marine topics. Offered alternate years. (Lec. 3) Pre: graduate standing or permission of instructor.

**GEO 525 Chemistry of the Earth** (3 crs.) Cross-listed as (OCG), GEO 525. Analysis of the solid Earth, ocean and atmosphere as a geological/chemical/biological system. Fundamentals of geochemistry will be developed within the context of broad Earth science questions: Earth formation, differentiation, evolution and human impacts. (Lec. 3) Pre: graduate or advanced undergraduate standing in a science major or permission of instructor.

**GEO 530 Petrogenetic Igneous Processes** (4 crs.) Examination of key physico-chemical processes responsible for the diversity of igneous rocks and igneous activity. Emphasis on geochemistry, petrography, field relationships, and tectonic setting. (Lec. 3, Lab. 2) Pre: GEO 320 or permission of instructor. In alternate years.

**GEO 531 Metamorphic Petrology** (3 crs.) Facies concept and other methods of interpreting metamorphic mineral assemblages. Chemical and fabric changes during metamorphism, including principles of structural petrology. (Lec. 2, Lab. 3) Pre: GEO 321 or permission of instructor. In alternate years.

**GEO 532 Analytical Geochemistry** (1-3 crs.) Advanced work in analytical geochemistry under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**GEO 533 Readings in Petrology and Geochemistry** (1-3 crs.) Seminar in petrology and geochemistry with readings drawn from the current professional literature. (Seminar) Pre: permission of instructor. S/U credit.

**GEO 551 Coastal Sedimentation Research** (1-3 crs.) Advanced research in coastal sedimentation under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**GEO 552 Readings In Sedimentation** (1-3 crs.) Seminar in sedimentary geology with readings drawn from the current professional literature. (Seminar) Pre: permission of instructor. S/U credit.

**GEO 565 Geophysical Models** (3 crs.) Model interpretation of gravity, magnetic, and geoelectric field surveys with geologic constraints. Conversion of quantitative geophysical models into geologic/hydrologic structures. (Lec. 2, Lab. 2) Pre: MTH 132, PHY 112 or equivalent. Offered in spring of odd-numbered years.

**GEO 568 Isotopes In Hydrogeology** (3 crs.) Use of environmental isotopes in groundwater studies; dating groundwater, delineating flow paths and identifying recharge areas; geochemical evolution of groundwater and assessment of contamination. (Lec. 3) Pre: GEO 483 and 468 or permission of instructor. Offered in even-numbered years.

**GEO 572 Advanced Evolutionary Biology** (4 crs.) Cross-listed as (BIO), GEO 572. A survey of modern evolutionary biology, including classic evolutionary theory, phylogenetics, evolution and development, adaptation, mass extinction and genomic evolution. (Lec. 4) Pre: BIO/GEO 272, graduate standing, or permission of instructor.

**GEO 577 Coastal Geologic Hazards** (3 crs.) Geologic hazards in the coastal zone and their impact on people. Includes waves, storm-surge, mass-wasting, and sea-level rise. Geologic effectiveness of engineering structures and management techniques. Emphasis on field study. (Lec. 2, Lab. 3) Pre: graduate or advanced undergraduate standing in environmental, resource, or engineering major.

**GEO 580 New England Geology** (3 crs.) Review of the bedrock geology of New England, and its applications for the Appalachian/Caledonides mountain chain and theories of orogenesis. Mandatory field trips. (Lec. 3) Pre: GEO 320 or 370, or permission of instructor. Offered in fall of odd-numbered years.

**GEO 581 Topics In Tectonic Geology** (3 crs.) Review of selected topics in continental and oceanic tectonics. (Seminar) Pre: permission of instructor. Offered in fall of even-numbered years.

**GEO 582 Innovative Subsurface Remediation Technologies** (4 crs.) Cross-listed as (GEO), EVS 582, NRS 583. Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. Offered alternate years (Lec. 4) Pre: permission of instructor.

**GEO 583 Groundwater Modeling** (3 crs.) Numerical modeling of ground-water flow and solute transport. Numerical methods, model conceptualization, assumptions, boundary conditions, and complex aquifer systems. Modeling exercises including full-scale modeling project using MODFLOW. (Lec. 2, Lab. 3) Pre: GEO 483, or NRS 461 or CVE 588, or permission of instructor. Offered in odd-numbered years.

**GEO 584 Environmental Hydrogeology** (4 crs.) Cross-listed as (GEO), EVS, NRS 584. Develop an understanding of the physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab 2) Pre: GEO 483 or CVE 588 or NRS 510 or permission of instructor.

**GEO 586 Readings in Hydrogeology** (1-3 crs.) Seminar in hydrogeology with readings drawn from the current professional literature. (Seminar) Pre: permission of instructor. S/U credit.

**GEO 590 Special Problems** (1-3 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**GEO 591 Special Problems** (1-3 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. S/U credit.

**GEO 601 Environmental Sciences Seminar** (1 cr.) Cross-listed as (EVS), GEO 601. Guest speakers present the results of research in the field of environmental sciences with special focus on hydrologic environments. (Seminar)

**GEO 920 Geoscience Workshop for Teachers WRK** (1-3 crs.) Current issues in Geosciences. Specific topics offered for in-service teachers and administrators. May be repeated with different topic. (Workshop/Online) Pre: teacher certification.

## GER | German

**GER 101 Beginning German I** (3 crs.) Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior German is required. Will not count toward the language requirement if the student has studied German for more than one year within the last six years. (FC) [D]

**GER 102 Beginning German II** (3 crs.) Continuation of GER 101. Students enrolling in this course should have taken GER 101 or equivalent. (Lec. 3) (FC) [D]

**GER 103 Intermediate German I** (3 crs.) Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. Students enrolling in this course should have taken GER 102 or equivalent. (Lec. 3) (FC) [D]

**GER 104 Intermediate German II** (3 crs.) Continuation of GER 103. Students enrolling in this course should have taken GER 103 or equivalent. (Lec. 3) (FC) [D]

**GER 105 Basic Conversation I** (1 cr.) Practice in conversational skills. (Lec. 1) Pre: credit or concurrent enrollment in GER 103.

**GER 106 Basic Conversation II** (1 cr.) Continued practice in conversational skills. (Lec. 1) Pre: credit or concurrent enrollment in GER 104.

**GER 111 Intensive Beginning German I** (4 crs.) Study of the fundamentals of German with special emphasis on listening and speaking skills. (Lec. 3, Rec. 1) Not for major credit in German. (FC) [D]

**GER 112 Intensive Beginning German II** (4 crs.) Study of the fundamentals of German with special emphasis on listening and speaking skills. Students enrolling in this course should have taken GER 111 or equivalent. (Lec. 3, Rec. 1) Not for major credit in German. (FC) [D]

**GER 113 Intensive Intermediate German** (4 crs.) Practice in listening and speaking. Development of basic reading and writing skills. Review of grammatical

structure. Students enrolling in this course should have taken GER 112 or equivalent. (Lec. 4) (FC) [D]

**GER 114 Intensive Intermediate German** (4 crs.) Practice in listening and speaking. Development of basic reading and writing skills. Review of grammatical structure. Students enrolling in this course should have taken GER 113 or equivalent. (Lec. 4) (FC) [D]

**GER 201 Intermediate Conversation I** (1 cr.) Conversation skills for students who have completed intermediate German. Students enrolling in this course should have taken GER 104 or equivalent. (Lec. 3)

**GER 202 Intermediate Conversation II** (1 cr.) Continuation of GER 201. Students enrolling in this course should have taken GER 104 or equivalent. (Lec. 3) (FC) [D]

**GER 205 Conversation and Composition** (3 crs.) Development of facility in spoken and written German using contemporary writings and topics; special emphasis on general classroom discussion. Students enrolling in this course should have taken GER 104 or equivalent. (Lec. 3) [FC] [D]

**GER 206 Conversation and Composition** (3 crs.) Development of facility in spoken and written German using contemporary writings and topics; special emphasis on general classroom discussion. Students enrolling in this course should have taken GER 104 or equivalent. (Lec. 3) [FC] [D]

**GER 215 Advanced Conversational German** (4 crs.) Intensive practice in speaking and listening, with some attention to writing skills. Students enrolling in this course should have taken GER 114 or equivalent. (Lec. 4) (FC) [D]

**GER 216 Advanced Conversational German** (4 crs.) Intensive practice in speaking and listening, with some attention to writing skills. Students enrolling in this course should have taken GER 114 or equivalent. (Lec. 4) (FC) [D]

**GER 221 Introduction to Business German** (1 cr.) Conversational practice in German with emphasis on the acquisition of vocabulary pertinent to international business. (Lec. 1) Pre: GER 112 or equivalent.

**GER 305 Advanced Conversation** (3 crs.) Intensive practice in spoken German based on matters of current interest in German-speaking countries. (Lec. 3) Pre: GER 206 or equivalent. In alternate years.

**GER 306 Advanced Composition** (3 crs.) Training in various forms of writing by means of frequent compositions and critiques. (Lec. 3) Pre: GER 206 or equivalent. In alternate years.

**GER 315 Language Study Abroad PRA** (3-5 crs.) Credit for advanced language study in a German-speaking country. (Practicum) Pre: GER 206 or equivalent and permission of section head.

**GER 316 Language Study**

**Abroad PRA** (3-5 crs.) Credit for advanced language study in a German-speaking country. (Practicum) Pre: GER 206 or equivalent and permission of section head.

**GER 327 Introduction to German Studies and Literature** (3 crs.) Major developments and figures in German culture, literature, art, and society of the 20th century. (Lec. 3) Pre: GER 206 or permission of instructor.

**GER 328 Introduction to German Cultural History and Literature** (3 crs.) Overview of major German cultural developments starting with the Germany of the Romans and ending with unification. Significant figures and developments in literature, art, and society. (Lec. 3) Pre: GER 206 (or equivalent) or permission of instructor.

**GER 408 The German Language: Past and Present** (3 crs.) Cross-listed as (GER), LIN 408. Introduction to the history and present state of the German languages. Study of standard and colloquial German, dialects, Swiss and Austrian variations, language of youth and professions. Analysis of various text types. Tendencies in present-day German. (Lec. 3) Pre: 305 or permission of instructor. Not for graduate credit.

**GER 411 Advanced Technical German** (3 crs.) Cross-listed as (EGR), GER 411. Seminar on advanced scientific and engineering topics in an international context. All reading, discussion, and associated writing is conducted in German. (Lec. 3) Pre: any 400-level course in German and senior standing in an approved engineering program. Not for graduate credit.

**GER 421 Business German** (3 crs.) Study of the concepts and terminology of the German language common to the realm of international business. Intended for advanced students of business and German. (Lec. 3) Pre: junior standing, credit or concurrent enrollment in GER 305 and 306.

**GER 485 Special Studies** (3 crs.) Special topics in German literature not emphasized in other courses. (Seminar) Pre: one semester of German at the 300 level or permission of section head. May be repeated with a change in topic. In alternate years.

**GER 486 Special Studies** (3 crs.) Special topics in German literature not emphasized in other courses. (Seminar) Pre: one semester of German at the 300 level or permission of section head. May be repeated with a change in topic. In alternate years.

**GER 497 Directed Study** (1-3 crs.) Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of project by a faculty member and permission of section head.

**GER 498 Directed Study** (1-3 crs.) Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of project by a faculty member and permission of section head.

**GER 585 Seminar in German Studies** (1-3 crs.) Topics in German literature and civilization. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topics.

**GER 586 Seminar In German Studies** (1-3 crs.) Topics in German literature and civilization. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topics.

**GER 598 Directed Studies** (1-3 crs.) Individual research on problems of special interest. (Independent Study) Pre: graduate standing, acceptance of project by a faculty member, and permission of chairperson. May be repeated with different topics.

**GRK | Greek**

**GRK 101 Ancient Greek I** (3 crs.) Grammar and syntax of Attic Greek, reading practice. (Lec. 3) Pre: no previous Greek is required. Will not count toward the language requirement if the student has studied Greek for more than one year within the last six years. (FC) [D]

**GRK 102 Ancient Greek II** (3 crs.) Continuation of GRK 101. Students enrolling in this course should have taken GRK 101 or equivalent. (Lec. 3) (FC) [D]

**GRK 301 Intermediate Greek I** (3 crs.) Grammar review; readings such as Lysias' Against Eratosthenes. Students enrolling in this course should have taken GRK 102 or equivalent. (Lec. 3) (FC) [D]

**GRK 302 Intermediate Greek II** (3 crs.) Readings selected in accordance with interests of students. Students enrolling in this course should have taken GRK 301 or equivalent. (Lec. 3) May be repeated for credit with a different topic. May be taken once for general education credit. (FC) [D]

**GRK 310 Greek Across the Curriculum** (1 cr.) Reading of original Greek texts and discussion in conjunction with courses throughout the University curriculum. Designed to maintain language skills and to enrich the study of different subjects by texts in the original language. (Lec. 1) Pre: GRK 301 or permission of instructor.

**GRK 497 Directed Study** (1-6 crs.) Individual readings and research. (Independent Study) Pre: acceptance of project by faculty member and approval of chairperson. May be repeated for credit with a different topic.

**GWS | Gender and Women's Studies**

**GWS 150 Introduction to Gender and Women's Studies** (3 crs.) Images of women, the theories and processes of socialization, historical perspectives, and implications for social change. (Lec. 3/Online) Service learning in some sections. (S) [D]

**GWS 220 Women and the Natural Sciences** (3 crs.) An interdisciplinary perspective on women as practitioners and subjects of the natural sciences; history of women in science; science as a gendered discourse. (Lec. 3) (L) [D]

**GWS 300 Field Experience In Women's Studies PRA** (2-6 crs.) Supervised field work allowing students to learn through direct personal experience about the background, problems, and concerns of particular populations of women. (Practicum) Service Learning. Pre: GWS 150 or 315 or permission of instructor. May be taken or repeated for a maximum of 6 credits.

**GWS 301 Women's Professional Development and Leadership** (3 crs.) Theory, data and skill development for career building and leadership. Gender issues in organizational settings, developing professional skills and responses to challenges in the workplace, and strategies for positive change. (Lec. 3/Online)

**GWS 305 Current Issues in Women's Studies** (1 cr.) Research and analysis of one issue such as job discrimination or sex trafficking. Class plans a project addressing the issue. (Lec. 1) Pre: GWS 150. May be repeated once if topic changes.

**GWS 306 Practicum in Women's Studies** (1 cr.) Practicum. Students work alone or in groups to conduct a project developed in GWS 305. May be repeated once if topic changes. (Lec. 1) Pre: GWS 305.

**GWS 310 Race, Class, and Sexuality in Women's Lives** (3 crs.) Interconnections among race, ethnicity, class, and sexuality and the impact of sexism, racism, classism, and heterosexism on women's lives are investigated. Alliance building among women is explored. (Lec. 3) Pre: WMS 150 or HPR 110 or WMS 210 or permission of instructor.

**GWS 315 Introduction to Feminist Theories and Methodologies** (3 crs.) Development of feminist thought, exploration of contemporary feminist theories and research methods, including African-American, lesbian, Western and non-Western perspectives, and the future role of feminist theories and methodologies. (Lec. 3/Online) Pre: GWS 150 or permission of instructor. (L) [D]

**GWS 317 Contemporary Women Novelists of the Americas** (3 crs.) Cross-listed as (GWS), ENG 31. Novels by contemporary women writers from the American continents. Topics include construction of the female body, sexuality and desire, motherhood, exile and immigration, women and work. (Lec. 3) (A) (L) [D]

**GWS 320 Feminist Thought into Action** (3 crs.) Analysis and discussion of how feminist thought has been transformed into action for social change. Women's civil and human rights. Political thought, analysis and activism in campaigns for women's rights. Pre: WMS 150 or permission of instructor. (L) (S) [D]

**GWS 325 International Women's Issues** (3 crs.) Focuses on women's rights in a global context, ideologies and practices that deny women equal status in society, including violence against women, freedom and democracy movements and women's rights. (Lec. 3/Online) Pre: GWS 150 or permission of instructor. (L)

**GWS 350 Special Topics in Women's Studies** (3 crs.) Selected areas of study pertinent to women's studies. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Lec.3/Online) Topics include Media Images of Women, Narrative of the Witch, Women and Aging, Women and Health, Women and the Law, Women and Music, Women and Religion, Women and Business Culture, and Women in Islam. Some topics may be offered online. May be repeated with different topic.

**GWS 350H Honors Section of GWS 350: Special Topics in Women's Studies** (3 crs.) Honors Section of GWS 350: Special Topics in Women's Studies. (Lec. 3/Online) Pre: 3.30 overall gpa.

**GWS 351 Special Topics in Women's Studies** (3 crs.) Selected areas of study pertinent to women's studies. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Lec.3/Online) Topics include Ecofeminism, Latin American Women, Native American Women, Women and Film, Women, Violence and Non-violence, Women and Mental Health, and Violence Prevention Training. Some topics may be offered online. May be repeated with different topic.

**GWS 360 Men and Masculinities** (3 crs.) Examines from a feminist perspective, the values, beliefs, myths, realities, research and writings about men and masculinities in contemporary United State life. (Seminar/Online) Pre: WMS 150.

**GWS 361 Women's Lives in New England, 1790-1930** (3 crs.) Social, political and literary history of women in New England with an emphasis on women's work and how that work shaped gender relations. Theoretical approaches from women's studies, race and gender studies will inform the treatment of women's history and the history of material culture in New England. (Lec. 3) Pre: junior standing or permission of the instructor.

**GWS 365 Sexual Violence** (3 crs.) Analysis of sexual violence, abuse, and exploitation. The history and politics of society's recognition of trauma and development of approaches to recovery. The psychological, social, and political harm of sexual violence to victims and society. (Lec. 3) Pre: GWS 150 or permission of the instructor.

**GWS 370 Sex Trafficking** (3 crs.) Focuses on the commercial sexual exploitation and slavery of women and girls and the impact on their health, rights, and status in society. (Lec. 3/Online) Pre: GWS 150 or permission of instructor.

**GWS 385 Women Writers** (4 crs.) Cross-listed as (ENG), GWS 385. Analysis of the poetry, drama, or fiction of women writers. Emphasis on 18th-century, 19th-century, 20th-century, or contemporary authors. May be repeated for credit when taken with different emphasis. (Lec. 3, Project 3)

**GWS 386 The Economics of Race, Gender, and Class** (3 crs.) Cross-listed as (ECN), GWS 386. An economic examination of the historical interrelations of race, class, and gender issues. (Lec. 3) Pre: ECN 100 or 201 or permission of instructor.

**GWS 387 Latin American History at the Movies** (3 crs.) Cross-listed as (HIS), GWS 387. Latin Americans see themselves very differently than how they are perceived by North Americans. Their self-portrayal, in literature and film, is the key to understanding their history and conflicts. (Lec. 3) Pre: HIS 180 is suggested but not required.

**GWS 400 Critical Issues And Feminist Scholarship** (3 crs.) Theoretical and value questions in women's studies; impact of feminist scholarship on traditional disciplines; feminist theory and research methods in selected fields; the future of feminism. (Seminar) Pre: WMS 310 or 315 or 320 and senior standing or permission of instructor.

**GWS 401 Human Trafficking and Contemporary Slavery** (3 crs.) Focuses on contemporary human trafficking and slavery, including sex trafficking, bonded labor, forced labor, child soldiers, and domestic servant slavery. (Lec. 3/Online) Pre: junior standing or permission of the instructor. Not for graduate credit.

**GWS 402 Campaigns and Services for Victims of Trafficking and Slavery** (3 crs.) Focuses on historical and contemporary campaigns for ending human trafficking and slavery and on providing services to contemporary victims of human trafficking and slavery. (Lec. 3/Online) Pre: junior standing or permission of instructor. Not for graduate credit.

**GWS 410 Portfolio in Women's Studies** (1 cr.) Portfolio of student papers and projects as culmination of Women's Studies course work. (Lec. 1) Pre: WMS majors and minors in senior year. Not for graduate credit.

**GWS 430 Women and Human Rights Policy** (3 crs.) Focus on women and human rights around the world and human rights policy in the U.S. The human rights movement from the 1970s to the present will be discussed. (Lec. 3/Online) Pre: junior standing.

**GWS 441 Women and Politics** (4 crs.) Cross-listed as (PSC), GWS 441. Explores the role of women in the American political system, as voters, campaign activists, and office holders, and as members of organized groups in the policy making process. (Seminar 3, Project 1) Pre: PSC 113 or PSC 210 or PSC 310 or permission of instructor.

**GWS 450 Independent Study** (3 crs.) Advanced work in women's studies under the direction of a faculty member affiliated with the women's studies program. (Independent Study) Pre: junior or senior standing. May be repeated for a maximum of 6 credits.

**GWS 490 Advanced Topics In Women's Studies** (1-3 crs.) Advanced study in topics of special interest in Women's Studies. This course will be conducted as a seminar for juniors, seniors and graduate students. Pre: WMS 310 or 315 or 320 and senior standing or permission of instructor. (Seminar/Online) Some topics may be offered online. May be repeated with different topic.

**GWS 490H Honors Section of WMS 490: Advanced Topics in Women's Studies** (1-3 crs.) Honors Section of WMS 490: Advanced Topics in Women's Studies. (Seminar) Pre: WMS 315 or 310 or 320, and senior standing, and 3.30 or better overall GPA, or permission of instructor.

**GWS 500 Colloquium in Women's Studies** (2-3 crs.) Discussion of research methods in women's studies; presentations on current research and issues relevant to women's and gender studies. (Seminar)

**GWS 501 Human Trafficking and Contemporary Slavery** (3 crs.) Focuses on contemporary human trafficking and slavery, including sex trafficking, bonded labor, forced labor, child soldiers, and domestic servant slavery. (Lec. 3) Pre: graduate standing or permission of instructor.

**GWS 502 Campaigns and Services for Victims of Trafficking and Slavery** (3 crs.) Focuses on historical and contemporary campaigns for ending human trafficking and slavery and on providing services to contemporary victims of human trafficking and slavery. (Lec. 3) Pre: GWS 501 or permission of instructor.

## HBW | Hebrew

**HBW 101 Beginning Hebrew I** (3 crs.) Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior Hebrew is required. Will not count toward the language requirement if the student has studied Hebrew for more than one year within the last six years. (FC) [D]

**HBW 102 Beginning Hebrew II** (3 crs.) Continuation of HBW 101. Students enrolling in this course should have taken HBW 101 or equivalent. (Lec. 3) (FC) [D]

**HBW 103 Intermediate Hebrew I** (3 crs.) Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. Students enrolling in this course should have taken HBW 102 or equivalent. (Lec. 3) (FC) [D]

**HBW 104 Intermediate Hebrew II** (3 crs.) Continuation of HBW 103. Students enrolling in this course should have taken HBW 103 or equivalent. (Lec. 3) (FC) [D]

## HDF | Human Development and Family Studies

**HDF 180 Personal And Career Development In Human Services** (1 cr.) Exploration of skills and interests related to career development. Seminar for human service career opportunities. Understanding of short and long term goal process emphasized. (Seminar/Online) HDF students only.

**HDF 190 First Year Leaders Inspired to Excellence** (3 crs.) Leadership development course focusing on leadership theories, personal and academic adjustment issues, civic leadership and community service and basic communication skills. Core requirement for the minor in leadership studies (Lec. 3) Pre: permission of instructor.

**HDF 200 Life Span Development I** (3 crs.) Physical, social, cognitive, and emotional growth and development of young children within the family and varied cultural settings. Review of contemporary issues and their relevance for social policy. (Lec. 3)

**HDF 201 Life Span Development II** (3 crs.) Physical, social, cognitive, and emotional growth and development from adolescence to senescence. Attention to varied cultural settings and relevant social policy. (Lec. 3)

**HDF 202 Research Perspectives in Human Development and Family Studies** (3 crs.) Introduction to research processes in human development and family studies. Emphasis on reading and evaluating the research literature and preparing and presenting literature reviews. (Lec. 3/Online) Pre: admission to the HDF or BIS program.

**HDF 203 Introduction to Work with Children** (4 crs.) Theory and practice in care, teaching, and guidance of preschool children. Lectures, discussion, and participation in a field setting for three hours a week. (Lec. 3, Lab 3) Pre: HDF 200 or PSY 232. Service Learning.

**HDF 205 Family Financial Issues Across the Life Span** (3 crs.) Introduction to financial issues faced by families and individuals at each stage of the life cycle from different income levels, family types and cultural backgrounds. (Lec. 3/Online)

**HDF 225 Consumer In The Economy** (3 crs.) Application of basic economic principles to consumer problems in a complex marketplace, buyer-seller relationships, effective consumer decision making, effects of government policies on consumers. (Lec. 3/Online) (S)

**HDF 230 Marriage and Family Relationships** (3 crs.) Male-female and other close relationships in courtship and family systems as influenced by personality and culture in a changing society. Professional and functional orientation. (Lec. 3/Online)

**HDF 290 Modern Leadership Issues** (3 crs.) Introductory leadership class. Topics include basic leadership theories, interna-

tional governance/economic systems, critical thinking, and leadership in U.S. education; community service organizations; families; diverse workplaces. Core option for the leadership studies minor. (Lec. 3) Pre: permission of instructor.

**HDF 291 Rose Butler Brown Peer Mentoring Program** (3 crs.) Explores cultural identity, adult development, leadership, body image and the media, issues relevant to women of color, community engagement and mentoring. Elective for leadership minors. (Lec. 3) Pre: permission of instructor.

**HDF 297 Contemporary Issues In Student Development** (1-3 crs.) Student orientation, leadership, and training practices presented by various Student Affairs and other University programs, such as Student Life, Residential Life, Health Services, University College, and Affirmative Action. (Seminar) May be repeated for up to 6 credits. S/U only.

**HDF 298 Contemporary Issues in Student Development** (1-3 crs.) Student leadership models and practices in various student development settings, such as Student Affairs, Student Life, Residential Life, University College, and Health Services. (Seminar) May be repeated for a maximum of 6 credits.

**HDF 301 Early Childhood Curriculum I: Introduction to Curriculum** (4 crs.) Theoretical foundations and practical applications of early childhood curriculum as a framework including process, content, context, teaching and facilitating. Includes 3 hour weekly practicum in diverse early childhood classrooms. (Lec. 3, Practicum 1) Pre: Acceptance into the Early Childhood Education Teacher Certification Program OR permission from instructor and HDF 203.

**HDF 302 Literature For Children** (3 crs.) Literary heritage of American children from all subcultures, and criteria for the selection and presentation of literature to children. (Lec. 3) Pre: junior standing.

**HDF 303 Early Childhood Curriculum II: Math & Science** (4 crs.) In-depth examination of early childhood math and science curriculum and assessment for Preschool through Grade 2. Course includes 3 hour per week supervised teaching in a URI Child Development Center. (Lec. 3, Practicum 1) Pre: HDF 301, HDF 420 and acceptance into the Early Childhood Certification Program. Not for graduate credit.

**HDF 305 Family Engagement in Early Childhood Settings** (3 crs.) Examination of the professional behaviors for establishing and maintaining positive, ongoing, effective reciprocal relationships with diverse families in various early childhood settings. (Lec. 3) Pre: HDF 230 and either HDF 203 or HDF 306, or acceptance into the Early Childhood Education Teacher Certification Program.

**HDF 306 Infant Development** (3 crs.) Study of development in the first three years including family interaction and early education. Emphasis is on cultural differences in

parenting. Supervised observation/participation working with infants and toddlers three hours a week included. (Lec. 3, Lab. 3) Pre: HDF 200 or PSY 232.

**HDF 310 Adolescent Growth and Development** (3 crs.) Physical, psychological, social, and emotional growth and development of the individual during adolescent years. Lecture, discussion and participation in a field setting with concurrent enrollment in 311. (Lec. 3) Pre: HDF 201 or permission of instructor.

**HDF 311 Early Field Experience With Adolescents PRA** (1 cr.) Supervised observation and participation experience working with adolescents. Pre: concurrent enrollment with HDF 310. S/U only.

**HDF 312 Adult Development** (3 crs.) Identification of influences, processes, and forces shaping adult development to late life. Environmental and lifetime theoretical approaches emphasized and stage theories reviewed. (Lec. 3) Pre: HDF 201 or permission of instructor.

**HDF 314 Introduction to Gerontology** (4 crs.) Introduction to the study of aging processes: Biological, psychological, and social theories. Health, social, and other age-related problems. Lecture, discussion, and participation in a field setting. (Lec. 3, Lab 3) Pre: completion of 24 or more credits.

**HDF 357 Family and Community Health** (3 crs.) Specific health and maintenance concerns throughout the life span. Community and world health needs and related agencies. (Lec. 3) Pre: junior standing.

**HDF 400 Child Development: Advanced Course** (3 crs.) Review and critique of major theories of child development. Examination of research studies and issues associated with the first decade of life. Emphasis on cultural contexts. (Lec. 3) Pre: HDF 200 or PSY 232, and HDF 201.

**HDF 412 Historical, Multi-Ethnic, and Alternative Leadership** (3 crs.) Examines issues of cultural anthropology, critical thinking, theories of inclusion, and crisis leadership. Capstone requirement for leadership minors. (Lec. 3) Pre: permission of instructor and HDF 190 or 290 and junior or senior standing.

**HDF 413 Student Organization Leadership Consulting** (3 crs.) Examines experiential education, organizational development, facilitation techniques, and ethical issues of peer leadership. Elective for leadership minors. (Lec. 3) Pre: permission of instructor and HDF 190 or HDF 290.

**HDF 414 Leadership for Activism and Social Change** (3 crs.) Explores issues related to social change, power and privilege, coalition building, non-violence, civic engagement and activist movements. Elective for leadership minors. (Lec. 3) Pre: permission of instructor and HDF 190 or HDF 290.

**HDF 415 FLITE Peer Leadership** (3 crs.) Explores mentoring strategies, leadership and identity development models, leadership style, and community involvement. Elective for leadership minors. (Lec. 2, Lab. 2) Pre: Permission of instructor and HDF 190 or HDF 290.

**HDF 416 Personal and Organizational Leadership** (3 crs.) Topics include leadership theory and style, experiential learning, peer mentoring, critical thinking, quality improvement, and organizational development. (Lec. 3) Elective for leadership minors. Pre: HDF 290 or 190 and permission of instructor.

**HDF 417 Internship for Leadership Minors PRA** (3 crs.) Supervised internship experience for leadership studies minors. A core requirement for the minor in leadership studies. (Practicum) Pre: permission of instructor and HDF 190 or HDF 290 and enrollment in leadership minor.

**HDF 418 Personal Finance** (3 crs.) Personal financial planning and decisions for attaining individual and family goals. Factors that affect, protect, and enhance financial security. (Lec. 3/Online) Pre: completion of 24 or more credits.

**HDF 420 Early Language and Literacy Development (Birth-5)** (3 crs.) Theoretical foundations of language and literacy development from birth through age 5. Examines practical applications of multi-modal language and literacy in diverse populations, including dual language learners. (Lec. 3) Pre: Acceptance into the Early Childhood Education Teacher Certification program OR permission of instructor. Not for graduate credit.

**HDF 421 Death, Dying, and Bereavement** (3 crs.) Cross-listed as (HDF), THN 421. Exploration of human death, dying and bereavement. Focus on biomedical, psychological, social and multicultural dimensions. Implications for social policy. (Lec. 3) Pre: junior standing or above.

**HDF 424 Personal Finance Applications** (3 crs.) Application of principles of family financial planning and decision making. Emphasis on mathematical and analytical evaluation and analysis including the use of computer software. (Lec. 3/Online) Pre: HDF 418 or permission of instructor.

**HDF 426 Retirement Planning** (3 crs.) Explanation and evaluation of financial information needed for effective retirement planning, including defining goals, estimating expenses, and analyzing resources. (Lec. 3/Online) Pre: HDF 418 or permission of instructor.

**HDF 428 Consumer Protection** (3 crs.) Effectiveness of diverse approaches to consumer protection. Analysis of techniques such as information disclosure, standards for products and services, government and private agencies, redress channels, and legislation. (Lec. 3/Online) Pre: HDF 205 or 225 or permission of instructor.

**HDF 430 Family Interaction** (3 crs.) Interdisciplinary approach to the dynamics of intrafamily relationships, interactions of family units and family members within the sociocultural environment. Implications for social policy. (Lec. 3) Pre: HDF 202 and 230.

**HDF 431 Family and the Elderly** (3 crs.) Emphasis on the elderly in analysis of intergenerational organization and relationships. Cultural values, psychosocial factors, economic considerations, and societal trends relative to family life. (Lec. 3)

**HDF 432 Perspectives on Parenting** (3 crs.) Historic examination of childhood and parenting philosophies and comparison of practices among different cultures. Attention to contemporary social policy and practices surrounding parenting. (Lec. 3) Pre: HDF 200 or PSY 232.

**HDF 433 Family Life Education** (3 crs.) History, philosophy and goals of Family Life Education including requirements for certification. Program planning, implementation and evaluation. Current issues, trends, research and theory. Emphasis on diversity of clientele and settings. (Lec. 3) Pre: HDF 202 and 230.

**HDF 434 Children and Families in Poverty** (3 crs.) Interdisciplinary approach to understanding the effects of poverty with attention to cultural, political and policy issues and implications. (Lec. 3) Service learning. Pre: senior standing in the major or permission of instructor and HDF 202.

**HDF 434H Honors Section of HDF 434: Children and Families in Poverty** (3 crs.) Honors Section of HDF 434: Children and Families in Poverty. (Lec. 3) Pre: 3.30 overall GPA, HDF 202, and senior standing in HDF major or permission of instructor.

**HDF 437 Law and Families in the United States** (3 crs.) Cross-listed as (HDF), SOC 437. Seminar to investigate family roles, relationships, rights, and responsibilities as defined by the law. Emphasis on explicit and implicit family policy revealed in the various branches of law. (Seminar) Pre: HDF 200 and 230 or SOC 212.

**HDF 440 Environmental Context of Aging** (3 crs.) Study of normal aging related changes as design determinants of the physical environment. Identifies theories and models of person-environment interaction and environment-behavior issues and procedures for post-occupancy evaluation studies. (Lec. 3) Pre: HDF 202 and 314.

**HDF 450 Introduction to Counseling** (3 crs.) Introduces students in human sciences to interviewing and counseling skills in both professional and paraprofessional settings. Integrates theory, practice, and application by didactic and experiential learning. (Lec. 3) Pre: Senior standing in HDF, graduate standing, or permission of instructor.

**HDF 451 Financial Counseling and Debt Management** (3 crs.) Examination of debt and budgeting problems affecting families.

Utilization of a problem-solving approach and inclusion of financial counseling strategies for coping with financial issues and becoming proactive in family financial management. (Lec. 3) Pre: HDF 418 and 450.

**HDF 455 Assessment in Early Childhood** (3 crs.) An overview of cognitive, affective, and psychomotor assessments used by early childhood development and education specialists, and examination of the assessment techniques and current trends and practices. (Lec. 3) Pre: HDF 420 or permission of the instructor.

**HDF 456 Assessment Practicum PRA** (3 crs.) Supervised experience in completing cognitive, affective, and psychomotor assessments of young children. (Practicum) Pre: credit or concurrent enrollment in HDF 455. In alternate years.

**HDF 458 R.I. Early Learning Standards** (3 crs.) Prepares early childhood professionals to implement the R.I. Early Learning Standards in diverse early care and education settings to increase program quality and support children's learning and development. (Lec. 3) Pre: Enrollment in R.I. Early Learning Standards Project sponsored by R.I. Dept. of Education. S/U only for undergraduate students. A-F grades for graduate students.

**HDF 471 Responding to Grief** (3 crs.) Cross-listed as (HDF), THN 471. Examines conceptual, psychosocial, somatic and pragmatic issues faced when grieving and how to cope or assist others accommodating imminent or realized loss due to death. (Lec. 3) Pre: HDF 421, or prior thanatology course, or permission of instructor.

**HDF 477 Field Experience In Family Financial Counseling and Planning PRA** (3 crs.) Approved, supervised work experience related to consumer well-being. Examples include research, advocacy, education, and dissemination of information, or provision of service. (Practicum) Pre: senior standing or permission of instructor. S/U credit. Not for graduate credit.

**HDF 478 Field Experience in Family Financial Counseling and Planning PRA** (3 crs.) Approved, supervised work experience related to consumer well-being. Examples include research, advocacy, education, and dissemination of information, or provision of service. (Practicum) Pre: senior standing or permission of instructor. S/U credit. Not for graduate credit.

**HDF 480 Senior Field Experiences in Community Agencies PRA** (6-12 crs.) Senior field experience in community agencies (Practicum) Service learning. Pre: concurrent enrollment in HDF 481; senior standing and permission of instructor. Application must be made on or before Feb. 1 in the year preceding internship. Orientation and learning contract occurs semester before field work. Not for graduate credit. S/U only.

**HDF 481 Field Experience Seminar and Reflections** (3 crs.) Group discussion of field experience in community agencies and related academic assignments. Includes senior reflections and portfolio. (Seminar) Service learning. Not for graduate credit. Pre: permission of instructor.

**HDF 492 Leadership Minor Portfolio Preparation of portfolios required for graduation with minor in leadership studies.** (Seminar) pre: enrollment in leadership studies minor.

**HDF 497 Special Problems** (1-3 crs.) Open to qualified seniors who wish to do advanced work primarily consisting of lab or field experiences. Students must obtain written approval from proposed faculty supervisor prior to registration. Pre: senior standing and permission of chairperson. May be repeated for no more than 9 credits. Not for graduate credit. S/U only.

**HDF 498 Special Problems** (1-3 crs.) Open to qualified seniors who wish to do advanced work. Conducted as a seminar or supervised individual project. Students must obtain written approval from proposed faculty supervisor prior to registration. Pre: senior standing and permission of chairperson. May be repeated for no more than 9 credits. Not for graduate credit.

**HDF 501 Developmental Science in Family Contexts** (3 crs.) Critical analysis of developmental science theories and related contemporary research. Using a lifespan perspective, the course will examine individual and family theories of development, and consider relevant practice and research implications. (Lec. 3) Pre: Graduate standing or permission of instructor.

**HDF 505 Human Sexuality and Counseling** (3 crs.) Historical, cultural, and developmental issues in human sexuality and counseling. Implications for self and client understanding through personal exploration and desensitization to sensitive topics. (Lec. 3) Pre: graduate standing or permission of instructor.

**HDF 506 Rhode Island Early Childhood Institute** (1-3 crs.) Intensive institute focused on contemporary issues in early childhood education in Rhode Island and the nation. Topics vary, with discussion of theoretical, empirical, and practical issues. (Seminar) Pre: Enrollment in Early Childhood Institute program or permission of instructor. May be repeated as topics vary.

**HDF 507 Seminar in Early Childhood Education** (3 crs.) Seminar in trends and model programs in early childhood education. Special attention to substantive evaluation and program design issues for the professional early childhood educator. (Seminar) Pre: student teaching or equivalent classroom experience or permission of instructor.

**HDF 511 Seminar on Infancy Through Childhood** (3 crs.) Examines trajectories, theories and research associated with child

development from infancy through childhood. Topics include early brain development, culturally sensitive caregiving, health, education, behavior, and the impact of public policy on this developmental stage. (Seminar) Pre: graduate standing or permission of instructor

**HDF 512 Seminar on Adolescence Through Young Adulthood** (3 crs.) Examine theories and research associated with adolescence and young adulthood. Topics include transitions, risky behaviors, health issues, work-family tensions, and the impact of public policy on this developmental stage. (Seminar) Pre: Graduate standing or permission of instructor.

**HDF 513 Seminar in Older Adulthood** (3 crs.) Examine theories and research associated with older adulthood and aging. Emphasis on current research and practice issues. Interdisciplinary focus on biopsychosocial aspects of growing older. (Seminar) Pre: graduate standing or permission of instructor.

**HDF 518 Seminar in Life-Span Financial Issues** (3 crs.) Survey and critical examination of research on life-span financial issues. Implications for diverse populations and human service settings will be drawn. (Independent Study) Pre: HDF 418 or permission of instructor.

**HDF 527 Health Care Policy** (3 crs.) Development of policy frameworks and their application for understanding current major health care policy issues across lifespan, including economic, political, and ethical dimensions. Exploration of the experiences of other countries. (Seminar) Pre: graduate standing or permission of instructor.

**HDF 530 Advanced Family Studies** (3 crs.) Intensive study of theories in the family field, integrated with contemporary family issues, and family therapy. (Seminar) Pre: HDF 430 or permission of instructor.

**HDF 533 Family Policy and Program Evaluation Seminar examining the political, socio-economic and cultural forces influencing development and implementation of national and local family policies with emphasis on evaluations of child and family programs.** (Seminar) Pre: graduate standing or permission of instructor

**HDF 535 Families Under Stress: Coping and Adaptation** (3 crs.) Theoretical models of family interaction, development, and stress as applied to understanding of family behavior in managing stress or events. Concepts of stress, vulnerability, adaptability, coping, regenerative power, social supports, and related research. (Seminar) Pre: HDF 430 or equivalent course work in family development or family sociology and permission of instructor.

**HDF 536 Family Dynamics and Health** (3 crs.) Provides an introduction to the research, theory and application of understanding of the major physical and

mental health issues facing modern families. (Seminar) Pre: graduate standing in HDF or permission of instructor.

**HDF 540 Interdisciplinary Teamwork in Health and Human Services** (3 crs.) Basic principles of interdisciplinary teamwork in health care, human service, and education professions. Practice in promoting effective communication, conflict resolution, and leadership in teams. Focus on social and experiential learning. (Lec. 3) Pre: permission of instructor.

**HDF 551 Counseling Theory and Techniques** (3 crs.) Theoretical foundation and practice of counseling with diverse adult populations. (Lec. 3) Pre: graduate standing and permission of instructor.

**HDF 553 Higher Education Practicum PRA** (3 crs.) Supervised practicum in higher education placements. Emphasis on applied assignments in the initial stages of college student personnel program. (Practicum) Pre: HDF 567 and permission of instructor. S/U only

**HDF 555 College Student Development and Learning I** (3 crs.) First course in sequence examining the human development and learning of students in higher education. Emphasis on developmental typologies and psychosocial development in a sociohistorical context. (Lec. 3) Pre: HDF 567.

**HDF 556 College Student Development and Learning II** (3 crs.) Second course in sequence examining the human development and learning of students in higher education. Emphasis on cognitive-structural development and integrative dimensions in a sociohistorical context. (Lec. 3) Pre: HDF 555.

**HDF 559 Diversity in Applied Family Settings** (3 crs.) Systemic integration of multicultural and contextual frameworks for service delivery and scholarly work in a diverse world. Emphasis on the development of multicultural competence, awareness, practical applications, and evaluation in family settings. (Seminar) Pre: HDF 450 or equivalent and graduate standing or permission of instructor.

**HDF 560 Group Procedures and Leadership** (3 crs.) Approaches and processes for conducting a range of group interventions from small group meetings to psychoeducational techniques. A practical and theoretical approach to facilitation skills, team leadership and group dynamics in higher education and other adult settings. Enrollment is limited. (Lec. 2, Lab. 4) Service learning. Pre: graduate standing and permission of instructor.

**HDF 562 Organization Development in Human Services** (3 crs.) Conceptual and technical components of organization development (OD) and consultation to various types of organizations, with emphasis on human service arenas. Approaches to the different phases of intervention in planned change efforts using theoretical frameworks,



case, and client applications. (Lec. 2, Lab. 4) Service learning. Pre: graduate standing and permission of instructor.

**HDF 563 Marital and Family Therapy I** (3 crs.) Major theoretical perspectives, including system theory as related to therapy. Communication and relationship skills, negotiation and behavioral contracting, treating specific relationship problems, therapy evaluation. (Seminar) Pre: HDF 430 and permission of instructor.

**HDF 564 Marital and Family Therapy II** (3 crs.) Major contemporary theories of family therapy and the development of family therapy as a unique intervention strategy; special consideration of issues and problems commonly confronted in conducting family therapy. (Seminar) Pre: permission of instructor.

**HDF 565 Family Therapy Practicum** (3 crs.) Supervised clinical experience in marriage and family therapy. Case materials will be presented by students, and taped segments of actual counseling sessions will be reviewed. (Lec. 3) Pre: admission to MFT program or permission of instructor. May be repeated for a maximum of 18 credits.

**HDF 566 Theoretical and Clinical Problems** (3 crs.) Examination of major ongoing and emerging theoretical issues in family therapy. The implications of these problems in clinical practice with families. (Lec. 3) Pre: HDF 564 and graduate standing.

**HDF 567 Principles and Practices of College Student Personnel** (3 crs.) Survey of the historical, philosophical, sociological, and cultural influences on college student personnel work as a profession and exploration of selected functional areas within student affairs. (Lec. 3) Pre: graduate standing in CSP and permission of instructor.

**HDF 568 College Student Development and Learning** (3 crs.) Examination of human development and learning of students in higher education. Emphasis on psychosocial, intellectual and moral development in a sociohistorical context. (Lec. 3) Pre: HDF 567.

**HDF 569 Assessment in Family Therapy** (3 crs.) Administration and interpretation of assessment instruments for treatment, planning, and evaluation. Ethical, legal, and theoretical issues related to family systems assessment are discussed. (Seminar) Pre: graduate standing or permission of instructor.

**HDF 570 Research in Human Development and Family Studies** (3 crs.) Historical, philosophical, and procedural foundations of scientific inquiries into individuals and families. Explores the various ways to acquire information about human development and family relationships. (Lec. 3) Pre: graduate standing or permission of instructor.

**HDF 572 Administrative Practices in Human Development and Family Studies** Introduction to administrative practices affecting entry level professionals in HDF. (Lec. 3) Pre: permission of instructor.

**HDF 573 Legal Issues in Higher Education** (1-3 crs.) An overview of the effect of federal and state legal systems on university administration and service delivery. Reviews authorities and agencies, major court decisions, and the application of substantive and procedural law principles. (Lec. 1-3) Pre: graduate standing and permission of instructor.

**HDF 574 Environmental Theory and Assessment in Higher Education** (3 crs.) Overview of selected person-environmental interaction theories and assessment frameworks applicable in higher education settings. Emphasis on campus ecology, cultural, perceptual, human aggregate, physical/architectural, and behavior setting approaches. (Seminar) Pre: HDF 555 and 556.

**HDF 575 Cultural Competence in Human Services** (1 cr.) Exploration of skills needed to enhance a diverse work environment and other human service settings. (Seminar) Pre: graduate standing and permission of instructor.

**HDF 576 Diversity in Higher Education** (2 crs.) Survey of the historical and current demographical profile of students in higher education. Emphasis on implications for programs, policies, and leadership. (Lec. 2) Pre: Graduate standing in College Student Personnel or permission of instructor.

**HDF 577 Seminar: Topics in Higher Education** (1-3 crs.) Recent developments and current issues in higher education. May be repeated for a maximum of 6 credits. (Seminar)

**HDF 578 Ethical, Legal, and Professional Concerns in Family Therapy** (3 crs.) Ethical, legal, and professional issues encountered by family therapists in the delivery of services. These aspects of therapy practice along with systemic theory are cornerstones of competent practice. (Seminar) Pre: HDF 563 and 565, 530 and 535, and concurrent enrollment in 583 and permission of instructor.

**HDF 580 Professional Seminar** (1-3 crs.) Emphasizes initial implementation phases of master's research requirement as well as legal, ethical, and professional issues. (Seminar) Pre: advanced standing and permission of instructor.

**HDF 581 Professional Seminar** (1-3 crs.) Emphasizes research applications, completion of master's research requirement, and making a transition to a professional position. (Seminar) Pre: concurrent enrollment in HDF 584 and permission of instructor.

**HDF 583 Master's Internship PRA** (3 or 6 crs.) Supervised field experience in various settings. Culminating experience integrates program theory and skills. (Practicum) Pre: advanced standing and permission of instructor. College Student Personnel students must enroll concurrently in HDF 580. S/U credit.

**HDF 584 Master's Internship PRA** (3 or 6 crs.) Supervised field experience in various settings. Culminating experience integrates program theory and skills. (Practicum) Pre:

advanced standing and permission of instructor. College Student Personnel students must enroll concurrently in HDF 581. S/U credit.

**HDF 595 Master's Project: Action Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor. Minimum of 6 credits is required of students who have chosen the action-thesis option. (Independent Study) S/U credit.

**HDF 597 Advanced Study** (1-3 crs.) Survey of important research contributions significant to the understanding of human development and relationships. (Independent Study)

**HDF 598 Advanced Study** (1-3 crs.) Survey of important research contributions significant to the understanding of human development and relationships. (Independent Study)

**HDF 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. Minimum of 6 credits is required of students who have chosen the thesis option. (Independent Study) S/U credit.

## HIS | History

**HIS 110 Ancient Greece: History and Archaeology** (3 crs.) Cross-listed as (HIS), CLA 110. An introduction to the history and archaeology of ancient Greece and Greek Civilization from the Bronze age to the death of Alexander the Great. (Lec. 2, Rec. 1) (L) [D]

**HIS 111 Ancient Rome: History and Archaeology** (3 crs.) An introduction to the history and archaeology of ancient Rome and Roman Civilization from the founding of the city through to the death of the emperor Nero. (Lec. 3) (L) [D]

**HIS 112 History of Medieval Europe** (3 crs.) Primarily western Europe. Continuation of 111. Medieval church, feudalism, revival of town life, commerce, industry, and money economy, rise of national states, and development in the arts. (Lec. 3) (L)

**HIS 113 History of Western Civilization from the Late Middle Ages to 1789** Introductory course treating Western civilization in its broadest sense from the late Middle Ages to the French Revolution and the beginnings of industrialization. (Lec. 3) (L) [D]

**HIS 114 History of Western Civilization Since 1789** (3 crs.) Continuation of HIS 113. Western civilization of the present time. (Lec. 3) (L) [D]

**HIS 116 History of Western Science** (3 crs.) Development of western science from ancient Greece and Rome until the present. Topics include relations of science and religion, emergence of science-based industry, and interaction between science and politics, especially during war. (Lec. 3). (L)

**HIS 117 History of Medicine** (3 crs.) Professionalization of medicine, status of healers in different cultures, creation of scientific medicine, alternative medical practice, effect of changing disease patterns on medical theory/practice. Focus on the U.S. in the 19th and 20th centuries. (Lec. 3) (L) [D]

**HIS 118 Women In European History** (3 crs.) Attitudes toward women, their role in society, women's work, and the feminist movement. Emphasis on 19th and 20th centuries with background material from earlier periods. (Lec. 3) (L) [D]

**HIS 130 History and the Sea** (3 crs.) The history of seafaring from ancient times to the 20th century. The course considers the political, military, economic, and social history of the maritime world. (Lec. 3) (L) [D]

**HIS 132 Introduction to Russian and Soviet History** (3 crs.) Selected topics in the development of Russian civilization since the 9th century. (Lec. 3) (FC) (L) [D]

**HIS 141 History of The United States to 1877** (3 crs.) Colonial and Revolutionary periods, and economic, social, and political development of the United States through the Civil War and Reconstruction. (Lec. 2, Rec. 1) (L) [D]

**HIS 142 History of the United States Since 1877** (3 crs.) General social, economic, and political development from 1877 to the present. (Lec. 2, Rec. 1) (L) [D]

**HIS 145 Women in the North American Colonies and the United States, 1500-1890** (3 crs.) Legacies of Native-American, Hispanic, and Anglo-American culture; slavery and abolition; women's work and sexuality; women's rights movements; ethnic and regional diversity, with emphasis on women in the West, the South, and Northeast. (Lec. 3) (L) [D]

**HIS 146 Women in the United States, 1890-Present** (3 crs.) Impact of immigration and industrialization; legacy of slavery and segregation; changes in sexuality, reproduction, and work; images of women in popular culture; women's political movements. (Lec. 3) (L) [D]

**HIS 150 Introduction to Afro-American History** (3 crs.) Cross-listed as (HIS), AAF 150. Survey of Afro-American history from African origins to the current racial confrontation. (Lec. 3) (L) [D]

**HIS 160 Technology and American Life: 1800-Present** (3 crs.) Surveys the development and social impact of technology on American life during the past two centuries. (Lec. 3) (L) [D]

**HIS 171 East Asian Culture and History** (3 crs.) Introduction to the culture and history of East Asia. Emphasis on the literary, artistic, and philosophical traditions of East Asia, especially those aspects which relate to and influence contemporary developments. (Lec. 3) (FC) (L) [D]

**HIS 172 Southeast Asian Culture and History** (3 crs.) Broad overview of the culture and history of Southeast Asia. Emphasis on society, culture, and religion and their influence on contemporary developments. (Lec. 3) (L) (FC) [D]

**HIS 176 Islamic History: From the Origins of Islam to 1492** (3 crs.) Introduces core ideas and events which have shaped the Islamic world. Topics include Muhammad and the Qur'an, the Sunni/Shii divide, the development of Sharia law and encounters with the West. (Lec. 3) (L) [D]

**HIS 178 History of the Modern Middle East** (3 crs.) (Previously HIS 177X) Course covers the major social and political issues which have shaped the history of the contemporary Middle East. Topics include the impact of colonialism, nationalism, socialism, and Islamic revival movements. (Lec. 3) (L) (FC)

**HIS 180 Introduction to Latin American Civilization** (3 crs.) Social, cultural, and political history of the Latin American region from the pre-conquest era to the present time. (Lec. 3) (FC) (L) [D]

**HIS 301 The Hellenistic World** (3 crs.) Cross-listed as (HIS), CLA 301. The history, archaeology, and civilization of the Hellenistic World from Alexander the Great to the Death of Cleopatra VII. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 302 The Roman Empire** (3 crs.) Cross-listed as (HIS), CLA 302. The history, archaeology, and civilization of the Roman Empire from Augustus to Constantine. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 304 Western Europe in the High Middle Ages** (3 crs.) Primarily France and England in the 12th and 13th centuries. Emphasis on the Medieval Gothic-Catholic culture, the rise of towns, and the development of a money economy. (Lec. 3) (L) Pre: Sophomore standing or permission of instructor.

**HIS 305 The Renaissance** (3 crs.) Europe in transition during the 14th through the early 16th centuries. The economic, social, and religious backgrounds of the Renaissance. Emphasis on culture and artistic developments. (Lec. 3) (L) Pre: Sophomore standing or permission of instructor.

**HIS 305H Honors Section of HIS 305: The Renaissance** (3 crs.) Honors Section of HIS 305: The Renaissance (Lec. 3) (L) Pre: must have a 3.30 overall GPA. Sophomore standing or permission of instructor.

**HIS 308 Between Eve and Mary: Women in the Middle Ages** (3 crs.) History of women in western Europe from about 500 A.D. to about 1500 A.D. Understanding the variety of medieval women's experiences (rich or poor, secular or religious, urban or rural) and how women were perceived by their society. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 309 The French Revolution and Napoleon** (3 crs.) Examination of the Revolution and Napoleonic eras with emphasis on the connections among economic, social, and political developments. Special attention to problems in interpretation. (Lec. 3) Pre: junior standing.

**HIS 310 History of Europe: 1815-1914** (3 crs.) Major political, economic, and intellectual developments in Europe from the defeat of Napoleon I to the outbreak of World War I; emphasis on the Revolutions of 1848, unification of Italy and Germany, impact of the Industrial Revolution, nationalism and imperialism, background of World War I. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

**HIS 311 History of Europe Since 1914** (3 crs.) Detailed study of developments from 1914 to present: wars, postwar adjustments, communist and fascist ideologies, history of individual states, and social and intellectual trends. (Lec. 3) Pre: sophomore standing or permission of instructor. (FC) (L) [D]

**HIS 314 Seventeenth- and Eighteenth-Century European Cultural History** (3 crs.) Intellectual and social movements of the Age of Reason and the Age of Enlightenment. (Lec. 3) (L) Pre: Sophomore standing or permission of instructor.

**HIS 323 History of Great Britain in the 19th Century** (3 crs.) Politics, culture and economy of Great Britain in the 19th century: elements of both continuity and change in the social life and organization of its inhabitants, and in their religious and social beliefs: effects of British imperial expansion on the colonizers and on the colonized. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

**HIS 327 German History Since 1914 Topics in German social and political history from the first world war to the present. Emphasis on the history of National Socialism.** (Lec. 3) Pre: Sophomore standing or permission of instructor. (FC) (L) [D]

**HIS 328 The Holocaust** (3 crs.) Study of Nazi efforts to exterminate Jews and others in Europe. Focuses on Nazi programs and policies; Jewish experiences; and the responses of the outside world. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 328H Honors Section of HIS 328: The Holocaust** (3 crs.) Honors Section of HIS 328: The Holocaust. (Lec. 3) Pre: Must have a 3.30 overall GPA and sophomore standing or permission of instructor.

**HIS 332 History of Imperial Russia** (3 crs.) Russian society, politics, and world view from the modernizing reforms of Peter the Great to the installation of parliamentary government in 1905. Emphasis on student writing, analysis of documents, trends, interconnections. (Lec. 3) (L) [D] Pre: sophomore standing or permission of instructor.

**HIS 333 Twentieth Century Russia** (3 crs.) From Imperial Russia's progress toward modernization to society, economy and politics in the 1990s. The Soviet experiment is studied from domestic and international angles. Close attention given to the Stalin Revolution, Cold War and attempts to revitalize the one party state. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

**HIS 335 American Colonial History to 1763** (3 crs.) American history from the founding of the colonies to the end of the French and Indian War, including developments within the colonies as well as their relationship with England. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 336 The American Revolution and Confederation: 1763-1789** (3 crs.) Social, political, and economic aspects of the Revolution and Confederation periods. (Lec. 3) Pre: sophomore standing, or permission of instructor.

**HIS 337 Creation of the Union: America from 1789-1848** (3 crs.) The development of the new nation through the Jacksonian years, with emphasis on the transformation of society and politics. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 339 Emergence of Industrial America: 1877-1914** (3 crs.) Growth and consolidation of business, urbanization, and the Populist and Progressive movements. America's emergence as a world power. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 340 United States History from 1914 to 1941** (3 crs.) Social, political, and economic developments in the U.S. from the onset of World War I through the end of the Great Depression. (Lec. 3) Pre: Sophomore standing or permission of instructor. (L) [D]

**HIS 341 United States History from 1941 to 1974** (3 crs.) U.S. Involvement in World War II. Social, political and economic developments in the postwar era. Equal emphasis on the domestic sphere and America's role in world affairs. (Lec. 3) Pre: Sophomore standing or permission of instructor. (L) [D]

**HIS 342 United States History from 1968-2001** (3 crs.) From Woodstock to the AIDS crisis, Richard Nixon to George Bush, Vietnam to Iraq, and Bob Dylan to Jay-Z, students will explore the developments that created today's United States. (Lec. 3) Pre: HIS 142 and sophomore standing.

**HIS 344 History of the North American Indian** (3 crs.) Native North Americans from pre-Columbian times to present. Emphasis on ideological conflict between Indians and whites. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 346 Immigration, Ethnicity, and Race in America** (3 crs.) History of immigration to the U.S. from the colonial period to the present, with emphasis on the 19th and 20th centuries. Compares different waves, explores shifting attitudes toward immi-

grants, and discusses how race and ethnicity shaped immigrants' experiences. (Lec. 3) Pre: Sophomore standing or permission of instructor. (L) [D]

**HIS 349 History of American Labor** (3 crs.) Changes in work, lifestyle, and political consciousness of American workers in the 19th and 20th centuries; conflicts between labor and capital, and relationship to emergence of labor movements. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 351 Historical Perspectives on Women and Health** (3 crs.) History of women healers, including midwives, nurses and physicians. Topics in women's health care will also be addressed. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

**HIS 351H Honors Section of HIS 351: Historical Perspectives on Women and Health** (3 crs.) Honors Section of HIS 351: Historical Perspectives on Women and Health Pre: sophomore standing and 3.30 overall GPA. (L) [D]

**HIS 352 Topics in the History of Women and Gender** (3 crs.) Themes in women's history, sexual identities, and the construction of gender roles. Primarily deals with United States since 1800. (Lec. 3) Pre: sophomore standing or permission of instructor. May be repeated.

**HIS 354 United States Diplomacy in the 20th Century** (3 crs.) Analysis of people, ideas, and institutions that have shaped American relations with the rest of the world from World War I to the present. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 355 Black Women in the U.S.: Colonial Times to the Present** (3 crs.) Cross-listed as (HIS), AAF 355. Women's experiences in the study of African-American history. Assigned readings familiarize students with the state of scholarship and examine the intersection of race, class, and gender in that experience. (Lec. 3) Pre: sophomore standing. (L) [D]

**HIS 356 Black Urban History: Late 19th and 20th Centuries** (3 crs.) Cross-listed as (HIS), AAF 356. Examines the historical black experience in urban environments in the U.S. Assigned readings, research, and group discussions examine the issues of migration, community, politics, class, and gender. (Lec. 3) Pre: sophomore standing. (L) [D]

**HIS 357 History of Religion in the United States** (3 crs.) Diversity of religious traditions in the U.S. especially in the 19th and 20th centuries. Emphasis on political, cultural and ethnic/racial dimensions of religion. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 358 Recent America in Film** (3 crs.) An investigation of American culture and history since 1930 using films as the major resource for study, with emphasis on the Great Depression, World War II, sexual interaction, and

race relations. (Lec. 1, Lab. 4) Pre: Sophomore standing or permission of instructor.

**HIS 359 History of Slavery in America** (3 crs.) Cross-listed as (HIS), AAF 359. Origins, development, and demise of slavery, with emphasis on the area that currently constitutes the United States. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 360 American Culture 1865-1940** (3 crs.) Explores the nature and sources of American culture with emphasis on the diversity of its origins and forms of expression. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 361 Women's Lives in New England, 1790-1930** (3 crs.) Social, political and literary history of women in New England with an emphasis on women's work and how that work shaped gender relations. Theoretical approaches from women's studies, race and gender studies will inform the treatment of women's history and the history of material culture in New England. (Lec. 3) Pre: junior standing or permission of the instructor.

**HIS 362 History of Rhode Island** (3 crs.) History of Rhode Island from the first English settlement to the present day. Social, political, and economic aspects of internal development and the relation of the state to the region and the nation. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 363 Public History: Presenting Rhode Island's Past** (3 crs.) The presentation of Rhode Island's history to the public through such media as museums, historic sites, monuments, documentaries, websites, and social networking media from the state's colonial beginnings. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 364 U.S. Environmental History** (3 crs.) This course explores the historical interactions between people and nature from pre-Columbian America to the present, including environmental movements, agriculture, cities, water, land use, food, and pollution. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 365 Civil War and Reconstruction** (3 crs.) American history during the period 1850-1877, giving equal emphasis to the background of the Civil War, the war itself, and the social, political, and economic aspects of Reconstruction. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 366 Twentieth-Century Black Politics and Protest** (3 crs.) Cross-listed as (HIS), AAF 366. Explores the development and evolution of black politics and protest in the twentieth century including the Civil Rights and Black Power Movements and their legacies. (Lec. 3) Pre: HIS 150 or AAF 150 or HIS 142 and sophomore standing or permission of instructor.

**HIS 374 History of Modern China** (3 crs.) Political, social, economic, and cultural development of China since 1800 with emphasis on the development of Chinese nationalism and on the rise, theory, and practice of

Chinese communism. (Lec. 3) Pre: sophomore standing or permission of instructor. (FC) (L) [D]

**HIS 375 History of Modern Japan** (3 crs.) Background and significance of the Meiji restoration (1868) and modernization; the development of Japanese militarism, the fall of the Japanese Empire, and the emergence of the New Japan. (Lec. 3) Pre: sophomore standing or permission of instructor. (FC) (L) [D]

**HIS 376 Women in Muslim Societies** (3 crs.) Examines gender relations in the modern Middle East through novels, poetry, and oral histories, as well as through historical and anthropological studies. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 377 Revolution In Islam** (3 crs.) Examines the history of revolutionary ideology in Islamic thought and places modern revolutions—such as the Iranian revolution of 1978—within a broader context of both Sunni and Shi'i radical activism. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 379 The Jews of Islamic Lands: A History** (3 crs.) This course introduces the Jews of Islamic lands. It examines their social, religious, intellectual, and political experiences from the beginning of Islam to 19th-century European colonialism in the Middle East. (Lec. 3) (L) (FC)

**HIS 381 History of Colonial Latin America** (3 crs.) The interaction of American-Indian civilizations with European and African elements in the Spanish and Portuguese empires of the New World, concluding with the wars for independence. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 382 History of Modern Latin America** (3 crs.) Historical analysis of the political, cultural, and social-economic dimensions of tradition, reform, and revolution in Latin America since 1810. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 384 The Modern Caribbean** (3 crs.) Historical roots of the contemporary Caribbean world, emphasizing globalization's powerful influence and the region's efforts toward cultural, political and economic independence. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 385 Revolution and Unrest in Central America and the Caribbean** (3 crs.) Historical origins of social unrest in Central America and the Spanish-speaking Caribbean. Cuban and Nicaraguan revolutions, civil conflict in Guatemala and El Salvador, U.S. policy. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 387 Latin American History at the Movies** (3 crs.) Cross-listed as (HIS), GWS 387. Latin Americans see themselves very differently than how they are perceived by North Americans. Their self-portrayal, in literature and film, is the key to understand-

ing their history and conflicts. (Lec. 3) Pre: HIS 180 is suggested but not required.

**HIS 388 History of Sub-Saharan Africa** (3 crs.) Cross-listed as (HIS), AAF 388. Ancient and medieval Africa, and the impact of Islam; the Glorious Age of the Sudanic empires; the slave trade and the age of exploration; the period of European partition and the rise of African nationalism. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 389 Exploration, Commerce and Conflict in the Atlantic World, 1415-1815** (3 crs.) The Atlantic world from the 15th to early 19th centuries. Voyages of exploration, cultural contact, Atlantic economy, piracy, smuggling, fishing, naval warfare, imperialism, migration, and life at sea in the Age of Sail. (Lec. 3) Pre: sophomore standing or permission of instructor.

**HIS 390 The Atlantic World in the Age of Iron, Steam, and Steel** (3 crs.) The Atlantic world in the 19th and early 20th centuries. Maritime technology, seaborne commerce, naval warfare, imperialism, migration, whaling, the slave trade, piracy, and life at sea. (Lec. 3) Pre: Sophomore standing or permission of instructor.

**HIS 391 Directed Study or Research** (3 crs.) Special work arranged to meet the needs of individual students who desire advanced work. (Independent Study) Pre: permission of chairperson. May be repeated for a total of 6 credits with permission of instructor and chairperson.

**HIS 393 Topics In History** (1-3 crs.) Subject, course content, and years offered will vary according to expertise and availability of instructors. (Lec. 1-3) May be repeated for credit with permission of chairperson. Pre: sophomore standing or permission of instructor.

**HIS 396 Maritime History and Underwater Archaeology Field School** (3 crs.) Usually, but not exclusively taught in Bermuda. Students may select an archaeological diving option, an archaeological non-diving option, or an archival research option. Pre: junior standing and those students who select the archaeological diving option will be required to go through the URI research diving certification process prior to departure.

**HIS 397 The Historical Landscape Of Britain** (3 crs.) Taught in England. Examines the impact of political, military, religious, economic, and social change in the past six or seven centuries on the landscape of village and field and town and country. (Lec. 2, Lab. 3) Usually taught in conjunction with ENG 397. Pre: Sophomore standing or permission of instructor.

**HIS 401 Advanced Topics in European History** (3 crs.) Subject and course content will vary from semester to semester. Student work will emphasize historiographical analysis and the use of specialized research materials. (Lec. 3) Pre: junior, senior, or graduate standing in history or permission

of instructor. May be repeated for credit with permission of chairperson.

**HIS 441 Advanced Topics in American History** (3 crs.) Subject and course content will vary from semester to semester. Student work will emphasize historiographical analysis and the use of specialized research materials. (Lec. 3) Pre: junior, senior, or graduate standing in history or permission of instructor. May be repeated for credit with permission of chairperson.

**HIS 481 Advanced Topics in Asian or Latin American History** (3 crs.) Subject and course content will vary from semester to semester. Student work will emphasize historiographical analysis and the use of specialized research materials. (Lec. 3) Pre: junior, senior, or graduate standing in history or permission of instructor. May be repeated for credit with permission of chairperson.

**HIS 490 Underwater Historical Archaeology** (3 crs.) Cross-listed as (HIS), APG 490. Methodological and theoretical foundations of underwater historical archaeology. Examines the contribution of shipwrecks and other inundated sites to our understanding of the global nature of modern life. (Seminar) Pre: at least 3 credits of course work at the 300-level in history, anthropology or art history, or permission of instructor.

**HIS 495 Seminar In History** (3 crs.) Development of skills in historical research and writing and in the critical analysis of historical works. Topics vary. (Seminar) Pre: completion of HIS 401 or 441 or 481, with the same instructor, or permission of the department. This course is required of undergraduate history majors. May be repeated for credit with different topic with permission of instructor.

**HIS 502 Special Readings in European History** (3 crs.) Intensive tutorial work, research, and readings in European history. (Independent Study) Pre: graduate standing, permission of instructor, and concurrent audit of parallel 300-level course. May be repeated.

**HIS 503 Special Readings in European History** (3 crs.) Intensive tutorial work, research, and readings in European history. (Independent Study) Pre: graduate standing, permission of instructor, and concurrent audit of parallel 300-level course. May be repeated.

**HIS 506 Seminar In European History** (3 crs.) Selected topics in European history, with intensive reading of important secondary and/or primary sources; critical written analysis of historical method, research, and modes of interpretation. May be repeated for credit with different topics. (Seminar) Pre: graduate standing or permission of instructor.

**HIS 507 Seminar In United States History** (3 crs.) Selected topics in United States history, with intensive reading of important secondary and/or primary sources; critical written analysis of historical method, research, and modes of interpretation. May

be repeated for credit with different topics. (Seminar) Pre: graduate standing or permission of instructor.

**HIS 508 Seminar In Asian Or Latin American History** (3 crs.) Selected topics in Asian or Latin American history, with intensive reading of important secondary and/or primary sources; critical written analysis of historical method, research, and modes of interpretation. May be repeated for credit with different topics. (Seminar) Pre: graduate standing or permission of instructor.

**HIS 536 Special Readings in American History** (3 crs.) Intensive tutorial work, research, and readings in American history. (Independent Study) Pre: graduate standing, permission of instructor, and concurrent audit of parallel 300-level course. May be repeated.

**HIS 537 Special Readings in American History** (3 crs.) Intensive tutorial work, research, and readings in American history. (Independent Study) Pre: graduate standing, permission of instructor, and concurrent audit of parallel 300-level course. May be repeated.

**HIS 544 Colloquium In Worker History** (3 crs.) Cross-listed as (LRS), HIS 544. Selected topics in American worker history with an emphasis on the most recent literature in the field. (Seminar) Pre: graduate standing or permission of instructor.

**HIS 588 Special Readings in Asian or Latin American History** (3 crs.) Intensive tutorial work, research, and readings in Asian or Latin American history. (Independent Study) Pre: graduate standing and permission of instructor. Concurrent audit of parallel 300-level course required. May be repeated.

**HIS 591 Directed Study or Research** (3 crs.) Directed readings, research, or study designed to meet the particular needs of individuals or small groups of graduate students. (Independent Study) Pre: permission of chairperson.

**HIS 599 Master's Thesis Research** Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## HLT | Health

**HLT 200 Introduction to Interdisciplinary Health Studies** (4 crs.) Foundational concepts, theories, and research in interdisciplinary perspectives on health. Includes applications to real world health-related problems. Emphasis on developing key knowledge and skills bases for the major. (Lec. 4)

**HLT 450 Advanced Interdisciplinary Health Studies** (4 crs.) Capstone course required for all majors. Subject and content will vary from semester to semester. Student will research and offer solutions to a problem in health studies using interdisciplinary

approaches. (Seminar) Pre: junior or senior standing in health studies or permission of instructor.

## HPR | Honors Program

**HPR 107 Honors Seminar in Letters** (3-4 crs.) Exploration of themes and topics in the field of letters. Topics include: Introduction to Islam; U.S. and Francophone Hip Hop Culture; Narrative of Ability and Disability; Spain, the Jews and the Inquisition; Philosophy and Literature; Power of the World: Prisons in the arts and the Arts in Prisons. (Seminar) Must have 3.30 overall GPA. (L)

**HPR 108 Honors Seminar in Mathematics** (3-4 crs.) Exploration of topics and creative use of problem solving in mathematics. Topics include: Computer Forensics. (Seminar) Must have 3.30 overall GPA. (MQ)

**HPR 109 Honors Seminar in Natural Sciences** (3-4 crs.) Exploration of themes and topics in the natural sciences. Topics include: Life in the Universe; Biological Consequences of Global Change; Biology for the Citizen; the Physics of Sports; Oceans, Atmospheres, and Global Change. (Seminar) Must have 3.30 overall GPA. (N)

**HPR 110 Honors Seminar in Social Sciences** (3-4 crs.) Exploration of themes and topics in the social sciences. Topics include: Psychology of Violence and Nonviolence, The Irish in Ireland, America, and Rhode Island, and Animal Agriculture, Food Policy & Society. (Seminar) Pre: must have 3.30 overall GPA. (S) [D]

**HPR 112 Honors Seminar in Writing** (3-4 crs.) Exploration of the elements of writing. Topics include: Building Bridges: Writing about Common Reading; Writing and Empathy; Writing to Understand: Ethnographic Explorations. (Seminar) Pre: must have 3.30 overall GPA. (ECw)

**HPR 119 Honors Seminar in Interdisciplinary Studies** (1-4 crs.) Honors Seminar in Interdisciplinary Studies. Topics include: Loss in the Lives of Children and Adolescents. (Seminar) Must have 3.30 overall GPA.

**HPR 124 Honors Seminar In Fine Arts** (1-4 crs.) (Seminar) Must have 3.30 overall GPA. (A)

**HPR 125 Honors Seminar In Literature** (1-4 crs.) Exploration of themes, topics, and techniques in literature. Topics include: American Culture and Literary Representations of Medical Professionals and Their Patients, Jane Austen, Good Judgement and You, American Indian/Indigenous Representation in Literature, Origins of Fantasy. (Seminar) Pre: must have 3.30 overall GPA. (A)

**HPR 201 Honors Colloquium** (3-4 crs.) (Lec. 2-3, Rec. 1-2) May be repeated for a maximum of 8 credits each. 201A, 202A (A); 201F, 202F (FC); 201L, 202L (L); 201M, 202M (MQ); 201N, 202N (N); 201S, 202S (S). Pre: GPA of 3.30 or better and one completed honors

course, or permission of the director of the honors program.

**HPR 201A Honors Colloquium** (3-4 crs.) HPR 201 may be repeated for a maximum of 8 credits. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (A)

**HPR 201F Honors Colloquium** (3-4 crs.) HPR 201 may be repeated for a maximum of 8 credits. Topics include: Race-Making a Difference. (Lec. 2-3, Rec. 1-2). Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (FC)

**HPR 201L Honors Colloquium (Letters)** (3-4 crs.) HPR 201 may be repeated for a maximum of 8 credits. Topics include: Cyber Security and Privacy; Demystifying India; Race-Making a Difference. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (L)

**HPR 201M Honors Colloquium** (3-4 crs.) HPR 201 may be repeated for a maximum of 8 credits. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (MQ)

**HPR 201N Honors Colloquium (Natural Science)** (3-4 crs.) HPR 201 may be repeated for a maximum of 8 credits. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (N)

**HPR 201S Honors Colloquium (Social Science)** (3-4 crs.) HPR 201 may be repeated for a maximum of 8 credits. Topics include: Cyber security and Privacy, Demystifying India, Race-Making a Difference. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (S)

**HPR 202 Honors Colloquium** (3-4 crs.) (Lec. 2-3, Rec. 1-2) May be repeated for a maximum of 8 credits each. 201A, 202A (A); 201F, 202F (FC); 201L, 202L (L); 201M, 202M (MQ); 201N, 202N (N); 201S, 202S (S). Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program.

**HPR 202A Honors Colloquium** (3-4 crs.) HPR 202 may be repeated for a maximum of 8 credits. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (A)

**HPR 202F Honors Colloquium** (3-4 crs.) HPR 202 may be repeated for a maximum of 8 credits. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (FC)

**HPR 202L Honors Colloquium** (3-4 crs.) HPR 202 may be repeated for a maximum of 8 credits. Topics include: Class Without

Borders. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (L)

**HPR 202M Honors Colloquium** (3-4 crs.) HPR 202 may be repeated for a maximum of 8 credits. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (MQ)

**HPR 202N Honors Colloquium** (3-4 crs.) HPR 202 may be repeated for a maximum of 8 credits. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (N)

**HPR 202S Honors Colloquium** (3-4 crs.) HPR 202 may be repeated for a maximum of 8 credits. Topics include: Classroom Without Borders. (Lec. 2-3, Rec. 1-2) Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. (S)

**HPR 301 Honors Tutorial Topic: Administrative Internship PRA** (1-4 crs.) Experiential course that provides an opportunity for students to learn and practice administrative decision-making and to develop research skills in an administrative setting. Placements include Brown Medical School, the Institute for International Sport, RI Planned Parenthood, and the URI Honors program. (Practicum) Pre: GPA of 3.50 or better and permission of the Director of the Honors Program.

**HPR 302 Honors Tutorial Topic: Administrative Internship PRA** (1-4 crs.) A continuation of HPR 301. (Practicum) Pre: GPA of 3.50 or better and permission of the Director of the Honors Program.

**HPR 307 Honors Seminar in Letters** (1-4 crs.) Topics include: Tibetan Buddhism; Diversity. (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (L)

**HPR 308 Honors Seminar in Mathematics** (1-4 crs.) (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program.

**HPR 309 Honors Tutorial in Natural Sciences** (3-4 crs.) Topics include: The Global Challenge of Emerging Infectious Disease; Invertebrate Medicine; Designing Sustainable Solutions for the Developing World. (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (N)

**HPR 310 Honors Tutorial in Social Sciences** (3-4 crs.) Topics include: Mass Death in American Culture, 1978-Present. Gender, Race and Human Rights. The Politics of Whiteness in American Sports Media Culture. (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (S)

**HPR 319 Honors Tutorial in Interdisciplinary Studies** (3-4 crs.) Topics include: Wisdom

Traditions of World Religions, The Global Challenge of Emerging Infectious Diseases. (Seminar) Pre: overall GPA 3.30 or better.

**HPR 324 Honors Tutorial in Fine Arts** (3-4 crs.) Topics include: Images of Masculinity in Film, Rebel Images in Film. (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (A)

**HPR 325 Honors Tutorial in Literature** (3-4 crs.) Topics include: Dwarves and Elves: The World According to Tolkien. (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (A)

**HPR 326 Honors Tutorial in Writing** (1-4 crs.) (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (ECw)

**HPR 397 Honors Directed Study** (1-4 crs.) (Independent Study) Pre: 3.30 GPA or better or permission of the director of the honors program.

**HPR 401 Honors Project** (3 crs.) (Independent Study) Pre: permission of the director of the Honors Program, and overall GPA of 3.30 or better.

**HPR 402 Honors Project** (3 crs.) (Independent Study) Pre: permission of the director of the Honors Program, and overall GPA of 3.30 or better.

**HPR 411 Honors Seminar** (3 crs.) Topics include: Controversies in Environmental Science; and Film and Video Practicum. (Seminar) Pre: overall GPA 3.30 or better.

**HPR 412 Honors Seminar** (3-4 crs.) (Seminar) Pre: overall GPA 3.30 or better.

## HSA | Health Services Administration

**HSA 360 Health Services Administration** (3 crs.) Introduction to key concepts and principles in health services administration through both didactic and experiential means. (Seminar/Online) Pre: admission to the B.I.S. program as a health services administration major and a minimum of 60 credits.

**HSA 380 Introductory Practicum In Health Services Administration PRA** (3 crs.) Didactic and experiential introduction to the delivery of health services including acute care, long-term care, nursing homes, and special services problems such as hepatitis, tuberculosis, and HIV. (Practicum) Pre: admission to the B.I.S. program as a health services administration major and a minimum of 75 credits.

**HSA 480 Advanced Practicum In Health Services Administration PRA** (6 crs.) An intensive experience in a health care setting selected by the student, combined with class meetings. (Practicum) Pre: admission to the B.I.S. program as a health services administration major and a minimum of 90 credits. Not for graduate credit.

## HSS | Human Science and Services

**HSS 130 The Problem of Hunger in the U.S.** (3 crs.) Cross-listed as (HSS), PSY 130. Survey of the problem of hunger in the United States, the causes, effects on individuals and society, and the policies and programs intended to help hungry people. (Lec. 2, Seminar 1) (S) (D)

**HSS 270 Field Experience in Human Science and Services II PRA** (2-6 crs.) Didactic and experiential learning in student-selected settings. Emphasis on achievement of pre-established learning goals leading to selected competencies. Goals established by the students, instructor, and site supervisor. (Practicum) Pre: admission to the human science and services program and permission of instructor.

**HSS 370 Field Experience In Human Science And Services** Supervised field experience in human service agencies. Prior to placement, the student must develop a learning contract in consultation with the agency and his or her faculty advisor. (Practicum) Pre: junior standing in human science and services and permission of instructor. S/U only.

**HSS 470 Fourth-Year Field Experience In Human Science and Services** (2-6 crs.) Didactic and experiential learning in student-selected settings. Emphasis on achievement of pre-established learning goals leading to selected competencies. Goals established by the students, instructor, and site supervisor. (Practicum) Pre: admission to the human science and services program and permission of instructor. Not for graduate credit.

**HSS 480 Senior Seminar In Human Science And Services** (3 crs.) Interdisciplinary capstone seminar, with content developed to fit learning goals and programs of study of the students. Portfolio development and assessment as culminating experience. (Seminar) Pre: senior standing in human science and services and permission of instructor. Not for graduate credit.

**HSS 530 Multidisciplinary Health Seminars For The Elderly** (3 crs.) Field experience for students in various health disciplines. Development of assessment techniques, curricular materials, and team delivery of health seminars to the elderly at community sites. (Seminar) Service learning. Pre: graduate standing or permission of instructor.

## ISE | Industrial and Systems Engineering

**ISE 220 Introduction to Systems Engineering** (1 cr.) An exploration of the practice of systems engineering and the interrelationships between industrial, mechanical and other systems. Systems performance evalu-

ation, improvement and planning. Ethics in the practice of engineering. (Seminar)

**ISE 240 Manufacturing Processes and Systems** (3 crs.) Introduction to a wide variety of manufacturing processes. Basic facility layout and manufacturing system design, including material handling and lean principles. (Lec. 3) Pre: CHM 101.

**ISE 241 Laboratory for Manufacturing Processes and Systems** (1 cr.) Laboratory demonstrations and experiments in machining, casting, metrology, and rapid prototyping. Plant visits and lab tours. (Lab. 3) Pre: Credit or concurrent enrollment in ISE 240.

**ISE 325 Computer Tools for Engineers** (3 crs.) Visual basic programming, including VBA and other computer applications used for engineering problem solving, system design and evaluation. (Lec. 2, Lab. 3) Pre: MTH 141.

**ISE 391 Special Problems in Industrial Engineering** (1-3 crs.) Independent study and seminar work under close faculty supervision. Discussion of advanced topics in preparation for graduate work. (Independent Study) Pre: junior standing and permission of instructor.

**ISE 392 Special Problems in Industrial Engineering** (1-3 crs.) Independent study and seminar work under close faculty supervision. Discussion of advanced topics in preparation for graduate work. (Independent Study) Pre: junior standing and permission of instructor.

**ISE 401 Industrial and Systems Engineering Capstone Design I** (3 crs.) Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering problems. First of a two-course sequence. (Lec. 2, Lab. 3) Pre: ISE 240, 412, and 432 or 433, or permission of instructor. Not for graduate credit.

**ISE 402 Industrial and Systems Engineering Capstone Design II** (3 crs.) Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering problems. Second of a two-course sequence. (Lec. 2, Lab. 3). Pre: ISE 401 or permission of instructor. Not for graduate credit.

**ISE 404 Engineering Economy and Project Planning** (3 crs.) Effects of economics on engineering decisions in design, selection, and product or project proposals, project planning, resource allocation and scheduling using computer based tools. (Lec. 3) Not for graduate credit in industrial and systems engineering.

**ISE 411 Probability and Statistics for Engineers** (3 crs.) Cross-listed as (ISE), MCE 411. Introduction to probability and statistics in engineering applications including data analysis, probability theory, probability distributions, sampling distributions, statistical inference, hypotheses testing, confidence

intervals, analysis of variance, and receiver operating characteristics. (Lec. 3) Pre: MTH 142 or permission of instructor.

**ISE 412 Statistical Methods and Quality Systems** (3 crs.) Study of statistical methods and quality systems in engineering applications including statistical methods, quality improvement tools, control charts, process capability, linear regression, design of experiments, and acceptance sampling. (Lec. 3) Pre: ISE 411 or STA 409 or MTH 451 or permission of instructor.

**ISE 432 Operations Research: Deterministic Systems** (3 crs.) Introduction to major areas of operations research and their application to systems analysis. Linear programming, transportation and transshipment models, elementary network analysis, integer programming, and related topics. (Lec. 3) Pre: MTH 362 or 215 or permission of instructor.

**ISE 433 Operations Research: Stochastic Systems** (3 crs.) Markov chains, dynamic programming, queuing theory, simulation, forecasting, game theory, simple stochastic models, and their relation to selected problems. (Lec. 3) Pre: ISE 411 and MTH 362 or MTH 244 or permission of instructor.

**ISE 446 Metal Deformation Processes** (3 crs.) Cross-listed as (ISE), MCE 446. Study of the characteristics of metal flow under different loading conditions. Theories, capabilities, and limitations of a wide range of deformation processes applied to industrial metalworking. (Lec. 3) Pre: ISE 240, CVE 220, and CHE 333.

**ISE 449 Product Design for Manufacture** (3 crs.) Cross-listed as (ISE), MCE 449. Techniques for analyzing product structures for ease of assembly and manufacture. Manual, robot, and high-speed mechanized assembly systems considered for mechanical and electronic products. Covers choice of material and processes in early design. (Lec. 3) Pre: ISE 240 or permission of instructor. Not for graduate credit.

**ISE 451 Production System Design** (3 crs.) Stochastic and deterministic models of production and inventory systems. Push and pull production control systems. Manufacturing system design, scheduling, material handling and facility layout. (Lec. 3) Pre: ISE 432 or 433 or permission of instructor.

**ISE 460 Product Design for the Environment** (3 crs.) Principles and practices of designing more environmentally beneficial products. Environmental effects. Life cycle analysis, recycling and remanufacturing. Design for disassembly and environment. Group projects on product and process design using LCA and DFE analysis tools. (Lec. 3) Pre: ISE 240, CHE 333 or 437.

**ISE 491 Special Problems** (1-6 crs.) Advanced work under the supervision of a member of the faculty and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**ISE 492 Special Problems** (1-6 crs.) Advanced work under the supervision of a member of the faculty and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**ISE 500 Project Planning and Management in Systems Engineering** (3 crs.) Presents the tools and processes to help plan and manage real-world systems engineering projects including network planning, scheduling, analysis, synthesis; critical path method/PERT; computer-aided planning; and other contemporary tools. (Lec. 3) Pre: ISE 432 or permission of instructor.

**ISE 513 Quality Systems** (3 crs.) Cross-listed as (ISE), STA 513. Topics in statistical quality control systems. Single, multiple, and sequential sampling. Design and analysis of a wide variety of statistical control systems used in conjunction with discrete and continuous data, for several kinds of data emission. (Lec. 3) Pre: ISE 411 or equivalent.

**ISE 525 Systems Simulation** (3 crs.) Cross-listed as (ISE), CSC 525, ELE 515. Simulation of random processes and systems. Continuous and discrete simulation models. Data structures and algorithms for simulation. Generation of random variates, design of simulation experiments for optimization and validation of models and results. Selected engineering applications. (Lec. 3) Pre: CSC 212 or ISE 325, ISE 433 or ELE 509, or permission of instructor.

**ISE 533 Advanced Statistical Methods for Research and Industry** (3 crs.) Describing and analyzing data, design of experiments, analysis of variance, regression analysis and applications in industry and applied science research. (Lec. 3) Pre: ISE 411 or permission of instructor.

**ISE 540 Production Control and Inventory Systems** (3 crs.) Theory and practice of industrial production control and inventory systems. A broad spectrum of mathematical models for static, dynamic, perpetual, and periodic inventory systems as they affect and relate to production. (Lec. 3) Pre: ISE 432 or permission of instructor.

**ISE 541 Advanced Materials Processing** (3 crs.) Continuation of 340. Engineering analyses in the processing of materials. Dynamic coupling, tool-work-piece interaction, energy and thermal analysis; mechanics of material removal and displacements; advanced topics in mechanical electrical systems for processing of materials. (Lec. 3) Pre: ISE 240 or permission of instructor.

**ISE 542 Introduction to Computer-Aided Manufacturing** (3 crs.) Use of computers in manufacturing. Solid modeling principles and applications. Numerical and adaptive control. CNC programming. Introduction to rapid manufacturing. (Lec. 3) Pre: ISE 240 or permission of instructor.

**ISE 543 Fundamentals of Machining** (3 crs.) Fundamental treatment of the mechanics and economics of metal machining and grinding. Includes an introduction to numerical control and computer-aided programming of CNC machine tools. (Lec. 3) Pre: ISE 240 or permission of instructor. Not for graduate credit for students with credit in 443.

**ISE 544 Automatic Assembly Systems** (3 crs.) Types and economics of automatic assembly systems. Analysis of automatic feeding and orienting techniques for small parts. Application of robots in assembly. Economics of assembly systems for printed circuit boards. (Lec. 3) Pre: ISE 240 or permission of instructor. Not for graduate credit for students with credit in 444.

**ISE 545 Manufacturing Systems: Analysis, Design, Simulation** (3 crs.) Problems in system analysis and design as related to modern manufacturing. Quantitative models and simulation methods for manufacturing planning, control scheduling, flexible manufacturing and highly automated manufacturing systems. (Lec. 3) Pre: ISE 432 or permission of instructor.

**ISE 546 Advanced Metal Deformation Processes** (3 crs.) Theory of metal flow under different loading conditions. Prediction of metal forming process capabilities. Advanced topics include effects of anisotropy and mechanics of powder forming. (Lec. 3) Pre: ISE 240 or permission of instructor. Not for graduate credit for students with credit in 446.

**ISE 549 Advanced Product Design for Manufacture** (3 crs.) Cross-listed as (ISE), MCE 549. Techniques for analyzing product structures for ease of assembly and manufacture. Considers mechanical and electronic products and choice of materials and processes. A design project and term paper are required. (Lec. 3) Pre: ISE 240 or permission of instructor. Not for graduate credit for students with credit in ISE 449.

**ISE 550 Design for Producibility** (3 crs.) Project work on product development, collaboration with industry, and submission of design project report. Concentration on effect of design decisions on manufacturing efficiency and cost. (Independent Study) Pre: ISE 449 or 549 or permission of instructor.

**ISE 552 Lean Systems** (3 crs.) Advanced study of enterprise system design including application of lean principles to service industries. Specific topics include lean manufacturing, waste elimination, reduction of cycle and set-up times, reconfigurable systems, quality and performance analysis. (Lec. 3) Pre: ISE 451 or 540 or permission of instructor.

**ISE 555 Deterministic Systems Optimization** (3 crs.) Linear, nonlinear and integer formulations and solutions. Sensitivity analysis and pricing problems; degeneracy and duality; decomposition methods for large-scale systems; use of mathematical programming languages and applications.

Pre: ISE 432 or permission of instructor. In alternate years.

**ISE 591 Special Problems** (1-6 crs.) Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**ISE 592 Special Problems** (1-6 crs.) Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**ISE 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**ISE 634 Design and Analysis of Experiments** (3 crs.) Advanced topics in the design and analysis of experiments: factorial designs, blocking and confounding in factorial designs, fractional factorial designs, response surface methods and designs, nested and split-plot designs, other design and analysis topics. (Lec. 3) Pre: ISE 533 or permission of instructor.

**ISE 660 Nonlinear Systems Optimization** (3 crs.) Methods of optimization: indirect, direct elimination, climbing. Geometric programming. Problems and other topics in applied optimization. (Lec. 3) Pre: ISE 432 or permission of instructor.

**ISE 691 Advanced Special Problems In Industrial Engineering** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**ISE 692 Advanced Special Problems in Industrial Engineering** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**ISE 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U only.

## ITL | Italian

**ITL 100 Accelerated Elementary Italian** (6 crs.) Equivalent to ITL 101 and 102. Develops basic communication skills in Italian. Explores the products, practices, and perspectives of Italian culture. (Lec. 6) Pre: Freshman or sophomore status only, or permission of instructor. (FC) [D]

**ITL 101 Beginning Italian I** (3 crs.) Elements of the language, pronunciation, grammar, inductive reading; exercises in reading,

writing, and conversation. (Lec. 3) Pre: no prior Italian is required. Will not count toward the language requirement if the student has studied Italian for more than one year within the last six years. (FC) [D]

**ITL 102 Beginning Italian II** (3 crs.) Continuation of ITL 101. Students enrolling in this course should have taken ITL 101 or equivalent. (Lec. 3) (FC) [D]

**ITL 103 Intermediate Italian I** (3 crs.) Development of facility in reading texts of moderate difficulty, supplemented by further work in grammar, conversation, and composition. Students enrolling in this course should have taken ITL 102 or equivalent. (Lec. 3) (FC) [D]

**ITL 104 Intermediate Italian II** (3 crs.) Continuation of ITL 103. Students enrolling in this course should have taken ITL 103 or equivalent. (Lec. 3) (FC) [D]

**ITL 205 Conversation and Composition** (3 crs.) Intensive course in conversation and composition. Promotes facility in speaking and understanding idiomatic Italian. Students enrolling in this course should have taken ITL 104 or equivalent. (Lec. 3) (FC) [D]

**ITL 206 Conversation and Composition** (3 crs.) Intensive course in conversation and composition. Promotes facility in speaking and understanding idiomatic Italian. Students enrolling in this course should have taken ITL 104 or equivalent. (Lec. 3) (FC) [D]

**ITL 301 Civilization of Italy** (3 crs.) The most important aspects of Italian civilization. From the Middle Ages to the end of the Renaissance. (Lec. 3) Pre: ITL 205 or 206 or permission of chairperson.

**ITL 302 Civilization of Italy** (3 crs.) The most important aspects of Italian civilization. From the 17th century to the present. (Lec. 3) Pre: ITL 205 or 206 or permission of chairperson.

**ITL 305 Advanced Conversation and Composition** (3 crs.) Intensive practice in spoken and written Italian. (Lec. 3) Pre: ITL 205 or 206 or permission of chairperson.

**ITL 315 Italian Cinema** (3 crs.) Representative Italian films and their directors through viewing and discussions of films, lectures, and readings. Course taught in English. (Lec. 3) Students counting the course for a major or minor in Italian are required to do written work in Italian and must have credit for ITL 205 or 206 or permission of instructor. May be repeated with different topics for a maximum of 9 credits. (Lec. 3)

**ITL 316 Italian Language and Culture Study Abroad I PRA** (3 crs.) Supervised cross-cultural experience in an Italian-speaking country for advanced language students. (Practicum 3). Pre: ITL 205 or ITL 206 or permission of instructor.

**ITL 317 Italian Language and Culture Study Abroad II PRA** (3 crs.) Supervised cross-cultural experience in an Italian-speaking country for advanced language students.



(Practicum 3). Pre: ITL 205 or ITL 206 or permission of instructor.

**ITL 325 Introduction to Italian Literature** (3 crs.) Appreciation of literature. Representative texts of Italian narrative, drama, and lyric poetry. Elements of the methods of criticism. (Lec. 3) Pre: ITL 205 or 206 or permission of chairperson.

**ITL 326 Introduction to Italian Literature** (3 crs.) Appreciation of literature. Representative texts of Italian narrative, drama, and lyric poetry. Elements of the methods of criticism. (Lec. 3) Pre: ITL 205 or 206 or permission of chairperson.

**ITL 390 Italian Literature in Translation** (3 crs.) Study of representative Italian authors in English translation. Students may use up to three credits from ITL 390 or 395 towards the Italian major. (Lec. 3, Sem.)

**ITL 395 Dante's Divine Comedy** (3 crs.) Reading in English translation of Dante's chief work. (Lec. 3) Not for major credit in Italian.

**ITL 450 Women Writers: Renaissance to the Enlightenment** (3 crs.) Examines Italian women who were active participants in the literary and artistic developments of Italian and European culture from the Renaissance to the Enlightenment: poets, playwrights, journalists, courtesans, matrons, and nuns. Study of their correspondence, dialogues, poetry, plays, literary periodicals, and fashion magazines in the context of the contemporary debates on the condition of women in society. (Lec. 3) Pre: one 300-level ITL course or permission of instructor. Not for graduate credit.

**ITL 455 Selected Italian Authors** (3 crs.) Works of one or more major authors of Italian literature. Specific author(s) are designated the semester before the course is given. (Lec. 3) Pre: one 300-level course or permission of instructor. May be repeated for a maximum of 12 credits with different topics.

**ITL 465 Topics in Italian Literature** (3 crs.) Special topics or themes in Italian literature not treated or emphasized in other courses. (Lec. 3) Pre: one 300-level course or permission of instructor. May be repeated with change in topic for a maximum of 9 credits.

**ITL 480 Business Italian** (3 crs.) Study of concepts and terminology relating to the Italian business world. (Lec. 3) Pre: junior standing, credit or concurrent enrollment in at least one 300-level Italian course, or permission of instructor.

**ITL 481 The Works of Dante Alighieri** (3 crs.) Dante's works with special attention given to analysis and interpretation of the Divine Comedy from the social, religious, philosophical, and political viewpoints of the Middle Ages. (Lec. 3) Pre: one 300-level course or permission of instructor.

**ITL 497 Directed Study** (3 crs.) Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre:

acceptance of project by a faculty member and approval of chairperson.

**ITL 498 Directed Study** (3 crs.) Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of project by a faculty member and approval of chairperson.

## ITR | Internships and Experiential Education

**ITR 300 Career Planning: Concepts and Skills** (1-3 crs.) Identify personal strengths, interests, and professional values related to career exploration. Develop professional job and internship search skills. (Seminar/Online) Pre: sophomore standing; NOT for BUS or Wanting BUS students.

**ITR 301 Field Experience I PRA** (3-12 crs.) Field experience gained at placement site through participation in the ITR program. The experience will be defined by a job description and learning contract arranged by the ITR director between the student intern, the intern's faculty advisor, and the relevant agency supervisor. (Practicum) Pre: junior or senior standing, a minimum quality point average of 2.50, participation in the ITR program, and permission of faculty advisor. May be repeated for a maximum of 24 credits. S/U credit.

**ITR 302 Field Experience II PRA** (3-12 crs.) Field experience gained at placement site through participation in the ITR program. The experience will be defined by a job description and learning contract arranged by the ITR director between the student intern, the intern's faculty advisor, and the relevant agency supervisor. (Practicum) Pre: junior or senior standing, a minimum quality point average of 2.50, participation in the ITR program, and permission of faculty advisor. May be repeated for a maximum of 24 credits. S/U credit.

**ITR 303 Colloquium I** (3 crs.) Seminar format. Discussions of issues and problems raised by internship experiences in public service agencies. (Seminar) Pre: concurrent enrollment in 301 for 303. Required for and open only to students enrolled in the ITR program.

**ITR 304 Colloquium II** (3 crs.) Seminar format. Discussions of issues and problems raised by internship experiences in public service agencies. (Seminar/Online) Pre: concurrent enrollment in 302 for 304. Required for and open only to students enrolled in the ITR program.

## JOR | Journalism

**JOR 110 Introduction to Mass Media** (3 crs.) Surveys newspapers, magazines, radio, movies, television, advertising, and emerging technologies. Examines economic and news functions of each. Considers First Amendment, legal and ethical problems, restrictions,

and social consequences of media. (Lec. 3) Recommended for nonmajors. Not for major credit in journalism. (S) (L) [D]

**JOR 110H Honors Section of JOR 110: Introduction to Mass Media** (3 crs.) Honors Section of JOR 110: Introduction to Mass Media. (Lec. 3) Pre: overall GPA of 3.30 or better. (L) (S) [D]

**JOR 115 Foundations of American Journalism** (3 crs.) Introduction to basic theories and principles of American journalism, and some of the major issues journalists confront. Examines news media audiences, effects, freedom, and responsibility. (Lec. 3) For journalism majors only.

**JOR 210 History of American Journalism** (3 crs.) Development of American newspapers, magazines, and broadcast industry with analysis of the ideas that have changed American journalism. Exploration of the journalist's experience at periods in American history; the effects of economic and social changes on the press. (Lec. 3) Pre: JOR 110 or 115 or permission of instructor. In alternate years.

**JOR 211 History of Broadcasting** (3 crs.) Survey of broadcasting. Examines its pioneers and the impact of significant historical events as covered by radio and television. Considers the origins of modern news shows, talk-show formats, magazine broadcasts, and quiz shows. (Lec. 3) Pre: JOR 110 or 115. In alternate years.

**JOR 215 Free Speech And American Society** (3 crs.) Legal and social parameters of freedom of speech in the United States. The legal and social history of freedom of speech will be examined and applied to discussions of recent free-speech controversies. (Lec. 3) Pre: JOR 110 or 115.

**JOR 220 Media Writing** (3 crs.) An introduction to writing for newspapers, magazines, broadcasting, and public relations. Includes consideration of objectivity, information gathering, language use, clarity and style, legal and ethical concerns. (Lec. 2, Lab. 2) Pre: WRT course with a grade of B or better and major in journalism or public relations, or permission of instructor.

**JOR 221 Multimedia Reporting** (3 crs.) Introduces students to reporting and writing stories for listeners and viewers as well as readers, including gathering and using sound, video and still pictures. Frequent out-of-class assignments. (Lec. 2, Lab. 2) Pre: journalism majors only; JOR 220 with grade of C or better. Not open to students with credit in 230.

**JOR 310 Media Law for Journalists** (3 crs.) Role of government and the law in the communication of news, including basic laws affecting freedom of the press, journalists' privileges and responsibilities, privacy, broadcasting, and advertising. Case studies. (Lec. 3) Pre: junior standing and 110 or 115 and one 300-level journalism skills course or permission of instructor.

**JOR 311 Journalism Criticism** (3 crs.) Examines news media performance in the United States by studying the works of media critics, both historical and contemporary. Practice in media monitoring and writing media criticism. (Lec. 3) Pre: JOR 110 or 115 or permission of instructor.

**JOR 313 Alternative News Media in the United States** (3 crs.) Critical analysis of nontraditional media in the United States, including black, religious, feminist, gay and lesbian press, as well as broadcast stations operated by and for minority groups. (Lec. 3) Pre: JOR 110 or 115. In alternate years.

**JOR 320 Public Affairs Reporting And Writing** (3 crs.) Practice in gathering and writing news of public affairs, including local and state government, courts, law enforcement. Introduces public records, alternatives to straight news story, interviewing techniques, rewriting. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: JOR 220 with a grade of C or better and major in journalism or public relations, or permission of instructor.

**JOR 321 Magazine Article and Feature Writing** (3 crs.) Planning, researching, and writing articles and feature stories for magazines and newspapers. Discussion of markets, freelance and job opportunities. Articles written and submitted to publications. (Seminar) Pre: junior standing and JOR 220 with a grade of C or better, and major in journalism or public relations, or permission of instructor.

**JOR 330 Television News** (3 crs.) Reporting, writing, anchoring and producing news for television. Group work leads to production of a half-hour studio newscast. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: JOR 221 or 230 with a grade of C or better.

**JOR 331 Electronic News Gathering** (3 crs.) Skill development in the visual technology of television news. Techniques of single-camera field production are stressed. Introduction to fundamentals of video tape editing; practice in ENG photography and editing. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: JOR 330 with a grade of C or better.

**JOR 340 Public Relations** (3 crs.) Cross-listed as (PRS), JOR 340. Principles and procedures in public relations: emphasis on role of the public relations practitioner as a specialist in communication; analysis of publications produced as a part of public relations. (Lec. 3) Pre: junior standing and JOR 220 with a grade of C or better.

**JOR 341 Editing For Publication** (3 crs.) An introduction to editing for the print media, including newspapers, magazines, and public relations. Focuses on taking work written by others and preparing it for publication. Includes consideration of legal and ethical issues. (Lec. 2, Lab. 2) Pre: junior standing and JOR 220 with a grade of C or better, and major in journalism or public relations, or permission of instructor.

**JOR 345 Journalism Internship PRA** (3 or 6 crs.) Supervised experience in: (a) reporting and writing; (b) editing; (c) radio news; (d) television news; (e) public relations. Requires a minimum of 120 hours (3 credits) or 240 hours (6 credits). Weekly one-hour class meeting. Maximum of 6 credits allowed toward graduation. (Practicum) Pre: journalism majors and minors and public relations minors only. Prerequisite courses depend on internship. Permission of instructor and application required.

**JOR 410 Ethics in Journalism** (3 crs.) Critical analysis of current issues affecting journalists and society in general, based on readings, videotapes, case studies, and discussion. Emphasis on ethics and decision making. (Lec. 3) Pre: JOR 110 or 115 and senior standing or permission of instructor. Not for graduate credit.

**JOR 411 Senior Portfolio** (1 cr.) Structured opportunity to select, review and reflect on examples of work for a portfolio. Formal presentations of portfolio to faculty required. (Portfolio) Pre: journalism major and senior standing and concurrent enrollment in JOR 410. Not for graduate credit.

**JOR 415 Perspectives On Reporting** (3 crs.) Cross-listed as (JOR), WRT 415. Critical assessment of reporting through the reading and analysis of book-length works of journalism and magazine and newspaper series of articles. (Seminar) Pre: JOR 110 or 115 and junior standing. Not for graduate credit.

**JOR 420 Advanced Reporting And Writing** (3 crs.) Planning, developing, and writing complex news stories for publication. Emphasizes story-idea generation, information gathering from multiple sources, using public records and documents, and advanced interviewing techniques. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: junior standing and 320 with a grade of C or better. Not for graduate credit.

**JOR 430 Advanced Television News** (3 crs.) Practical experience in longer, more specialized news formats. Students report, write, videotape in-depth television news pieces. (Lec. 3) Pre: JOR 330 with a grade of C or better.

**JOR 440 Independent Study** (1-3 crs.) Individual reading programs, research, or project in journalism or mass media. (Independent Study) Pre: junior standing and submission to chairperson of proposal signed by supervising faculty member. Not for graduate credit.

**JOR 441 Public Relations Practices PRA** (3 crs.) Cross-listed as (PRS), JOR 441. Practical application of traditional PR methods in solving problems in a variety of markets. Explores fundamental agency operations, client-agency relationships. Combines practical experience with individual projects, programs, and campaigns. (Practicum) Pre: PRS 340. Not for graduate credit.

**JOR 442 Publication Design for Journalism and PR** (3 crs.) An introduction to designing and producing for the print media, including newspapers, magazines, and newsletters. Extensive use of computers and desktop-publishing technology. Includes consideration of legal and ethical issues. (Lec. 2, Lab. 2) Pre: Junior standing. JOR 341 with a grade of C or better recommended.

**JOR 443 Strategic Media Communication** (3 crs.) Cross-listed as (PRS), WRT, COM 442, JOR 443. Introduces strategic media relation tactics when responding to the media, specifically crisis communication situations. Students gain practical experience in various writing and speaking opportunities to effectively work with the media. (Lec. 3) Pre: PRS 340. Open only to majors in Communication Studies, Public Relations, Journalism, and Writing. Not for graduate credit.

**JOR 445 Special Topics in Journalism** (3 crs.) Subject, course content, and years offered will vary according to expertise and availability of instructors. (Lecture/Lab. or Seminar) Pre: permission of instructor. May be repeated for credit with different topic. Not for graduate credit.

## JPN | Japanese

**JPN 101 Beginning Japanese I** (3 crs.) Fundamentals of grammar and pronunciation, exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior Japanese is required. Will not count toward the language requirement if the student has studied Japanese for more than one year within the last six years. (FC) [D]

**JPN 102 Beginning Japanese II** (3 crs.) Continuation of JPN 101. Students enrolling in this course should have taken JPN 101 or equivalent. (Lec. 3) (FC) [D]

**JPN 103 Intermediate Japanese I** (3 crs.) Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. Students enrolling in this course should have taken JPN 102 or equivalent. (Lec. 3) (FC) [D]

**JPN 104 Intermediate Japanese II** (3 crs.) Continuation of JPN 103. Students enrolling in this course should have taken JPN 103 or equivalent. (Lec. 3) (FC) [D]

## KIN | Kinesiology

**KIN 105L Beginner Elective Activity I: Aerobics** (1 cr.) Beginning level of instruction for students with little or no previous experience in the activities offered. Select appropriate letter for activity desired; e.g., 105A Beginning Archery. (Studio 3)

**KIN 116 Teaching Individual Sports Activities** (1 cr.) Emphasis on learning rules of play, sport specific skills, and teaching and instructional methods for sport activities and games that are individually based. (Lab. 3) Pre: Kinesiology majors only.

**KIN 117 Teaching Team Sports Activities** (1 cr.) Emphasis on learning rules of play, sport specific skills, and teaching and instructional methods for sport activities and games that are team based. (Lab. 3) Pre: Kinesiology majors only.

**KIN 118 Teaching Lifetime Physical Activities** (1 cr.) Emphasis on learning rules of play, sport specific skills, and teaching and instructional methods for physical activities and games that are lifetime fitness based. (Lab. 3) Pre: Kinesiology majors only.

**KIN 120 Weight Training And Physical Conditioning** (1 cr.) Principles of weight training and conditioning with emphasis on constructing individual and group exercise programs. (Studio 3) Open to kinesiology majors only.

**KIN 121 Principles of Youth Fitness** (1 cr.) Principles of exercise as it relates to children and adolescents. Emphasis on teaching principles of aerobic exercise, flexibility, and resistance training. (Lec./Lab. 2) Open to kinesiology majors only.

**KIN 122 Human Anatomy and Physiology** (4 crs.) Structure and function of organ systems of the human body with emphasis on applications to human health. (Lec. 3, Rec. 1) Not for major credit for BS in Biological Sciences.

**KIN 123 Foundations of Health** (3 crs.) Development of attitudes and practices that lead to more healthful living. Personal and community health problems studied. (Lec. 3/Online) (S) [D]

**KIN 123H Honors Section of KIN 123: Foundations of Health** (3 crs.) Honors Section of KIN 123: Foundations of Health. (Lec. 3/Online) Pre: 3.3 overall gpa. (S) [D]

**KIN 125 Group Exercise Instruction and Leadership** (2 crs.) This course will familiarize students with basic group exercise standards and guidelines, develop basic teaching skills, and develop skills in designing and teaching group exercise classes to apparently healthy adults. (Lec.1, Lab. 2)

**KIN 210 Beginner Sailing** (2 crs.) Students will learn the fundamentals of sailing a small sailboat, including the theoretical aspects of sailing. Classes include both lectures and on the water instruction. (Lec. 1.5/Lab 1.5)

**KIN 215B Individual Sports-Badminton** (0.5 cr.) Emphasis on analysis of skills, strategies, class organization, and teaching techniques. Select appropriate letter for activity desired. (Studio 3) Open to Kinesiology majors only.

**KIN 215C Individual Sport: Bowling Emphasis on analysis of skills, strategies, class organization, and teaching techniques. Select appropriate letter for activity desired.** (Studio 3) Open to Kinesiology majors only.

**KIN 243 Prevention And Care Of Athletic Injuries** (3 crs.) Conditioning, use of physiotherapy equipment, massaging, taping

and bandaging technique. Latest American Red Cross procedures with the opportunity to receive standard certification. (Lec. 2, Lab. 2) Open to kinesiology majors only or with permission of instructor.

**KIN 250 Intermediate Sailing** (2 crs.) Students will learn intermediate sailing techniques including sloop rigged dinghies and keel boats, spinnaker use, trapezing and introductory racing. (Lec. 1.5/Lab. 1.5) Pre: KIN 210 or permission of instructor.

**KIN 270 Introduction to Teaching Physical Education and Health** (3 crs.) Foundations of teaching physical education and health. Application of current theories of effective practices of teaching physical education and health in the elementary and secondary schools. (Lec. 3)

**KIN 272 Basic First Aid and CPR Instructor** (1 cr.) Instruction and practice in performance and teaching the basic level of injury prevention and first aid and CPR procedures. Students successfully meeting requirements will receive First Aid and CPR Instructor certifications. (Lec./Lab. 2) Open to Kinesiology majors only.

**KIN 275 Introduction to Exercise Science** (3 crs.) Introduction to the field of exercise science. Principles of exercise, components of health-related physical fitness, weight management, and basic exercise prescription. (Lec. 3/Online)

**KIN 278 Physical Activity, Cultural Diversity, and Society** (3 crs.) Introduction to the multiple ways in which issues of cultural diversity shape physical activity in American Society. (Lec.3) Pre: Open to kinesiology majors only or with permission of instructor.

**KIN 300 Physiology of Exercise** (3 crs.) Cross-listed as (KIN), BIO 300. Applied human physiology, with applications to physical activity, exercise, and sport. Particular attention to acute and chronic adjustments of the circulatory, respiratory, metabolic, and muscular systems with exercise. (Lec. 3) Pre: BIO 201 or 242.

**KIN 301 Physiology of Exercise Laboratory** (1 cr.) Cross-listed as (KIN), BIO 301. Student participation in laboratory sessions designed to understand the physiology of exercise relating to body composition, EKG, pulmonary, and metabolic functions. (Lab. 3) Pre: BIO 201 or 242.

**KIN 304 Methods of Teaching Physical Education In Elementary Schools** (3 crs.) Instruction in contemporary techniques used in a program of physical education for elementary school children. Types of activities found in basic programs and in planned progressions for various age groups. (Lec.2, Lab.2) Pre: concurrent enrollment in 305, admission to the teacher education program by the start of semester.

**KIN 305 Supervised Experience-Physical Education in the Elementary School PRA** (1 cr.) Students participate in supervised experience laboratory for

methods learned in 304. (Practicum) Pre: concurrent enrollment in 304, admission to the teacher education program by the start of semester. S/U only.

**KIN 307 Methods of School Health Instruction** (3 crs.) Designed to teach methods, techniques, learning styles, and skills necessary to recognize the developmental, physical, social, and emotional growth of elementary and secondary level students. (Lec. 3) Pre: Admission into the PHETE program.

**KIN 309 Supervised Experience in Health Education PRA** (1 cr.) Students participate in supervised experience laboratory for methods learned in KIN 307: Methods of School Health Instruction; (Practicum) Pre: Concurrent enrollment in KIN 307 and admission in the PHETE program.

**KIN 310 Principles of Human Motor Development** (3 crs.) Overview of the principles of motor development for the physical education teacher. Examines human motor development across the life span with emphasis on assessment and program development. Includes basic principles of motor learning. (Lec. 3) Pre: admission to the teacher education program and PSY 113; or permission of instructor.

**KIN 314 Methods of Teaching Physical Education in Secondary Schools** (3 crs.) Instruction in contemporary techniques used in a program of physical education for secondary school children. Type of activities found in basic programs and in planned progressions for various age groups. (Lec. 2, Lab. 2) Pre: Concurrent enrollment in KIN 315 and admission to the teacher education program.

**KIN 315 Supervised Experience-Physical Education in the Secondary School PRA** (1 cr.) Students participate in supervised experience laboratory for methods learned in 314. (Practicum) Pre: Concurrent enrollment in KIN 314 and admission to the teacher education program.

**KIN 320 Fundamentals of Resistance Training** (3 crs.) Scientific and theoretical basis of strength training reinforced with hands-on laboratory experiences. Training techniques, safe and effective program design and program modification for individuals with special considerations are emphasized. (Lec. 2, Lab. 1) Pre: BIO 121, BIO 242, KIN 300.

**KIN 322 Outdoor Leisure Pursuits** (1 cr.) Principal philosophical foundations of adventure theory and wilderness leadership are examined while the student learns to teach outdoor leisure activities. Concepts of judgment, decision-making, leadership and environmentally sensitive practices are introduced. (Lec. 1) Pre: kinesiology majors only.

**KIN 324 Rhythms and Dance** (1 cr.) Instruction in the fundamental skills of folk, square, ballroom, and social dances, emphasizing personal skill acquisition and the skills necessary for teaching dances in the public/private school physical education environ-

ment. (Lab. 3) Pre: Kinesiology majors only.

**KIN 325 Exercise Testing and Prescription** (3 crs.) Physical fitness assessments with focus on appropriate test selection and performance. Emphasis on exercise prescription and the practical skills of test administration. Preparation for ACSM-HFS certification. (Lec. 2, Lab. 2) Pre: KIN 275.

**KIN 368 Assessment in Physical Education and Health** (3 crs.) Focuses on the method and materials for measurement and evaluation in PE. Provides a basic introduction to data analyses and statistical inference. (Lec. 3) Pre: completion of math general education requirement.

**KIN 369 Measurement and Evaluation in Kinesiology** (3 crs.) Students learn the statistical basis for descriptive analyses and hypothesis testing in kinesiology. Students also learn to select, administer, and create reliable and valid tests in exercise, sport, fitness, and health. (Lec. 3) Pre: completion of math general education requirement, completion of at least 30 credit hours. Open to kinesiology majors only.

**KIN 370 Kinesiology** (3 crs.) The study of human movement based on anatomical, physiological, and mechanical principles. Emphasis on application of these principles to fundamental movement and physical education activity. (Lec. 3) Pre: BIO 121, 242, and kinesiology major.

**KIN 381 Exercise Behavior and Psychosocial Outcomes** (3 crs.) Review of theories of how psychological factors and interventions can affect exercise behavior and examine the psychosocial outcomes that are influenced by engaging in exercise both acutely and chronically. (Lec. 3) Pre: PSY 113.

**KIN 382 Psycho-Social Aspects of Physical Education and Sport** (3 crs.) The scientific study of the behavior of individuals' and groups within sport and physical activity. (Lec. 3) Pre: PSY 113 or permission of instructor.

**KIN 390 Seminar in Kinesiology** (2 crs.) Seminar for students preparing for careers and internships in Kinesiology. Subject areas include career and internship opportunities, certification, and graduate school. A variety of practicing professionals are featured speakers. (Seminar) Pre: junior standing.

**KIN 391 Directed Study** (1-3 crs.) Development of an approved project supervised by a member of the department faculty. (Independent Study) Pre: junior standing and permission of chairperson and instructor.

**KIN 401 Current Issues in Health Education** (3 crs.) Designed to develop student awareness of contemporary issues that are of concern to school health and other health educators. Extensive review of contemporary literature and film and critical analysis of selected issues and their effect on health education at the local, national, and global level. (Lec. 3) Pre: Acceptance into the PHETE program.

**KIN 410 Adapted Physical Education** (3 crs.) Planning and evaluation of physical education programs for individuals with special needs. Includes issues regarding disability laws and various mental, psychological, and physical conditions. (Lec. 2, Lab. 2) Pre: credit or concurrent enrollment in KIN 304 or 314 or permission of instructor.

**KIN 411 Assessment of Special Populations** (3 crs.) Assessment and programming of fitness, motor, and functional skill behaviors for individuals with special needs. (Lec. 2, Lab. 2) Pre: KIN 410, 369 or permission of instructor.

**KIN 414 Advanced Strength and Conditioning** (3 crs.) Scientific and practical basis for developing, designing, evaluating, and implementing resistance training programs. Emphasis on the physiological basis of program design. Prepares students for National Strength and Conditioning Association certification. (Lec. 3) Pre: BIO 242, KIN 234, KIN 320, and KIN 370.

**KIN 420 Fitness Programs for Individuals with Chronic Diseases** (3 crs.) Theory and application of physical fitness programs and testing of individuals with cardiovascular, musculoskeletal, and metabolic diseases. (Lec. 3) Pre: 325, 334 and 335. Not for graduate credit.

**KIN 425 Fitness and Wellness Program Development** (3 crs.) Development and administration of fitness and wellness programs. Includes program leadership and managerial skills for corporate, commercial, community, and clinical settings. (Lec. 3) Pre: KIN 275.

**KIN 430 Adapted Aquatics** (3 crs.) Planning, administering, and teaching adapted aquatics. Application of kinesiological concepts, characteristics, and methods of teaching aquatics to people with disabilities. (Lec. 2, Lab. 2) Pre: KIN 410, intermediate level swimming ability, admission to the teacher education program, or permission of instructor.

**KIN 475 Gender Issues in Sport and Physical Culture** (3 crs.) Use of critical social theories to examine the complexities of how gender manifests within and unavoidably structures, every person's experience in sport and physical culture. (Lec. 3) Pre: SOC 100 or GWS 150 or JOR 110 or KIN 278 or permission of instructor.

**KIN 478 Sport, Cultural Politics, and Media** (3 crs.) Critical examination of social issues and cultural politics mediated through print, film, television, Internet and video games related to sports, fitness, and physical activity. (Lec. 3) Pre: SOC 100 or WMS 150 or JOR 110 or KIN 278 or permission of instructor.

**KIN 484 Supervised Field Work PRA** (12 crs.) Supervised internship in clinical, community, corporate, or commercial settings. (Practicum) Pre: completion of core exercise science courses with a 2.5 GPA. Not for graduate credit.

**KIN 486 Field Experience Seminar** (3 crs.) Seminar for students completing field work in health, physical education, or recreation. Topics include identification of problems, resource materials, and discussions of future career concerns. (Seminar) Pre: concurrent enrollment in KIN 484. Not for graduate credit in physical education. Note: Student teaching includes practicum in both elementary and secondary schools under the supervision of the department. See EDC 485, 486, 487, 488, and 489.

**KIN 501 Seminar in Kinesiology** (1 cr.) This course provides a forum for students, faculty and staff from the Department of Kinesiology to present and discuss research and current issues related to the field of Kinesiology. (Seminar) Pre: Graduate standing or permission of chairperson. Must be taken twice prior to graduation.

**KIN 508 Physical Activity Promotion: Theory and Practice** (3 crs.) This course examines theory and methods to facilitate individual and group behavior change, focused on promoting physical activity. Concepts in behavioral sciences affecting health behavior, motivation, and decision-making are explored. (Lec. 3)

**KIN 510 Current Issues in Physical Education, Health, and Recreation** (3 crs.) Designed to develop student awareness of contemporary situations that are of concern to the above professions. Extensive review of contemporary literature. Critical analysis of selected issues, their components and effects. (Lec. 3) Pre: permission of instructor.

**KIN 515 Physiology of Physical Activity and Health** (3 crs.) The physiological basis of human movement, including contemporary topics such as the relationship between physical activity and health, obesity, exercise and aging, and youth fitness. (Lec. 3)

**KIN 520 Curriculum Construction in Physical Education** (3 crs.) Analysis of criteria and procedures for curriculum construction in physical education. Standards for the evaluation and revision of elementary and secondary school physical education courses. (Lec. 3) Pre: permission of instructor.

**KIN 524 Obesity: Causes, Consequences and Care** (3 crs.) Overview of the obesity epidemic and implications for morbidity and mortality. Consideration of energy balance issues and metabolism. Emphasis on the role of physical activity in preventing and treating obesity. (Lec. 3) Pre: graduate standing or permission of instructor.

**KIN 530 Research Methods and Design in Physical Education and Exercise Science** (3 crs.) An introduction to the basic aspects of research, including problem selection, literature review, instrumentation, methodology, and the writing of research reports and articles. (Lec. 3) Pre: competence in basic statistics and permission of instructor.

**KIN 531 Advanced Experimental Techniques in Exercise Science** (3 crs.) Instruction in using the computer for research purposes with an emphasis on data analysis (i.e., statistical techniques). (Lec. 3) Pre: KIN 530 or permission of instructor.

**KIN 545 Advanced Motor Development** (3 crs.) Advanced study of the continuous process of motor development across the lifespan. Planning and directing movement experiences, factors mediating growth and development, and individual and gender differences are investigated.

**KIN 555 Women in Sport: Issues and Controversies** (3 crs.) Critical analysis of women's sports using contemporary feminist perspectives. Emphasis on psychosocial and political-economic constructs that regulate women's emergence into sport. (Lec. 3)

**KIN 559 Principles of Exercise Testing and Interpretation** (3 crs.) Theory and practical application of the graded exercise test including oxygen consumption measurements. Special emphasis on writing a safe exercise prescription based on the interpretation of the exercise test data. (Lec. 3) Pre: graduate standing or permission of instructor

**KIN 560 Seminar in Health, Physical Education, and Recreation** (3 crs.) Selected topics within the three areas, depending on availability of specialized instruction including visiting professorship. (Seminar) Pre: permission of instructor.

**KIN 562 Advanced Exercise Physiology** (3 crs.) Advanced study of the physiological factors limiting physical performance and work capacity with emphasis on the effects of physical conditioning on health and fitness. (Lec. 3) Pre: graduate standing or permission of instructor.

**KIN 563 Epidemiology of Physical Activity Presentation of exercise epidemiology and the effects of exercise on health. Current findings regarding the association between physical activity and chronic diseases and their risk factors.** (Lec. 3) Pre: graduate standing or permission of instructor.

**KIN 564 Physiology of Aging** (3 crs.) Library searches, reports, and discussion of topics of current research on the physiology of aging. Subject matter adapted to meet interests of students. (Lec. 3) Pre: graduate standing or permission of instructor.

**KIN 565 Cardiovascular Disease: Prevention and Rehabilitation** (3 crs.) Focus on cardiac rehabilitation, underlying pathology and pathophysiology, diagnostic and prognostic testing, and principles of rehabilitation. Special emphasis on electrocardiographic analysis and exercise intervention. (Lec. 3) Pre: graduate standing or permission of instructor.

**KIN 578 Cultural Studies of Sport and Physical Activity** (3 crs.) Survey course focusing on the social, cultural, political, and economic conditions that produce and influ-

ence sport and physical activity. Emphasis on critical analyses of the social and political dimensions of physical activity, fitness, sport, health and wellness. (Lec. 3) Pre: KIN 278, graduate standing, or permission of instructor.

**KIN 580 Inclusive Practices in Adapted Physical Education** (3 crs.) Strategies for inclusion of children and youth with disabilities into general physical education, including legal, moral, and ethical considerations and responsibilities; theories of inclusive practices and application based on individual needs. (Lec. 3)

**KIN 581 Psychological Aspects of a Healthy Lifestyle** (3 crs.) Cross-listed as (KIN), PSY 581. Considers the psychological processes and behaviors related to exercise participation and the adoption of a healthy lifestyle. Analysis of models and theories used in exercise psychology, associated research, and the implications for practitioners. (Lec. 3) Pre: graduate standing, PSY 113 and 232, or permission of instructor.

**KIN 582 Applied Sport Psychology** (3 crs.) Focus on performance enhancement techniques (i.e., imagery, goal-setting, etc.) designed to improve individual and team performance. (Lec. 3) Pre: graduate standing, PSY 113 and 232 or permission of instructor.

**KIN 585 Disability Sports** (3 crs.) Sports and recreational opportunities for individuals with disabilities; federal legislation effecting participation opportunities; spectrum of participation in community recreation to elite athletic opportunities within various disability sports organizations and events. (Lec. 3)

**KIN 591 Special Problems** (3 crs.) Written paper reporting an in-depth investigation of a pertinent problem in the field, including a review of relevant literature, analysis, and solution of the problem based on scientific methodology, with recommendations for improved practices. (Independent Study) Limited to and required of all graduate students in physical education who elect the nonthesis option.

**KIN 592 Internship In Physical Education And Exercise Science PRA** (3 crs.) Directed field experience under the supervision of a faculty member and a professional member of the cooperating institution. Application of knowledge, synthesis of practical experiences. Paper required. (Practicum) Pre: a minimum of 12 graduate credits in physical education and permission of major professor and chairperson.

**KIN 595 Independent Study** (3 crs.) Development of an approved project supervised by a member of the graduate faculty. (Independent Study) Pre: permission of chairperson and instructor. May not be substituted for 591 or 599.

**KIN 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major pro-

fessor or program committee. (Independent Study) S/U credit.

## LAN | Languages

**LAN 191 Beginning Foreign Language I** (3 crs.) Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation in a foreign language not included in regular departmental offerings. (Lec. 3) Pre: no prior experience in a specific language is required. May be repeated for credit for different languages. Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**LAN 192 Beginning Foreign Language II** (3 crs.) Continuation of LAN 191. Students enrolling in this course should have taken LAN 191 or equivalent in the same language. (Lec. 3) May be repeated for credit for different languages. Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**LAN 193 Intermediate Foreign Language I** (3 crs.) Development of facility in speaking, listening comprehension, writing, and reading texts of moderate difficulty in a language not included in regular departmental offerings. Students enrolling in this course should have taken LAN 192 or equivalent. (Lec. 3) Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**LAN 194 Intermediate Foreign Language II** (3 crs.) Continuation of LAN 193. Students enrolling in this course should have taken LAN 193 or equivalent. (Lec. 3) Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**LAN 205 Advanced Foreign Language I** (3 crs.) Further development of all language skills with emphasis on writing and reading. Students enrolling in this course should have taken HBW 104 or JPN 104 or LAN 194 or equivalent in the same language. (Lec. 3) (FC) [D]

**LAN 206 Advanced Foreign Language II** (3 crs.) Continuation of LAN 205. Students enrolling in this course should have taken LAN 205 or equivalent in the same language. (Lec. 3) (FC) [D]

## LAR | Landscape Architecture

**LAR 101 Freshman Inquiry into Landscape Architecture** (1 cr.) Introduction for freshmen to Landscape Architecture: the profession, practices and principles. Interact weekly with faculty and staff. Explore hands-on studio and field studies (Lec. 1) S/U credit.

**LAR 201 Survey of Landscape Architecture** (3 crs.) Introduction to landscape design theory and composition as an applied art form. (Lec. 3/Online) (A)

**LAR 202 Origins of Landscape Development** (3 crs.) Examines the impact of environment, social history, philosophy, art, and literature on architecture and landscape development from ancient to modern times. Emphasis on European Renaissance through contemporary United States. (Lec. 3) (L) [D]

**LAR 243 Landscape Architecture Graphics** (4 crs.) Introduction to landscape graphic communication techniques with emphasis on design and construction drawing and perspective illustration. (Lec. 2, Studio 4)

**LAR 244 Basic Landscape Architectural Design** (4 crs.) Introduction to the development of outdoor space with emphasis on the design process and the manipulation of spatial volumes. (Lec. 2, Studio 4) Pre: 243.

**LAR 246 Digital Design Media for Landscape Architecture** (1 cr.) Introduction to digital media software with emphasis on principles and practices within the profession of landscape architecture. (Lec. 1, Studio 2) Pre: LAR 243.

**LAR 300 Computers In Landscape Architecture** (4 crs.) Intensive course in computer usage for landscape architects. Focus on the application of landscape architecture computer-aided design software to project development. (Lec. 2, Studio 4) Pre: sophomore standing in landscape architecture. Intended for landscape architecture majors only.

**LAR 301 Landscape Expression and Analysis** (4 crs.) Focuses on existing landscape methodologies to examine the earth's surface: using topographical surveying, 3-D mapping, soils analysis, graphic depiction, land interpretation and land development drainage and associated environmental impacts. (Lec. 3, Studio 2) Pre: LAR 244 and MTH 111. For LAR majors or with permission of instructor.

**LAR 302 GIS Applications for Landscape Architecture** (3 crs.) GIS software, data and orthophotos will be explored and used for site analysis and the creation of plans suitable for standing alone or being incorporated into CAD design/planning applications. (Lec.2, Lab.2) Pre: junior or senior landscape architecture major or permission of instructor.

**LAR 343 Landscape Architecture Studio I** (4 crs.) Landscape concepts in graphic form. Emphasis on preparing landscape plans for small- to intermediate-scale properties. Students study in a professional studio environment. (Lec. 2, Studio 4) Pre: LAR 201, 202, and 244. Intended for landscape architecture majors only.

**LAR 344 Landscape Architecture Studio II** (4 crs.) Continuation of landscape concepts and graphics. Emphasis on drawing landscape plans for intermediate to larger scale properties. Advanced rendering. (Lec. 2, Studio 4) Pre: LAR 301, 343, and 345; credit or concurrent enrollment in 346. Intended for landscape architecture majors only.

**LAR 345 Landscape Construction I** (4 crs.) A comprehensive survey of construction materials and their uses in landscape construction. (Lec. 2, Studio 4) Pre: LAR 244 and 300. Intended for landscape architecture majors only.

**LAR 346 Landscape Construction II** (4 crs.) The study of soil adjustment; grading, drainage, cut and fill, reshaping of earth surfaces. (Lec. 2, Studio 4) Pre: 301 and 345. Intended for landscape architecture majors only.

**LAR 353 Landscape Plants I** (3 crs.) Cross-listed as (LAR), PLS 353. Identification and description under fall conditions; classification and adaptation of the important trees and shrubs including broadleaf evergreens and their value in ornamental plantings. (Lec. 1, Lab. 4) Pre: BIO 102 or PLS 150.

**LAR 354 Landscape Plants II** (3 crs.) Cross-listed as (LAR), PLS 354. Identification and description under winter and spring conditions; classification and adaptation of the coniferous evergreens, vines, and groundcovers and their value in ornamental plantings. (Lec. 2, Lab. 2) Pre: LAR 353 or PLS 353.

**LAR 399 Landscape Architecture Internship PRA** (1-6 crs.) Directed work experience program at landscape architecture offices, contracting firms and related industries. (Practicum) Pre: permission of instructor.

**LAR 434 Introduction to Environmental Law** (3 crs.) Cross-listed as (CPL), LAR 434. Surveys issues arising out of laws designed to protect the environment and manage resources: right to a decent environment, government regulation versus private property rights, citizen participation in planning environmental controls. (Lec. 3) Pre: sophomore standing (45 credits completed) and above.

**LAR 443 Planting Design** (4 crs.) The use of plant materials in landscape composition. Combines spatial definition of various land uses with plant selection. Preparation of plans, details, and specifications. (Lec. 2, Studio 4) Pre: LAR 344 and 354. Intended for landscape architecture majors only. Not for graduate credit.

**LAR 444 Landscape Architecture Studio III: Sustainable Design** (4 crs.) Sustainable design principles and practices. Theoretical and real-world problem solving for individual sites and local communities. Explore sustainability practices, green infrastructure, and public participation. (Lec. 2 Studio 4) Intended for LAR majors, MESM students, or with permission of instructor. Pre: LAR 344 and 346 or by permission of instructor.

**LAR 445 Landscape Architecture Studio IV** (4 crs.) Study of comprehensive landscape architectural projects. Coordination of research and preparation of alternative design solutions and work with public agencies and communities. (Lec. 2, Studio 4) Service learning. Intended for LAR majors, MESM students, or with permission of instructor. Pre: LAR 443 and 444 or by permission of instructor.

**LAR 447 Professional Landscape Architectural Practice** (3 crs.) Professional practice, ethics, marketing design services, preparation of contract documents, and effective time management. (Lec. 3) Pre: senior standing in landscape architecture. Not for graduate credit.

**LAR 450 Landscape Architecture Portfolio Development** (1 cr.) This senior level course will cover the strategy and skills necessary for constructing a professional portfolio and provide students with an opportunity to understand the full potential of the portfolio within the profession. (Lec. 1) Pre: LAR 443 and 444. Not for graduate credit.

**LAR 491 Special Projects and Independent Study** (1-3 crs.) Special work to meet specialized needs in the landscape architecture profession. (Independent Study) Pre: permission of instructor. Not for graduate credit.

**LAR 492 Special Projects and Independent Study** (1-3 crs.) Special work to meet specialized needs in the landscape architecture profession. (Independent Study) Pre: permission of instructor. Not for graduate credit.

## LAS | Latin American Studies

**LAS 390 The Hispanic Caribbean: Study Abroad in the Dominican Republic** (3 crs.) Emphasis on the Dominican Republic, Cuba, and Puerto Rico. Topics will include colonization and slavery, race, gender, religion, European and U.S. interventionism, migration, and development. (Lec. 3) Pre: SPA 104; HIS 180 is suggested.

**LAS 397 Directed Study For Senior Research Project** (3 crs.) Research in a particular area of Latin American studies. Project must be approved by the LAS Committee. (Independent Study) Pre: approval of LAS Committee and instructor.

## LAT | Latin

**LAT 101 Beginning Latin I** (3 crs.) Latin grammar and syntax. Exercises in reading prose. (Lec. 3) Pre: no previous Latin is required. Will not count toward the language requirement if the student has studied Latin for more than one year within the last six years. (FC) [D]

**LAT 102 Beginning Latin II** (3 crs.) Continuation of LAT 101. Students enrolling in this course should have taken LAT 101 or equivalent. (Lec. 3) (FC) [D]

**LAT 301 Intermediate Latin** (3 crs.) Grammar review; readings such as Petronius' Satyricon. Students enrolling in this course should have taken LAT 102 or equivalent. (Lec. 3) (FC) [D]

**LAT 302 Intermediate-Advanced Latin** (3 crs.) Study of Latin texts from different

time periods and different genres; syllabus changes on a four-year rotational basis. Students enrolling in this course should have taken LAT 301 or equivalent. (Lec. 3) May be repeated for a maximum of 12 credits with different topics. May be taken once for General Education credit. (FC) [D]

**LAT 497 Directed Study** (1-6 crs.) Individual readings and research. (Independent Study) Pre: acceptance of a project by a faculty member; approval of section head. May be repeated for credit with different topic.

**LAT 498 Directed Study** (1-6 crs.) Individual readings and research. (Independent Study) Pre: acceptance of a project by a staff member; approval of section head. May be repeated for credit with different topic.

## LET | Letters

**LET 151 Topics In Letters** (3 crs.) Study of the history of thought, of the search for values, of the attempt to define the human condition, as reflected in written texts, both past and present. (Seminar/Online) May be repeated for credit with different topic. May be taken once for General Education credit. Some topics may be offered online. Topics: Francophone Hip-Hop Culture (L) or (FC) [D]; Q Contemporary France (L) or (FC) [D]; The European Union (FC) (L) [D] (online); Native American History (L) [D]; Archaeology Frontiers (L); Franco-American Relations (A) or (L) or (FC) [D]; Social, Ethical and Political Issues in Disability (L) [D]; Jewish American Literature and Culture from The Great Tide of Immigration (1881-1924) to the Present. (L) or (A) [D]; Introduction to World Mythology (L) [D]

**LET 351 Topics In Letters** (3 crs.) Study of the history of thought, of the search for values, of the attempt to define the human condition, as reflected in written texts, both past and present, at an advanced level. (Seminar) Pre: junior standing. May be repeated for credit as often as the topic changes.

## LIB | Library

**LIB 120 Introduction To Information Literacy** (3 crs.) In-depth exploration and practice of information literacy skills designed to support college-level research and lifelong learning. (Lec. 3/Online) (EC)

**LIB 140 Special Topics In Information Literacy** (1 cr.) Introduction to core concepts of information literacy and essential skills in finding, analyzing, organizing, and presenting information. (Lec. 1) Must be taken concurrently with a course that requires information literacy skills.

**LIB 220 Issues of the Information Age** (3 crs.) Critical current issues concerning the use of information are examined. Emphasis placed on the interdisciplinary nature of information and the use of research techniques as a foundation for informed citizenship. (Lec./Online) (EC) (L)

**LIB 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

## LIN | Linguistics

**LIN 200 Language and Culture** (3 crs.) Cross-listed as (APG), LIN 200. Cross-cultural survey of the interaction of culture and language. Introduction to various fields of linguistic research emphasizing descriptive and semantic investigations. Linguistic studies used as illustrative material. (Lec. 3) (S) [D]

**LIN 220 Introduction to the Study of Language** (3 crs.) Cross-listed as (LIN), APG 220. Introduction to the analysis and description of a language's sounds, forms, syntax, and meaning; the relationship of linguistics to other disciplines; and a survey of major schools of linguistic thought. (Lec. 3)

**LIN 320 Sociolinguistics** (3 crs.) Cross-listed as (LIN), APG 320. Presentation of the major areas of micro- and macro-sociolinguistics: speech acts, registers, repertoires, language attitudes, social correlates of phonological and syntactic features and changes. (Lec. 3) Pre: APG/LIN 200 or 220.

**LIN 408 The German Language: Past and Present** (3 crs.) Cross-listed as (GER), LIN 408. Introduction to the history and present state of the German languages. Study of standard and colloquial German, dialects, Swiss and Austrian variations, language of youth and professions. Analysis of various test types. Tendencies in present-day German. (Lec. 3) Pre: 305 or permission of instructor. Not for graduate credit.

**LIN 420 Second Language Acquisition** (3 crs.) An evaluation of current trends and developments in the understanding of second language learning; analysis of second language acquisition research and its practical implications. (Seminar) Pre: LIN 200 or EDC 312 or 3 credits of language courses numbered 300 or above, or permission of section head.

**LIN 431 Applied Linguistics in the Language Laboratory** (1 cr.) Principles of contrastive phonology and syntax and their application to the preparation, use, and evaluation of tape drills. Use of language laboratory equipment monitoring student exercises. Recommended for prospective teachers of language. (Lab. 2) Pre: 9 credits of language courses at the 300 level or above, or permission of section head.

**LIN 497 Directed Study** (3 crs.) Individual research and reports on problems of special interest. (Independent Study) Pre: LIN 220 and acceptance of project by faculty member and approval of section head.

**LIN 498 Directed Study** (3 crs.) Individual research and reports on problems of special interest. (Independent Study) Pre: LIN 220 and acceptance of project by faculty member and approval of section head.

## LRS | Labor Relations and Human Resources

**LRS 432 Work, Employment, and Society** (3 crs.) Cross-listed as (SOC), LRS 432. Explores the workplace and employment relations from a sociological perspective. Topics include work systems, worker alienation and organization, occupational identity, and the impacts of immigration, feminization, and globalization on the workplace. (Lec. 3) Pre: SOC 100 or permission of instructor.

**LRS 480 Seminar In Labor Studies** (3 crs.) Cross-listed as (ECN), LRS 480. Intensive studies examining various important topics in labor studies. Class discussion of assigned readings and student reports. (Lec. 3) Pre: permission of instructor. Not for graduate credit.

**LRS 500 Labor Relations and Human Resources** (3 crs.) Cross-listed as (LRS 500), MBA 571. Introduction to labor relations and human resources, including employment practices in unionized and non-union organizations; also issues related to data sources and research methodology. (Lec. 3) Pre: graduate standing or permission of instructor.

**LRS 503 Problems In Public Personnel Administration** (3 crs.) Cross-listed as (PSC), LRS 503. Development of personnel administration, including problems of recruitment, examination, promotion, and staffing within public service. Emphasis on evaluation of employee performance and collective bargaining in public service. (Lec. 3) Pre: graduate standing or permission of instructor.

**LRS 520 Developments In Worker Representation** (3 crs.) Structure, functions, responsibilities, and programs of unions and union leadership. Emphasis on policies and decision making. Evaluation of labor and management performance. Consideration of administrative problems associated with growth of white collar unions. (Lec. 3) Pre: graduate standing or permission of instructor.

**LRS 521 Comparative Labor Relations Systems** (3 crs.) Cross-listed as (LRS), PSC 521. Comparative labor and industrial relations systems, including union, management, and government functions and roles; also the functions of international organizations in labor relations. (Lec. 3) Pre: permission of instructor.

**LRS 526 Economics of Labor Markets** (3 crs.) Cross-listed as (LRS), ECN. The theory of labor market behavior, and application of theory for public policy analysis in areas such as discrimination, unemployment, and education. (Lec. 3) Pre: ECN 201 and 202 or 590 or equivalent.

**LRS 531 Employment Law** (3 crs.) Analysis of legislation protecting worker health, employment, income security, including OSHA, workers' compensation, equal opportunity, fair labor standards, Walsh-Healy and Davis-Bacon, pension funds, unemployment compensation, and social security. (Lec. 3) Pre: permission of Labor Research Center director.

**LRS 532 Seminar In Employment Law** (3 crs.) Advanced seminar to review and evaluate current issues and changing trends in selected aspects of employment law. May be repeated for credit with different topic, for maximum of 6 credits. (Seminar) Pre: permission of instructor.

**LRS 533 Pension, Health Care, and Employee Benefits Programs** (3 crs.) An analysis of employee assistance plans (EAPs), health fringe benefits, and pension plans and their negotiation within both private and public sectors. (Lec. 3) Pre: permission of instructor and Labor Research Center director.

**LRS 541 Labor Relations Law** (3 crs.) Legal framework for private and public sector collective bargaining. Regulation of activities with emphasis on individual rights, collective rights, and policy considerations of federal and state courts, the NLRB, and state labor boards in determining society's rights. Case studies. (Lec. 3) Pre: graduate standing or permission of instructor.

**LRS 542 Labor Relations And Collective Bargaining** (3 crs.) Collective bargaining literature, theories, and practice. Emphasis on the institutional features of bargaining in both public and private sectors as well as techniques, and dynamics of the bargaining process. (Lec. 3) Pre: graduate standing or permission of instructor.

**LRS 544 Colloquium In Worker History** (3 crs.) Cross-listed as (LRS), HIS 544. Selected topics in American worker history with an emphasis on the most recent literature in the field. (Seminar) Pre: graduate standing or permission of instructor.

**LRS 545 Arbitration and Mediation of Labor and Employment Disputes** (3 crs.) Students prepare, present, and analyze labor and employment arbitration/mediations. The course also covers interest arbitration, and innovative methods for resolving disputes. Pre: graduate standing or permission of instructor.

**LRS 546 Negotiation And Alternative Dispute Resolution** (3 crs.) Examination of the interpersonal dynamics of negotiations and conflict resolution processes, including interest-based or collaborative bargaining in a variety of contexts; e.g. labor relations, community, environmental, divorce, racial, commercial. (Lec. 3) Pre: permission of instructor.

**LRS 551 Human Resource Strategy** (3 crs.) Cross-listed as (LRS 551), MBA 572. Human resource issues addressed in context of changing product and labor markets, in-

cluding relationship among human resource policies; the economic, social, and political environment; and firms' strategic objectives. (Lec. 3) Pre: permission of instructor.

**LRS 573 Staffing Organizations** (3 crs.) Cross-listed as (LRS), MBA 573. Introduction to the staffing process from scientific, legal, administrative, and strategic perspectives. Covers workforce planning, strategic staffing, job analysis, recruitment, selection testing, interviewing, and making final hiring decisions. Pre: MBA 502 or LRS 500/MBA 571

**LRS 580 Professional Seminar in Labor Relations and Human Resources** (3 crs.) Advanced labor relations seminar of variable coverage and focus; adjusted yearly to consider most recent labor relations developments. Major research paper required. (Seminar) Pre: final semester graduate standing in labor relations and human resources and permission of Labor Research Center director.

**LRS 581 Internship: Labor Relations and Human Resources PRA** (3-6 crs.) Variable length internship with a trade union, a public or private sector personnel or industrial relations department, or a governmental administrative or regulatory agency, under the supervision of both a URI Labor Research Center faculty member and a member of the affiliated organization. May be taken as one 6-credit unit or two 3-credit units. (Practicum) Pre: graduate standing in labor relations and human resources and permission of Labor Research Center director. S/U only.

**LRS 590 Directed Readings and Research in Labor Relations and Human Resources** (3 crs.) Readings and research under the direction of LRC-associated faculty to meet individual student requirements. (Independent Study) Pre: graduate standing in labor relations and human resources and permission of Labor Research Center director and instructor.

**LRS 591 Directed Readings and Research in Labor Relations and Human Resources** (3 crs.) Readings and research under the direction of LRC-associated faculty to meet individual student requirements. (Independent Study) Pre: graduate standing in labor relations and human resources and permission of Labor Research Center director and instructor.

## LSC | Library and Information Studies

**LSC 502 Lead, Manage & Connect Library and Information Services** (3 crs) Apply professional values, ethics, principles, theories, and problem-solving to present and future library and information services (LIS). Plan, lead, manage, and connect LIS with transformational leadership in diverse communities. (Lec. 3)

**LSC 503 Collection Management** (3 crs.) Introduction to the process of collection building and management of resources

including various formats and subjects for libraries or information centers. Community assessment, formulation of policies, procedures, and evaluation methods. (Lec. 3) Pre: Graduate standing

**LSC 504 Searching for Answers: Meeting Users' Information Needs** (3 crs.) Practical experience in the use of basic electronic and print information sources with readings and discussion on the philosophy and administrative aspects of reference work. (Lec. 3) Pre: Graduate standing.

**LSC 505 Organization of Information** (3 crs.) Theory and practice of organizing information following national and international standards; focus on bibliographic information. Emphasizes the understanding and application of cataloging and classification principles, standards, tools, bibliographic utilities and networks. (Lec. 3) Pre: Graduate standing.

**LSC 506 Technical Services** (3 crs.) Principles and policies in the acquisition, organization, conservation, and circulation of materials in libraries and information centers. Includes examination of automation of library processes. (Lec. 3) Pre: Graduate standing

**LSC 508 Introduction to Information Science and Technology** (3 crs.) Introduction to information science through the exploration of fundamental information science theories and information technologies. Theory and technology are discussed and applied to practical purposes in library and information services. (Lec. 3) Pre: Graduate standing.

**LSC 510 Books to Bytes** (3 crs.) The historic and contemporary art and craft of book production, with emphasis on e-publishing and digital book creation. (Lec. 3) Pre: Graduate standing.

**LSC 515 Information Ethics and Policy** (3 crs.) Ethical, legal, and policy approaches to key LIS issues (including privacy, intellectual property, and intellectual freedom) in a world of rapidly changing technology; professional decision-making. (Lec. 3)

**LSC 516 Information and Culture ONL** (3 crs.) Studies cultural architectures of information, exploring how cultural forms of information are understood and exchanged locally, nationally, and globally. (Online)

**LSC 517 Community Relations for Libraries** (3 crs.) Includes public relations, advocacy, determining community needs, identifying potential partners, building partnerships, developing a community relations plan, and envisioning the library's future. Incorporates programs and strategies of core professional organizations. (Lec. 3) Pre: LSC 502 or permission of instructor.

**LSC 518 Global Information Services** (3 crs.) Study, compare, and analyze information issues, practices, and organizations in a range of countries. Course may require travel to study information services. (Lec. 3) Pre: permission of instructor.



**LSC 520 School Library Media Services** (3 crs.) Prepare school librarians to meet RIPTS and AASL roles: teacher, information specialist, instructional partner, administrator and leader. Emphasize teaching AASL standards integrated with Common Core Standards. Includes 60-hour field experience. (Lec. 2, Prac. 1) Pre: completion of 18 hours including core courses 502, 504, 505, and 508 or permission of instructor.

**LSC 521 Public Library Service** (3 crs.) Planning, evaluation and programming in public libraries, with an emphasis on community analysis and responsive services for seniors, adults, young adults, and children. (Lec. 3) Pre: LSC 502 or permission of instructor.

**LSC 522 College and University Library Service** (3 crs.) Study of the functions, organization, management, and services of college and university libraries. (Lec. 3) Pre: LSC 502 or permission of instructor.

**LSC 523 Special Library Service** (3 crs.) Survey of major categories of special libraries in academia, corporations, foundations, government agencies, and the military, including archives, rare book collections, museums, religious and legal institutions, businesses, and healthcare organizations. (Lec. 3) Pre: LSC 502 or permission of instructor.

**LSC 525 Multiculturalism in Libraries** (3 crs.) Determining information needs and planning library collections, services, and programs for diverse populations. Historical, philosophical, and comparative aspects of multiculturalism in libraries will also be considered. (Lec. 3) Pre: LSC 504 or permission of instructor.

**LSC 527 Digital Information Literacy Instruction** (3 crs.) Design and teach digital and information literacy skills to diverse library users to promote effective and ethical use of digital and information resources in a variety of library settings. (Lec. 3) Pre: LSC 504 or permission of instructor.

**LSC 528 Digital Visual Information Literacy** (3 crs.) Provides an introduction to the theory, practice, and critical analysis of print and digital designs through digital and visual literacy studies. (Lec. 3)

**LSC 530 Texts & E-Tools for Tots to Teens** (3 crs.) Select, evaluate, and promote the use of print, media, and digital resources for diverse populations by ensuring and mediating access to library resources and e-resources beyond collections. (Lec. 3)

**LSC 531 Information Resources & Competencies for Youth** (3 crs.) Understand the information needs of children and teens to promote reading, writing and digital literacy and examine how children and youth make use of information resources for learning. Examine the design, structure and dissemination of resources appropriate for children and youth. (Lec. 3/Online)

**LSC 537 Health Sciences Librarianship** Serves as an introduction to the field. Covers the literature, vocabulary, computer

applications, reference tools, information retrieval, and environments relating to health sciences libraries. Pre: LSC 502 and 504 or permission of instructor.

**LSC 538 Law Librarianship** (3 crs.) Introduction to legal bibliography and research and to a broad range of problems involved in the administration and operation of various kinds of law libraries. Pre: LSC 502 and 504 or permission of instructor.

**LSC 539 Business Information** (3 crs.) An introduction to many aspects of business information services, as well as to business information in all formats. This course will emphasize services in business libraries and information centers, and the fields of corporate intelligence and knowledge management will also be considered and discussed. (Lec. 3) Pre: LSC 504 or permission of instructor.

**LSC 540 Humanities Information and Materials** (3 crs.) Information needs and services of all areas of the humanities. Unique aspects of library services and materials in all formats will be considered. Pre: LSC 504 or permission of instructor.

**LSC 541 Social Science Information** (3 crs.) Information needs and services in all areas of the social sciences and the professions, including information in all formats. Pre: LSC 504 or permission of instructor.

**LSC 542 Library Materials in Science and Technology** (3 crs.) Library resources in science and technology, including the major works, serial publications, and reference and bibliographical materials. (Lec. 3) Pre: LSC 503 and 504 or permission of instructor.

**LSC 543 Government Publications** (3 crs.) Survey of the publishing activities and publications of national, state, and local governments with emphasis on the publications of the United States government. (Lec. 3) Pre: LSC 504 or permission of instructor.

**LSC 544 Visual Information Science** (3 crs.) An introduction to the interdisciplinary study of visual information science related to visual information (data) collection, analysis, processing, transmission, utilization, and communication in modern and digital libraries and information centers. (Lec. 3) Pre: LSC 508 or permission of instructor.

**LSC 545 Indexing and Abstracting** (3 crs.) Create and evaluate indexes for effective retrieval from books, periodicals, and electronic resources. Principles of traditional, automatic, and natural language indexing applied to searches. Abstracting, thesaurus construction, and software evaluation. (Lec. 3) Pre: LSC 504 or permission of instructor.

**LSC 547 Information Storage and Retrieval and Online Searching and Services** (3 crs.) Theory, methods, evaluation, and research of analyzing, storing, indexing languages, information storage media, information storage and retrieval systems, and information seeking and retrieving in libraries and information services. (Lec. 3) Pre: LSC 504 or permission of instructor.

**LSC 548 Information Architecture and Web Site Development** (3 crs.) Introduces principles of information architecture, library science and information science to plan, design, develop, and evaluate cohesive web sites and intranets that are attractive, navigable, manageable, and expandable. Pre: LSC 508 or permission of instructor.

**LSC 550 Organization of Digital and Nonbook Resources** (3 crs.) Using current international and national standards for organization of digital and nonbook resources, the course emphasizes bibliographic control for retrieval and subject analysis, standards, access, and other mark-up languages. (Lec. 3) Pre: LSC 505 or permission of instructor.

**LSC 557 Document, Assess, Evaluate** (3 crs.) Exploration of nature and role of library and information organizations and how information and organizational problems are identified and creative solutions are developed, implemented, and assessed in real-world settings. (Lec. 3) Pre: completion of 15 credits or permission of instructor.

**LSC 560 Human Information Behavior** (3 crs.) Designed to introduce students to human information behavior (IB), investigating characteristics of information users, IB theories and research methods, and IB in personal, social, and institutional contexts. (Lec. 3) Pre: LSC 504.

**LSC 562 Digital Archives and Preservation** (3 crs.) Principles and techniques for administering digital manuscript and archival repositories, including acquisition policies, appraisal criteria, description and classification, and preservation practices. (Lec. 3)

**LSC 570 Leadership in Information Professions ONL** (3 crs.) Introduction to the principles, practices, theories and ethics of leadership in the information professions. Focus on leading from any position within an organization or the larger LIS community. (Online) Pre: LSC 502

**LSC 590 Introduction to Chinese Information Services** (3 crs.) The seminar will provide students and professionals with an opportunity to study the history of Chinese librarianship and libraries and information services from the ancient to the contemporary times. (Seminar)

**LSC 593 Independent Work** (1-6 crs.) Supervised reading or investigation in areas of special interest. Student must obtain written approval prior to registration for the semester for which the study is proposed. (Independent Study) Pre: 18 hours of library science with B average and permission of instructor; LSC 557 strongly recommended. LSC 593 and 595 may be repeated for a combined total of 6 credits.

**LSC 595 Apply and Reflect PRA** (1-6 crs.) Directed field experience applying theory to practice in libraries, information centers, and related organizations. Jointly supervised by a member of the faculty and a professional in the cooperating institution. (Practicum) LSC

593 and 595 may be repeated for a combined total of 6 credits. Pre: 18 hours of LSC with a B average and permission of instructor.

**LSC 596 School Library Media Practicum and Seminar** (9 crs.) Twelve-week directed field experience in two school library media programs. Candidates demonstrate mastery of RIPTS and AASL five roles: teacher, information specialist, instructional partner, administrator and leader. Bi-weekly seminars. (Seminar 3/Practicum 6) Pre: LSC 520 with a B or better and 21 hours of library science with a B average or permission of the instructor.

**LSC 597 Current Trends** (3 crs.) Selected topics of current and special interest in library and information studies not covered in existing course offerings. May be repeated with different topics. (Lec. 3)

## MAC | Master of Science in Accounting

**MAC 501 Current Accounting Theory** (3 crs.) Critical examination of accounting theory and practice to develop research techniques with emphasis on financial accounting. (Lec. 3) Pre: Graduate standing in accounting or permission of M.S. in Accounting Director.

**MAC 502 Current Accounting Theory** (3 crs.) Critical examination of accounting theory and practice with respect to cost and managerial accounting. (Lec. 3) Pre: graduate standing in accounting or permission of M.S. in Accounting Director.

**MAC 503 Taxation of Business Entities** (3 crs.) Examination of the tax law, underlying theory, tax compliance requirements and tax planning for: Corporations, flow-through entities and the transfer tax system. (Seminar) Pre: BUS 403 or permission of graduate advisor.

**MAC 504 Financial Statement Analysis and Reporting** (3 crs.) Development of accounting policy with respect to analysis of financial statements and the use of evaluation techniques, managerial planning and control. Emphasis on analytical evaluation of cases with major research project. (Lec. 3) Pre: graduate standing in accounting or permission of M.S. in accounting director.

**MAC 505 Advanced Problems in Accounting** (3 crs.) Integrative and specialized accounting problems. (Lec. 3) Pre: graduate standing in accounting or permission of M.S. in accounting director.

**MAC 506 Seminar in Tax Research, Policy, and Planning** (3 crs.) Examination of the methodology of tax research, the principles and procedures, involved in tax planning, and the procedures involved in dealing with the IRS. (Seminar) Pre: BUS 403 or MAC 510 or equivalent

**MAC 507 International Accounting** (3 crs.) Covers interpretation of international financial statements, focusing on foreign

currency exchange, comparative accounting principles and disclosures, and audit reports. Uses actual financial statements in case analysis. (Lec. 3) Pre: MBA 503 or permission of instructor.

**MAC 508 Advanced Auditing** (3 crs.) Statements on auditing standards, auditing electronic systems, auditors' reports, statistical sampling in auditing, regulations of SEC, and cases in auditing. (Lec. 3) Pre: BUS 404.

**MAC 509 Taxation of Flow Through Entities** (3 crs.) Examines the federal income tax laws applicable to the flow through entities of partnerships and corporations. Pre: BUS 403.

**MAC 510 Federal Taxes and Business Decisions** (3 crs.) The course focuses on tax law and its effect on business decisions. Cases are employed and primary emphasis is on income tax planning, although estate and gift taxes are explored. (Lec. 3) Pre: MBA 503

**MAC 515 Law and Accounting** (3 crs.) Introduction to C.P.A. law exam, question and answer techniques, coverage of most accounting-legal subjects currently included on the C.P.A. exam. (Lec. 3) Pre: MBA 530 or BUS 315 or BUS 317 or permission of dean.

**MAC 518 Directed Study in Accounting** (1-3 crs.) Advanced work under the supervision of a faculty member and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**MAC 519 Directed Study in Accounting** (1-3 crs.) Advanced work under the supervision of a faculty member and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**MAC 520 Internship in Accounting PRA** (3 crs.) Participation in management and/or problem solving under the supervision and guidance of a sponsoring agency with evaluation by the College of Business Administration. (Practicum) Pre: proposal acceptance by the College of Business Administration, no previous internship credit, graduate standing. S/U credit.

## MAF | Marine Affairs

**MAF 100 Human Use and Management of the Marine Environment** Examination of uses and management efforts in the coastal and ocean environment. Assessment of problems arising from those uses and attempts to conserve resources, protect the environment, and minimize use conflicts in the context of changing technological capabilities, knowledge, and values. (Lec. 3) (S)

**MAF 120 New England and the Sea** (3 crs.) An examination of the human and environmental impacts of the sea and its uses on the New England and Gulf of Maine region. Considers marine resource use and management from colonial to modern times. (Lec. 3)

**MAF 220 Introduction to Marine and Coastal Law** (3 crs.) Basic principles of marine and coastal law in the United States. An integration of coastal zone, outer continental shelf, fisheries, marine pollution, and admiralty laws. (Lec. 3) (S) [D]

**MAF 312 The Politics of the Ocean** (3 crs.) Survey of decision making with respect to the marine environment at the international, national, and local levels. Special emphasis on laws and treaties of the United States and the United Nations. (Lec. 3)

**MAF 320 Shipping and Ports** (3 crs.) An introduction to waterborne movement of cargo. An examination of shipping and port operations, innovations in maritime transportation systems, and the interplay of the operators, shipping, and ports. (Lec. 3) Pre: MAF 100.

**MAF 330 World Fishing** (3 crs.) The role of marine fisheries and aquaculture in world food production. Social, economic, legal, and scientific issues in fisheries management. (Lec. 3) Pre: MAF 100.

**MAF 410 Senior Seminar in Marine Affairs** (3 crs.) Advanced work in the management of the coastal and marine environment, with special emphasis on case studies and student projects. Seniors only. (Seminar) Required for seniors in marine affairs. Not for graduate credit in marine affairs.

**MAF 413 Peoples of the Sea** (3 crs.) Cross-listed as (APG), MAF 413. Examination of human sociocultural adaptation to the seas. (Lec. 3) Pre: APG 203 or MAF 100 or graduate status. Open only to juniors, seniors, and graduate students.

**MAF 415 Marine Pollution Policy** (3 crs.) Introduction to management techniques for marine pollutants (biodegradable materials, nutrients, petroleum, metals, synthetic organics, radioactive materials, plastics, heat, and dredge spoils) with emphasis on strategies to limit environmental impacts. (Lec. 3) Pre: junior standing or above. Not for graduate credit.

**MAF 461 Coastal Zone Management** (3 crs.) Examination of activities and management efforts in the coastal zone of both developed and developing countries and their impacts on the environment. Resolution of use conflicts. (Lec. 3)

**MAF 465 GIS Applications in Coastal and Marine Management** (3 crs.) The use of geographical information systems (GIS) technology in coastal and marine settings. Database acquisition and management are emphasized. Case application in coastal zone management, artificial habitat, and fisheries management. (Lec. 3)

**MAF 471 Island Ecosystem Management** (3 crs.) An ecosystem approach to the sustainable development and environmental management of mid-oceanic islands in the Caribbean and the Pacific Ocean. Topics include tourism, reef fishery, cultural heritage and marine conservation. Simulation game on island-wide management process. (Lec. 3)

**MAF 472 Marine Recreation and Tourism Management Seminar** (3 crs.) Analysis of domestic and international case studies emphasizing identification of and solutions to problems of coastal recreation and tourism. Use of experiential learning. Emphasis placed on presentation, leadership, and negotiation skills. (Seminar)

**MAF 475 Human Responses to Coastal Hazards and Disasters** (3 crs.) Examines the impact of hazards and disasters on human population inhabiting the coastal zone. Sets human adaptations to coastal hazards and disasters in an historical context. Extracts lessons learned for comparative analysis. (Lec. 3)

**MAF 482 Quantitative Methods in Marine Affairs** (3 crs.) Introduction to descriptive and inferential statistics in geography and marine affairs. Emphasis on the spatial application of statistical tests with particular utility to the geographer and marine affairs students. (Lec. 3) Pre: STA 220 or equivalent for undergraduate students.

**MAF 484 Environmental Analysis and Policy in Coastal Management** (3 crs.) Analysis of environmental policy strategies as applied in federal and state coastal management programs. Emphasis on coastal environmental assessment and program evaluation techniques, hazards management, regulatory frameworks, and environmental ethics. (Lec. 3)

**MAF 490 Field Experience In Marine Affairs PRA** (3-6 crs.) Supervised undergraduate internship within an approved work setting designed to provide students with on-the-job experience relevant to their academic training and career goals. Students are responsible for securing internship positions and learning contract. (Practicum) Pre: permission of instructor, senior standing recommended. Not for graduate credit.

**MAF 491 Special Problems** (3 crs.) Individual guidance in major readings and methods of research. (Independent Study) Pre: permission of chairperson.

**MAF 492 Special Problems** (3 crs.) Individual guidance in major readings and methods of research. (Independent Study) Pre: permission of chairperson.

**MAF 494 Cases In Marine Policy** (3 crs.) A single, current problem drawn from areas such as coastal management, ports, or fisheries is examined through detailed analysis of alternatives and decision processes. (Seminar) Pre: permission of instructor or chairperson.

**MAF 499 Directed Study** (1-3 crs.) Individual research and reports on problems of special interest, including honors thesis research. (Independent Study) Pre: permission of instructor.

**MAF 502 Research Methods in Marine Affairs** (3 crs.) Emphasis on the application of alternative research methods utilized in a typical interdisciplinary study. Development of specific research projects. (Lec. 3) Pre: MAF 482 or permission of instructor.

**MAF 511 Ocean Uses and Marine Sciences** (3 crs.) Introduction to selected ocean uses focusing on the interplay of public policy and marine science. Emphasis on policy implications of uses such as resource and energy extraction. (Lec. 3)

**MAF 515 Marine Pollution Policy** (3 crs.) Introduction to management techniques for marine pollutants (biodegradable materials, nutrients, petroleum, metals, synthetic organics, radioactive materials, plastics, heat, and dredge spoils) with emphasis on strategies to limit environmental impacts. (Lec. 3) Pre: graduate standing only.

**MAF 516 Seminar On The Urban Waterfront** (3 crs.) Cross-listed as (MAF), CPL 516. The urban environment and its evolution, structure, and function as it pertains to metropolitan waterfronts and small recreational harbors. Emphasis on the permitting process, public participation, marine recreation, and management issues. Field trip and student project required. (Seminar)

**MAF 521 Coastal Zone Law** (3 crs.) Examination of the authority of different levels and agencies of government to make decisions affecting coastal regions. Survey of existing and proposed state and national legislation affecting coastal regions. (Lec. 3)

**MAF 523 Fisheries Law and Management** (3 crs.) Examination of the relationship between law and fisheries policy on the international and national levels, law relating to fisheries, jurisdictional levels, function of law in implementing fisheries management policy. (Lec. 3)

**MAF 526 Management of Marine Protected Areas** (3 crs.) Examination of ecological, political, legal and social factors in establishing and managing marine protected areas. Case studies of MPA efforts highlight interrelationships among interest groups, institutions, and legislation. (Lec. 3)

**MAF 527 Marine Protected Areas: An Interdisciplinary Analysis** (3 crs.) Cross-listed as (MAF), NRS 527. Examination of the ecological, political, social, cultural, and economics factors influencing the use of MPAs (Lec. 3) Pre: permission of instructor.

**MAF 563 Maritime Transportation Passenger and commodity transportation.** Analysis of the relationship between transportation services and the spatial distribution of activities. Emphasis on multimodal transport and bulk commodities. (Lec. 3) Pre: Senior or graduate standing or permission of instructor.

**MAF 564 Port Operations and Policy** (3 crs.) Analysis of coastal and international trade routes and the response of ports. Special emphasis on the container revolution, liquid natural gas transportation, and deep-water ports for supertankers. (Lec. 3)

**MAF 565 Cruise Ship Operations, Marketing, and Ports** (3 crs.) Explores the many facets of the cruise ship industry from the points of view of social, management,

and policy science. Designed to familiarize the student, utilizing an interdisciplinary approach, with the genesis, current status, and future roles of this dynamic industry. (Seminar) Pre: graduate standing, or seniors with permission of instructor.

**MAF 577 International Ocean Law** (3 crs.) Cross-listed as (MAF), PSC 577. Principles of international law as they relate to ocean management problems. Jurisdiction in zones, such as territorial seas, exclusive economic zones, and the high seas will be examined, as well as the problems posed by zonal approaches to ocean-use management.

**MAF 578 International Ocean Organizations** (3 crs.) International organizations involved in marine-related activities, including their planning, management, regulatory, and assistance functions. Attention to the impact of organizations on ocean management efforts in the developed and developing world, (Lec. 3) Pre: MAF 577 or permission of instructor.

**MAF 582 Coastal Ecosystem Governance** (3 crs.) This course links human impacts on coastal environments with existing or proposed governance solutions. Management regimes for individual sectors, coastal regions, and land/estuarine ecosystems are introduced and compared. (Seminar)

**MAF 589 Master's Project Research** (3 crs.) Preparation of a major research paper for M.M.A. students under the guidance of a graduate faculty member. (Independent Study) Pre: graduate standing in the M.M.A. program. S/U credit.

**MAF 591 Directed Study or Research** (3 crs.) Areas of special research interest of graduate students. (Independent Study) Pre: permission of chairperson.

**MAF 592 Directed Study or Research** (3 crs.) Areas of special research interest of graduate students. (Independent Study) Pre: permission of chairperson.

**MAF 595 Environment and Development Economics** (3 crs.) Cross-listed as (EEC), MAF, PSC, SOC 595. Application of economic principles and research methods to understand the economics of environmental and natural resource management and poverty alleviation. (Lec. 3) Pre: EEC 528 or permission of instructor.

**MAF 599 Master's Thesis Research** Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**MAF 602 Federal Ocean Policy and Organization** (3 crs.) Ocean policy development and implementation by the executive and legislative branches of government. Allocation of powers and analysis of the decision-making process for the oceans. (Lec. 3)

**MAF 651 Marine Affairs Seminar** (3 crs.) Interdisciplinary seminar conducted by marine affairs program faculty supplement-

ed by guest speakers from industry and government. Focuses on problems of marine resources development and management at the local, state, national and international policy levels. (Seminar)

**MAF 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. Maximum of 6 credits of 699 may be taken prior to completing approved dissertation proposal. (Independent Study) S/U credit.

## MBA | Master's in Business Administration

**MBA 500 Statistical Methods for Management** (3 crs.) Introductory statistical methods applied to business problems. Topics include descriptive statistics, probability, distributions, inference, regression analysis, chi-square analysis, and introduction to time series. (Lec. 3) Graduate credit for students matriculated in the M.B.A. and M.S. in accounting programs only.

**MBA 501 Computing for Management** (2-3 crs.) Computer concepts and programming using spreadsheet, database, presentation, communication, and other software packages. Emphasis on PC computing as an administrative and analytic tool for applications in management. (Lec. 2-3)

**MBA 502 Organizational Behavior** (3 crs.) Examination of the theory, research, and practice of organizational behavior in work settings, focusing on individual differences, communications, group dynamics, motivation, and leadership in the workplace. Cannot be taken for credit if student has already taken MBA 532. (Lec. 3)

**MBA 503 Financial Accounting** (3 crs.) Covers basic accounting principles, accounting systems design, and financial reporting issues. Focusing on financial statement analysis techniques necessary to accurately assess a company's financial position and results of operations. (Lec. 3) Pre: MBA 500. Cannot be taken for credit if student has already taken MBA 533.

**MBA 504 Financial Management** (3 crs.) Functions and responsibilities of financial managers. Examination of: financial statement analysis, cost of capital, capital structure, valuation, markets, capital budgeting, working capital, mergers, bankruptcy, multinational finance. (Lec. 3) Pre: MBA 500, 503 or 533, and ECN 590. Cannot be taken for credit if student has already taken MBA 534.

**MBA 505 Managerial Marketing** (3 crs.) Analysis of marketing problems and determination of marketing policies in product development, promotion, pricing, channel selection; legal aspects. (Lec. 3) Pre: MBA 500 or permission of instructor.

**MBA 506 Mathematical Methods for Management** (3 crs.) Fundamental mathe-

matical methods applied to the understanding and solution of managerial problems. Topics include the solution of systems of linear equations, differential calculus, and related areas. (Lec. 3) Graduate credit for students matriculated in the M.B.A. and M.S. in accounting programs only.

**MBA 510 Managerial Accounting** (3 crs.) Determination of accounting information for the purposes of decision making, control, and evaluation with emphasis on decision models using accounting information. (Lec. 3) Pre: MBA 500 and MBA 503 or MBA 533. Cannot be taken for credit if student has already taken MBA 537.

**MBA 516 Professional Writing, Speaking and Presenting** (1 cr.) Development of professional writing, speaking, and presentation skills. (Lec. 1) Pre: Open to one year MBA students only.

**MBA 517 Business Foundations 1** (4 crs.) Provide an in-depth understanding of the fundamentals of statistics, management, accounting and finance needed to define, measure, analyze, improve and control organizational strategic decisions and challenges. (Lec. 4) Pre: Open to one year MBA students only.

**MBA 518 Business Foundations 2** (4 crs.) Provide an in-depth understanding of the fundamentals of marketing, supply chain management, economics and information technology needed to define, measure, analyze, improve and control organizational strategic decisions and challenges. Pre: Open to one year MBA students only.

**MBA 519 Customer and Project Analysis** (2 crs.) Identifying problems in organizations using continuous improvement, including defining case for change, stakeholders affected, scope of the problem, schedule for addressing problem, and outcomes associated with solutions. (Lec. 2) Pre: Open to one year MBA students only.

**MBA 520 Objectives and Metrics** (2 crs.) Knowledge of business metrics, including identify current key metrics, validate metrics, identify sources of data, and determine how data is used in decision making processes. Emphasis on finance and accounting. (Lec. 2) Pre: open to one-year M.B.A. students only.

**MBA 521 Situation Analysis and Solution Development** (2 crs.) Analyzing the current business environment to determine current resources available, possible causes of failure, and obstacles of success for proposed solutions. (Lec. 2) Pre: Open to one year MBA students only.

**MBA 522 Business Process Improvement and Sustainability** (2 crs.) Identify possible improvements in business and corporate social responsibility. Course topics include continuous improvement, product and process innovation, improvement assessment, business responsibility and sustainability. (Lec. 2) Pre: Open to one year MBA students only.

**MBA 523 Risk Assessment, Change and Control** (2 crs.) Determine how to control risk, cost, quality, and change; define how progress and success will be tracked; and identify mechanisms to ensure change is implemented and sustained. (Lec. 2) Pre: Open to one year MBA students only.

**MBA 524 Innovation, Process and Performance** (4 crs.) Integration of four disciplines: business, technology, organization, and customers. Offers a perspective on delivering unique value with an emphasis on quality, efficiency, productivity and performance. (Lec. 4) Pre: Open to one year MBA students only.

**MBA 525 Business Innovation Process** (6 crs.) Project based learning on how business processes are analyzed, studied and improved upon. Utilizes continuous improvement methodology to deliver business innovation. (Lec. 6) Pre: Open to one year MBA students only.

**MBA 526 Product and Service Management** (6 crs.) Project based learning to develop business ideas, market strategy, quality control, and life cycle of product and service development. Utilizing creative design processes to deliver product innovation. (Lec. 6) Pre: Open to one year MBA students only.

**MBA 527 Protection Contracts and Intellectual Property** (2 crs.) Business protection contracts and the laws that govern intellectual property, patents, copyrights, trademarks, trade secrets, and talented people. (Lec. 2) Pre: Open to one year MBA students only.

**MBA 528 Innovation Enterprises and Information Technology** (4 crs.) Examining knowledge acquisition leading to innovation and competitive advantage. Management of the acquisition, processing, storage, and dissemination of vocal, pictorial, textual, and numerical information. (Lec. 4) Pre: Open to one year MBA students only.

**MBA 529 Career Planning** (1 cr.) Implement career planning by researching career options, setting individual goals, preparing cover letters and resumes, and practicing for interviews. (Lec. 1) Pre: Open to one year MBA students only.

**MBA 530 Legal Environment of Business** Coverage includes both substantive and procedural rules of law in the civil and administrative law field with emphasis on business, regulation, societal, and ethical issues. (Lec. 3) Pre: graduate standing.

**MBA 532 Organizational Behavior for Healthcare Professionals** (3 crs.) Examination of the theory, research and practice of organizational behavior in health care organizational settings. Focus on individual differences, communications, group dynamics, motivation and leadership in the workplace. Cannot be taken for credit if student has already taken MBA 502. (Lec. 3)

**MBA 533 Financial Accounting for Healthcare Professionals** (3 crs.) Learn to prepare, interpret and use health care

financial reports. Cannot be taken for credit if student has already taken MBA 503. (Lec. 3) Pre: MBA 500 or permission of instructor.

**MBA 534 Financial Management for Healthcare Professionals** (3 crs.) Learn operational knowledge of healthcare financial management theory and concepts, and apply in a healthcare environment. Cannot be taken for credit if student has already taken MBA 504. (Lec. 3) Pre: ECN 590, MBA 500, MBA 503 or 533, or permission of instructor.

**MBA 535 Information Resources for Healthcare Professionals** (3 crs.) Concepts of information technology and information systems in the context of a healthcare organizational environment. Cannot be taken for credit if student has already taken MBA 550. (Lec. 3)

**MBA 536 Healthcare Operations and Supply Chain Management** (3 crs.) Learn the factors that impact the design and management of healthcare operations and supply chains. Cannot be taken for credit if student has already taken MBA 560. (Lec. 3) Pre: MBA 500 or permission of instructor.

**MBA 537 Managerial Accounting for Healthcare Professionals** (3 crs.) Learn to identify, explain, and use managerial accounting information needed by an organization's management for decisions in a health care environment. Cannot be taken for credit if student has already taken MBA 510. (Lec. 3) Pre: MBA 500, MBA 503 or 533, or permission of instructor.

**MBA 540 Organizational Decision Making and Design** (3 crs.) Theory and skills development in strategic thinking and organizational design; use of critical analysis in the diagnosis of organizational and management problems. (Lec. 3) Pre: graduate standing.

**MBA 550 Managing with Information Resources** (3 crs.) Concepts of information technologies and systems as they relate to the information-age organization. Major focus is on how the various information resources can be managed to facilitate organizational effectiveness. Topics include information and communication technologies, decision support and information systems, technology-enabled process re-engineering, and information architecture. (Lec. 3) Pre: permission of instructor. Cannot be taken for credit if student has already taken MBA 532.

**MBA 555 Managerial Economics** (3 crs.) The applications of economic theory and methodology to business problems. (Lec. 3) Pre: MBA 504 or 534, 550 or 535, 560 or 536.

**MBA 558 Fixed Income Security Analysis** (3 crs.) To provide a working knowledge of the fixed-income markets; analyze portfolio of fixed income securities, strategies and performance; study mortgage backed securities. (Lec. 3) Pre: MBA 504 or equivalent

**MBA 560 Operations and Supply Chain Management** (3 crs.) The management of manufacturing and service operations. Topics

include flow processes, inventories, scheduling, capacity, and operations strategy. (Lec. 3) Pre: MBA 500. Cannot be taken for credit if student has already taken MBA 536.

**MBA 562 Global Supply Chain Management** (3 crs.) Examines the factors that impact the design and management of Global Supply Chains through strategic relationships and tactical activities. (Lec. 3) Pre: MBA 560 or 536.

**MBA 565 Strategic Management** (3 crs.) Case studies of management problems and evaluation of alternative solutions by integrating functional areas of business. Discussion of ethical, social, and regulatory environments in domestic and multinational firms. Includes the MBA written comprehensive examination. (Lec. 3) Service learning. Pre: All MBA 500 first level courses or equivalent and a minimum of 21 MBA credits which must include MBA 502 or 532, 503 or 533, 504 or 534, and 505, or permission of instructor.

**MBA 566 Security and Investment Analysis** (3 crs.) Analysis of the problems of investing funds and managing investments. Use of the latest investment theories and their implementation via quantitative techniques will be explored. (Lec. 3) Pre: MBA 504 or 534.

**MBA 567 Advanced Portfolio Theory and Security Analysis** (3 crs.) An examination of advanced theories and practices in portfolio building and maintenance. Issues related to security price behavior are also examined. (Seminar) Pre: MBA 504 or 534 or equivalent.

**MBA 568 Advanced Financial Theory** (3 crs.) Analysis of the theoretical framework for corporate decision making related to financial planning, capital budgeting decisions, dividend policy, and capital structure decisions. Emphasis on current research developments. (Seminar) Pre: MBA 504 or 534 or equivalent.

**MBA 569 Advanced International Financial Management** (3 crs.) Analysis of issues relevant to the international financial manager. The financial operations of multinational enterprises are examined through both the theoretical and the case approach. (Seminar) Pre: MBA 504 or 534 or equivalent.

**MBA 570 Hedge Fund Management and Investment Bank** (3 crs.) Introduce performance of hedge fund strategies, performance, fees, and organization structure. Discuss the practice and issues related to investment banking. (Lec. 3) Pre: MBA 504 or equivalent.

**MBA 571 Labor Relations and Human Resources** (3 crs.) Cross-listed as (LRS 500), MBA 571. Introduction to labor relations and human resources, including employment practices in unionized and non-union organizations; also issues related to data sources and research methodology. (Lec. 3) Pre: graduate standing or permission of instructor.

**MBA 572 Human Resource Strategy** (3 crs.) Cross-listed as (LRS 551), MBA 572.

Human resource issues addressed in context of changing product and labor markets, including relationship among human resource policies; the economic, social, and political environment; and firms' strategic objectives. (Lec. 3) Pre: permission of instructor.

**MBA 573 Staffing Organizations** (3 crs.) Cross-listed as (LRS), MBA 573. Introduction to the staffing process from scientific, legal, administrative, and strategic perspectives. Covers workforce planning, strategic staffing, job analysis, recruitment, selection testing, interviewing, and making final hiring decisions. Pre: MBA 502 or LRS 500/MBA 571

**MBA 574 Consulting and Management Practice PRA** (3 crs.) Review of the theory and practice of effective consulting and development of consultation skills. (Practicum) Pre: MBA 502 or permission of instructor.

**MBA 575 Seminar in Management** (3 crs.) Class discussion of typical cases, original research work in the field of management with discussion of data collected and analyzed by individual students. (Seminar) Pre: permission of dean.

**MBA 576 Advanced Topics In Management** (3 crs.) Integrated approach to problems in major areas of business management with emphasis on administrative and executive viewpoint. (Seminar) Pre: permission of dean.

**MBA 577 Compensation Administration** (3 crs.) Compensation and performance appraisal systems. Theory and techniques used to determine job worth. Special issues in compensation management, such as relating pay to performance through appraisal techniques and pay compression. (Lec. 3) Pre: MBA 502 or 532 or permission of instructor.

**MBA 578 Human Resource Development** (3 crs.) Techniques used in procurement and development of human resource. Planning through recruitment, selection, and placement to training and development. Integration of HRD process with organizational strategic plans. (Lec. 3) Pre: MBA 502 or permission of instructor.

**MBA 579 International Business Management** (3 crs.) Examines the problems and characteristics of international management by focusing on the role of the multinational corporation in a cross-cultural setting. (Lec. 3) Pre: MBA 502 or 532 or permission of instructor.

**MBA 580 Management Systems Analysis And Design** (3 crs.) An overview of Systems Analysis and Design, and its role in the development of information systems. Major focus is on the methodologies, techniques and tools used to create successful information systems. (Lec.3) Pre: MBA 550 or 535 or permission of instructor.

**MBA 581 Database Management Systems** (3 crs.) Design and analysis of complex multi-user databases used in real time business transaction processing. The class will contain discussion and examination of

databases for strategic and tactical purposes. (Lec.3)

**MBA 582 Applied Time Series Methods And Business Forecasting** (3 crs.) Study of time series methods. Construction and use of autoregressive integrated moving averages (ARIMA) forecasting models. Applications to strategic decision actions. (Lec. 3) Pre: MBA 500 or permission of instructor.

**MBA 583 Seminar in Operations and Supply Chain Management** (3 crs.) Preparation and presentation of papers on selected topics in operations management and supply chain issues. (Seminar) Pre: MBA 560 or 536 or permission of instructor.

**MBA 584 Buyer Behavior** (3 crs.) Analysis of major factors influencing the behavior and demand of consumers. Emphasis on using these factors to identify and segment target markets and to assess the effects of these factors on markets. (Lec. 3) Pre: MBA 505 or permission of instructor.

**MBA 585 Marketing Research** (3 crs.) Marketing information needs and appropriate means of providing the requisite information are analyzed. Several major marketing decision areas and their research implications are examined in depth. (Lec. 3) Pre: MBA 500, 505, 506, ECN 590 or permission of instructor.

**MBA 586 International Marketing Management** (3 crs.) Marketing policy making for the multinational firm; organizing for international marketing; its opportunities, pricing, channels, promotion, and research. (Lec. 3) Pre: MBA 505 or permission of instructor.

**MBA 587 Product Management** (3 crs.) Development of product policies and strategies. Emphasis on organizing the marketing function to deal with various product-related activities including new product development, life cycle strategies, and product deletion. (Lec. 3) Pre: MBA 505 or permission of instructor.

**MBA 588 Marketing Communications Management** (3 crs.) Provides an in-depth knowledge base for developing effective and efficient strategic marketing communications. Covers communication objectives, strategies, and tactics, and explores when to use them. Pre: MBA 505.

**MBA 591 Directed Study in Business** (1-3 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**MBA 592 Directed Study in Business** (1-3 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**MBA 593 Internship in Business Administration** (3-6 crs.) Participation in business administration under the field supervision of

a sponsoring organization with evaluation by the College of Business Administration. (Independent Study) Pre: proposal approved by the College of Business Administration. S/U credit.

**MBA 594 Internship in Business Administration** (3-6 crs.) Participation in business administration under the field supervision of a sponsoring organization with evaluation by the College of Business Administration. (Independent Study) Pre: Proposal approved by the College of Business Administration. S/U credit.

## MCE | Mechanical Engineering

**MCE 201 Engineering Graphics** (3 crs.) Introduction to the principles of graphic representation in engineering design, with emphasis on computer-aided drafting, orthographic projection, isometric and auxiliary views, sections, dimensioning, and rapid prototyping. (Lec. 2, Lab. 3)

**MCE 262 Statics** (3 crs.) Newton's laws of force systems in equilibrium and their effects on particles, systems of particles, and rigid bodies. Both scalar and vector methods of analysis are developed. (Lec. 3) Pre: MTH 141 and credit or concurrent enrollment in EGR 106, or permission of instructor.

**MCE 263 Dynamics** (3 crs.) Kinematic and kinetic study of motion of particles, systems of particles, and rigid bodies, acted upon by unbalanced force systems, using both scalar and vector methods; development of methods of analysis based on the direct application of Newton's laws, work-energy and impulse-momentum principles. (Lec. 3) Pre: 262.

**MCE 301 Application of Mechanics in Design** (3 crs.) Concepts of engineering design, material selection, failure theories, fracture and fatigue, and finite-element analysis. Application to the design of mechanical components such as shafts, bolts, welded joints, and springs. (Lec. 3) Pre: CVE 220, credit or concurrent enrollment in ISE 240, and ((at least a 2.0 (C) average in PHY 203, MCE 262, CVE 220 and students must be admitted to the College of Engineering) or permission of instructor.

**MCE 302 Design of Machinery** (3 crs.) Analysis and design of mechanisms and machine elements including linkages, gear trains, cam-follower systems, bearings, brakes and clutches, flexible mechanical elements, and intermittent and other devices. Graphical, analytical and computer-aided synthesis techniques. (Lec. 3) Pre: (MCE 201 or permission of instructor) and 263 and 301).

**MCE 313 Introduction To Mechanical Engineering Experimentation** (3 crs.) Report writing, computer-assisted data acquisition and control, statistical and other measures of data uncertainty, propagation of uncertainty, curve fitting. Introduces basic instrumenta-

tion for measuring pressure, temperature, velocity and strain. (Lec. 2, Lab. 3) Pre: CVE 220 and concurrent registration in MCE 341 and MCE 354.

**MCE 341 Fundamentals of Thermodynamics** (3 crs.) Basic principles and laws of thermodynamics and their relation to pure substances, ideal gases, and real gases. Use of thermodynamic property tables. Development of concepts of reversibility and availability. First and Second Law application to engineering systems; power and refrigeration cycles. (Lec. 3) Pre: MCE 263 and MTH 243.

**MCE 348** (448) Heat and Mass Transfer (3 crs.) Transfer of heat by conduction, convection, and radiation in steady and unsteady states. Theory and application of dimensional analysis; heat and mass transfer in equipment such as heat exchangers and steam condensers. (Lec. 3) Pre: 341 and 354 and 372, or permission of instructor. Not for graduate credit.

**MCE 354 Fluid Mechanics** (3 crs.) Physical properties of fluids, development of continuity, energy, and momentum concepts using vector methods; application to problems involving viscous and nonviscous fluids including boundary layer flows, flows in closed conduits and around immersed bodies. (Lec. 3) Pre: MCE 263 and MTH 243 or permission of instructor.

**MCE 366 System Dynamics** (3 crs.) Systems analysis emphasizing control and vibration. Time and frequency domain techniques. Modeling of typical mechanical, hydraulic, pneumatic, and thermal systems. Transfer functions and block diagram methods. Elementary control laws. (Lec. 3) Pre: MCE 263 and MTH 244 and (students must be admitted to the College of Engineering or permission of instructor.

**MCE 372 Engineering Analysis** (3 crs.) Application of advanced mathematical methods and computer software to solution of mechanical engineering problems with emphasis on the techniques of engineering analysis. (Lec. 3) Pre: EGR 106, MTH 243, MTH 244, or permission of instructor.

**MCE 401 Mechanical Engineering Capstone Design I** (3 crs.) Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering problems. First of a two-course sequence. (Lec. 2, Lab. 3) Pre: MCE 302 and 366 and 448 and ISE 240 and concurrent registration in CHE 333, or permission of instructor. Must be taken in the semester prior to MCE 402. Not for graduate credit.

**MCE 402 Mechanical Engineering Capstone Design II** (3 crs.) Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering problems. Second of a two course sequence. (Lec. 2, Lab. 3) Pre: MCE 401. Must be taken in the semester following MCE 401. Not for graduate credit.

**MCE 411 Probability and Statistics for Engineers** (3 crs.) Cross-listed as (ISE), MCE 411. Introduction to probability and statistics in engineering applications including data analysis, probability theory, probability distributions, sampling distributions, statistical inference, hypotheses testing, confidence intervals, analysis of variance, and receiver operating characteristics. (Lec. 3) Pre: MTH 142

or permission of instructor.

**MCE 414 Mechanical Engineering Experimentation** (3 crs.) Course aims to build on foundation from MCE 313 and to apply experimental tools to topics from the two main emphasis areas in the undergraduate curriculum, mechanical systems and thermal systems. (Lec. 2, Lab. 3) Pre: MCE 313 and concurrent registration in 448. Not for graduate credit.

**MCE 426 Advanced Mechanics of Materials** (3 crs.) Introduction to continuum mechanics: stress, strain and deformation, constitutive equations. Theories of failure. Shear center and unsymmetrical bending of beam. Curved beams. Energy method. Torsion. (Lec. 3) Pre: MCE 301 or permission of instructor.

**MCE 428 Mechanics of Materials in Extreme Environments** (3 crs.) Study of material microstructure and mechanical properties, high loading rate mechanics, time-dependent deformation mechanisms, energy generation applications, materials in irradiated environment, and future directions in materials for extreme environments. (Lec. 3) Pre: CVE 220, or permission of instructor.

**MCE 431 Computer Control of Mechanical Systems** (3 crs.) Use of computers to control mechanical systems. Advanced control algorithms. Computer-aided design methods. Digital control algorithms and software implementation. Interfacing and digital controller hardware. (Lec. 3) Pre: MCE 366 or permission of instructor.

**MCE 433 Mechatronics** (3 crs.) Design of microprocessor-controlled electromechanical systems. Topics covered include: real-time programming, motion control elements, interfacing of sensors and actuators, basic electronics, and microprocessor architecture. (Lec. 2, Lab. 2) Pre: MCE 366 and ELE 220 or permission of instructor.

**MCE 434 Heating, Ventilation, and Air Conditioning** (3 crs.) Application of the principles of thermodynamics and heat transfer to environmental problems. Topics will include thermal control of living spaces, solar heating and cooling, heat pumps, minimum energy consumption. (Lec. 3) Pre: MCE 341 or permission of instructor.

**MCE 437 Turbomachinery Design** (3 crs.) Application of the principles of thermodynamics and fluid mechanics to the design of rotating machinery such as turbines, compressors, centrifugal and axial flow pumps. (Lec. 3) Pre: MCE 341 and 354 or permission of instructor.

**MCE 438 Internal Combustion Engines** (3 crs.) Principles, design, and operation of internal combustion engines, including cycles, combustion, fuels, detonation, carburetion, cooling, supercharging, ignition, friction, and lubrication. Gasoline and diesel, two- and four-stroke cycles, and performance of various engines including the Wankel rotary. (Lec. 3) Pre: MCE 341 or permission of instructor.

**MCE 440 Mechanics of Composite Materials** (3 crs.) Introduction to the basic concepts of the mechanical behavior of composite materials. Analysis and performance of fiber-reinforced composites. Special design considerations and experimental characterization of composites. (Lec. 3) Pre: CVE 220 or permission of instructor.

**MCE 446 Metal Deformation Processes** (3 crs.) Cross-listed as (ISE), MCE 446. Study of the characteristics of metal flow under different loading conditions. Theories, capabilities, and limitations of a wide range of deformation processes applied to industrial metalworking. (Lec. 3) Pre: ISE 240, CVE 220, and CHE 333.

**MCE 449 Product Design for Manufacture** (3 crs.) Cross-listed as (ISE), MCE 449. Techniques for analyzing product structures for ease of assembly and manufacture. Manual, robot, and high-speed mechanized assembly systems considered for mechanical and electronic products. Covers choice of material and processes in early design. (Lec. 3) Pre: ISE 240 or permission of instructor. Not for graduate credit.

**MCE 454 Tribology** (3 crs.) Introductory course on the basic principles of tribology (friction, wear, lubrication); fundamentals of surface contact; friction theories; wear mechanisms; temperature considerations in sliding contacts; lubrication regimes; materials selection; design of bearings; advanced applications; experimental analysis. (Lec) Pre: CVE 220 and MCE 354 or permission of instructor.

**MCE 455 Advanced Fluid Mechanics** (3 crs.) Continuation of 354. Selected topics in advanced fluid mechanics including potential flows, compressible flow, fluid machinery, and electric and magnetic field effects. (Lec. 3) Pre: MCE 354 or permission of instructor.

**MCE 460 Product Design for the Environment** (3 crs.) Principles and practices of designing more environmentally beneficial products. Environmental effects. Life cycle analysis, recycling and remanufacturing. Design for disassembly and environment. Group projects on product and process design using LCA and DFE analysis tools. (Lec. 3) Pre: ISE 240, CHE 333 or 437.

**MCE 464 Vibrations** (3 crs.) Elementary theory of mechanical vibrations, including the one-degree-of-freedom system, multi-mass systems, vibration isolation, torsional vibration, beam vibration, critical speeds, and vibration instruments. (Lec. 3) Pre: 366 or permission of instructor.

**MCE 466 Introduction to Finite Element Method** (3 crs.) Application of the finite element method to problems in mechanical engineering including plane elasticity, heat transfer, and fluid mechanics. Basic concepts, matrix formulation, interpolation functions, basic element types, and implementation to problem solution. (Lec. 3) Pre: MCE 301 and 372, or permission of instructor.

**MCE 471 Nuclear Reactor Engineering** (3 crs.) Cross-listed as (MCE), CHE 471. Energy production from nuclear reactions, cross sections, number density, and binding energy. Fission process, neutron life cycle, criticality, neutron diffusion, reactor design, reactor kinetics and control, reactivity feedback, nuclear system design. (Lec. 3) Pre: MTH 244 and MCE 341 or CHE 313, or permission of instructor.

**MCE 472 Power Plant System Design and Safety Analysis** (3 crs.) Cross-listed as (MCE), CHE 472. Energy production, power systems, energy conversion system design, safety engineering and design, phenomenological modeling and analysis, probabilistic risk assessment, risk-informed design, advanced power plant systems design. (Lec. 3) Pre: MCE 341 or CHE 313 or permission of instructor.

**MCE 473 Nuclear Fuel Cycle and Performance** (3 crs.) Cross-listed as (CHE), MCE 473. Analysis and design of stages of the nuclear fuel cycle including mining, milling, conversion, enrichment, fuel fabrication, fuel burn-up, spent fuel interim storage, reprocessing, safety and aspects of high level waste. (Lec. 3/Online) Pre: MTH 244 and MCE 341 or CHE 313, or permission of instructor.

**MCE 474 Nuclear Reactor Thermal-Hydraulics** (3 crs.) Cross-listed as (CHE), MCE 474. Analysis and design of stages of the nuclear fuel cycle including mining, milling, conversion, enrichment, fuel fabrication, fuel burn-up, spent fuel interim storage, reprocessing, and aspects of high level waste. (Lec. 3) Pre: (MTH 244 and (MCE 341 or CHE 313)), or permission of instructor. Not for graduate credit.

**MCE 476 Mechanics of Materials in Nuclear Applications** (3 crs.) Cross-listed as (MCE), CHE 476. Nuclear systems, material microstructure and mechanical properties, high temperature deformation mechanisms, radiation effects, reactor materials, materials selection for primary and secondary cycles. (Lec. 3) Pre: (CVE 220 and (CHE 332 or 333)), or permission of instructor.

**MCE 491 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits. Not for graduate credit.

**MCE 492 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be

repeated for a maximum of 12 credits. Not for graduate credit.

**MCE 501 Graduate Seminar** (1 cr.) Seminars and discussions presented by faculty members of academia and industry. Attendance is required of all students in graduate residence. (Seminar) S/U credit.

**MCE 502 Graduate Seminar** (1 cr.) Seminars and discussions presented by faculty members of academia and industry. Attendance is required of all students in graduate residence. (Seminar) S/U credit.

**MCE 503 Linear Control Systems** (4 crs.) Cross-listed as (ELE), MCE 503. State-variable description of continuous-time and discrete-time systems, matrices and linear spaces, controllability and observability, pole-placement methods, observer theory and state reconstruction, MATLAB exercises for simulation and design. (Lec. 4) Pre: ELE 314 or MCE 366 or equivalent and MTH 215 or equivalent.

**MCE 504 Optimal Control Theory** (3 crs.) Cross-listed as (ELE), MCE 504. Quadratic performance indices and optimal linear control, frequency response properties of optimal feedback regulators, state estimation, separation theorem, optimal control of nonlinear systems, Pontryagin's minimum principle. (Lec. 3) Pre: ELE 503.

**MCE 523 Advanced Kinematics I** (3 crs.) Analytical kinematic and dynamic analysis of planar mechanisms, graph theory, topological synthesis, topological analysis, Burmester theory, mechanism design software. (Lec. 3) Pre: MCE 302 or equivalent.

**MCE 530 Real-Time Monitoring and Control** (3 crs.) Fundamentals of the development of real-time software for monitoring and control. Mechanical systems computer interfacing, timing, cooperative and preemptive scheduling, distributed control, RTOS, and embedded control. Laboratory exercises. (Lec. 3) Pre: graduate standing or permission of instructor.

**MCE 534 Vibration-Based Structural Health Monitoring** (3 crs.) Linear and nonlinear vibration signal analysis for the health monitoring of machines and structures; linear/nonlinear signal processing; damage sensitive features extraction; pattern recognition; damage detection, diagnosis and prognosis. (Lec. 3) Pre: graduate standing, or MCE 366 and 372, or permission of instructor.

**MCE 538 Mechanical Engineering Systems** (3 crs.) Modeling and simulation of typical mechanical, thermal, fluid and electromechanical elements found in mechanical engineering systems. Feedback control concepts. Control software structures, and software implementation of control systems. (Lec. 3) Pre: graduate standing or permission of instructor.

**MCE 541 Advanced Thermodynamics I** (3 crs.) Advanced study of classical thermodynamics with emphasis on basic concepts, laws, and thermodynamic relationships.

Selected topics of current interest including areas of irreversible thermodynamics, statistical mechanics, and the thermodynamics of solids. (Lec. 3) Pre: MCE 341 or permission of instructor.

**MCE 545 Heat Transfer** (3 crs.) Conduction in two and three dimensions and conducting systems with radiation and fluid motion. Solutions obtained by mathematics, computer-numerical methods, and analog devices. (Lec. 3) Pre: MCE 448.

**MCE 546 Convection Heat Transfer** (3 crs.) Relationship between heat transfer and fluid flow with emphasis on the solution of governing equations by exact methods, integral methods, and similarity techniques. (Lec. 3) Pre: MCE 448.

**MCE 549 Advanced Product Design for Manufacture** (3 crs.) Cross-listed as (ISE), MCE 549. Techniques for analyzing product structures for ease of assembly and manufacture. Considers mechanical and electronic products and choice of materials and processes. A design project and term paper are required. (Lec. 3) Pre: ISE 240 or permission of instructor. Not for graduate credit for students with credit in ISE 449.

**MCE 550 Theory of Continuous Media** (3 crs.) Foundations for advanced studies in mechanical and thermal behavior of solids and fluids. Cartesian and general tensors, small and large deformation theory, Cauchy and Piola-Kirchhoff stress, conservation principles, constitutive laws with applications to materials of engineering interest. (Lec. 3) Pre: CVE 220, MCE 354, 372 or equivalent.

**MCE 551 Fluid Mechanics I** (3 crs.) Basic treatment of real fluid flows using the continuum mechanics approach. Exact solutions of the governing equations. Laminar shear flows and boundary layer theory, turbulent transition. (Lec. 3) Pre: MCE 354 or equivalent.

**MCE 552 Advanced Experimental Methods** (3 crs.) Theory and application of various experimental techniques used in fluid mechanics, solid mechanics, and tribology. Emphasis on mechanical and chemical methods of wear detection, and strain and optical techniques of stress evaluation. (Lec. 2, Lab. 3) Pre: MCE 354 and CVE 220 or permission of instructor.

**MCE 561 Computational Methods in Solid Mechanics** (3 crs.) Finite and boundary element methods based on variational and weighted residual concepts implementation to static and dynamic field problems in elasticity, plasticity, and heat conduction. (Lec. 3) Pre: MCE 372 and one graduate course in elasticity or heat conduction.

**MCE 562 Computational Methods in Fluid Flow and Heat Transfer** (3 crs.) Computational techniques and applications for practical problems concerning multidimensional fluid flow, heat and mass transfer, and chemical reactions. (Lec. 3) Pre: undergraduate work in fluid mechanics and heat transfer or permission of instructor.

**MCE 563 Advanced Dynamics** (3 crs.) Newtonian mechanics, motion in rotating coordinate systems, Lagrange's Mechanics, Hamilton's principle. Variational methods, nonconservative and nonholonomic systems; matrix-tensor specifications of rigid body motions, normal coordinates. Hamilton's equation of motion, canonical transformation, Hamilton-Jacobi theory. (Lec. 3) Pre: MCE 366 and 372 or equivalent.

**MCE 564 Advanced Vibrations** (3 crs.) Theory of vibration of lumped-parameter multi-degree-of-freedom systems; distributed-parameter systems: exact and approximate solutions; nonlinear and random vibrations. Experimental methods and design procedures. (Lec. 3) Pre: MCE 366 or MCE 464 or equivalent.

**MCE 565 Wave Motion and Vibration of Continuous Media** (3 crs.) Wave motion and vibrations of strings, rods, beams, plates, and membranes; dynamic elasticity theory; Rayleigh surface waves; solutions using separation of variables and integral transforms. (Lec. 3) Pre: MCE 372, 464, or equivalent.

**MCE 566 The Mechanics of Robot Manipulators** (3 crs.) Detailed analysis of the kinematics, dynamics, and control of industrial-type robot manipulator systems. (Lec. 3) Pre: MCE 302, 366, or permission of instructor.

**MCE 567 Experimental Nonlinear Dynamics** (3 crs.) Fundamentals of the experimental analysis of nonlinear dynamical systems; mathematical concepts and algorithmic tools to characterize, analyze, model, and predict dynamics of nonlinear systems. (Lec. 3) Pre: MCE 366 or 464 or equivalent.

**MCE 568 Theory of Plates** (3 crs.) Cross-listed as (MCE), CVE 568. Development of basic plate equations. Classical solution examples of rectangular and circular plates. Additional topics selected from orthotropic plates, large deflections, finite element, and numerical solutions. (Lec. 3) Pre: CVE 220 and MTH 244.

**MCE 571 Theory of Elasticity I** (3 crs.) Development of the basic field equations; general concepts of stress and strain; generalized Hooke's law; plane problems; stress functions; Saint Venant torsion and flexure; introduction to three-dimensional problems. (Lec. 3) Pre: CVE 220 or equivalent.

**MCE 576 Fracture Mechanics** (3 crs.) Fundamentals of linear and nonlinear materials behavior, linear elastic fracture mechanics, stress analysis and energy viewpoints, two- and three-dimensional problems, elastic-plastic considerations, dynamic and time-dependent fracture, fatigue crack growth, micro-mechanics of fracture processes, experimental techniques, application to design. (Lec. 3) Pre: MCE 426 or permission of instructor.

**MCE 577 Seminar In Sensors And Surface Technology** (1 cr.) Students, faculty, and invited outside speakers present and discuss



selected topics related to research interests of the Sensors and Surface Technology Partnership. (Seminar) Pre: permission of instructor. May be repeated. S/U credit.

**MCE 578 Seminar in Sensors and Surface Technology** (1 cr.) Students, faculty, and invited outside speakers present and discuss selected topics related to research interests of the Sensors and Surface Technology Partnership. (Seminar) Pre: permission of instructor. May be repeated. S/U credit.

**MCE 580 Micro/Nanoscale Energy Transport** (3 crs.) Fundamentals and applications of energy transport at micro/nanoscale, including equilibrium statistics, Boltzmann transport equation, and nano/microscale heat conduction and radiation, with applications in contemporary technologies. (Lec. 3) Pre: MCE 448 or equivalent, or permission of instructor.

**MCE 591 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit individual requirements of the student. May be repeated for a maximum of 6 credits. Pre: permission of instructor.

**MCE 592 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit individual requirements of the student. May be repeated for a maximum of 6 credits. Pre: permission of instructor.

**MCE 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**MCE 653 Fluid Mechanics II** (3 crs.) Continuation of 551, including turbulent modeling, turbulent shear flows and boundary layers, incompressible irrotational flows, and selected topics such as an introduction to non-Newtonian fluid behavior, geophysical flows, or numerical methods. (Lec. 3) Pre: MCE 551.

**MCE 663 Nonlinear Dynamics** (3 crs.) Nonlinear dynamics theory and its applications to mechanical, chemical, electromagnetic or biological oscillators; stability, phase analysis, limit cycles, bifurcations, perturbation methods, chaos, fractals, strange attractors and other advanced topics. (Lec. 3) Pre: MCE 563 or 564 or permission of instructor.

**MCE 671 Theory of Elasticity II** (3 crs.) Continuation of 571; advanced topics selected from complex variable methods; anisotropic solutions; thermoelasticity; displacement potentials and stress functions for three-dimensional problems; micromechanics modeling; variational, approximate, and numerical methods. (Lec. 3) Pre: MCE 571 or equivalent.

**MCE 678 Micromechanics** (3 crs.) Mechanics of material behavior from the micro structural viewpoint; physical mechanisms of deformation and fracture; continuum mechanics and thermodynamics; rheological

classification of solids; thermodynamics and viscoelasticity; plasticity and viscoplasticity; damage mechanisms; applications to metals, ceramics and composites. (Lec. 3) Pre: MCE 571, CHE 333 or equivalent.

**MCE 679 Theory of Plasticity** (3 crs.) Uniaxial behavior of plasticity; perfect plasticity, plastic potential; work-hardening materials, loading surface and loading rules, flow rules; stress-strain relationships; nonlinear kinematic hardening models; foundation of state-variable approaches, viscoplasticity; applications to engineering materials. (Lec. 3) Pre: MCE 571 or permission of instructor.

**MCE 680 Advanced Topics in Solid Mechanics** (3 crs.) Advanced studies in the mechanics of solids with specific topics determined by current department interests. Designed for students with at least one year of previous graduate studies. (Lec. 3) Pre: permission of instructor. May not be repeated.

**MCE 691 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 6 credits.

**MCE 692 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 6 credits.

**MCE 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## MIC | Microbiology

**MIC 102 Exploring the Microbial World** (3 crs.) A guided tour of aquatic and disease-causing microorganisms, emphasizing their impact on humans. The role of microorganisms in evolution, environmental and human health, biotechnology, and natural product prospecting. (Lec. 3)

**MIC 190 Issues in Biotechnology** (3 crs.) Cross-listed as (AFS), BCH, MIC, NRS, PLS 190. Introduction to modern biotechnology in medical, pharmaceutical, forensic, agricultural, marine, and environmental applications. Consideration of ethical, environmental, health, and social issues. (Lec. 3/Online) (N)

**MIC 201 Introductory Medical Microbiology** (4 crs.) Required of all students in nursing, dental hygiene, and pharmacy. Lecture and laboratory designed to illustrate microbiological principles and techniques. For students in allied health professions. (Lec. 3, Lab. 3) Pre: one semester of biology and one year of chemistry. Not open to students with credit in MIC 211.

**MIC 211 Introductory Microbiology** (4 crs.) Introduction to microorganisms. Morphology, structure, metabolism, genetics,

growth, populations in natural habitat, and their effect on the environment. For biological science majors. (Lec. 3, Lab. 1) Pre: one semester of biology, one year of chemistry. Not open to students with credit in 201.

**MIC 306 Eukaryotic Microbiology/Protistology** (3 crs.) Free-living and disease-causing eukaryotic microorganisms are examined in depth, with a focus on those causing human and animal diseases, inhabiting coastal/marine habitats, or used in research. (Lec. 3) Pre: two semesters of biology.

**MIC 333 Immunology and Serology** (3 crs.) Introduction to the immune response; host resistance to infection; immunopathology; antibodies, antigens, and use of serological techniques. (Lec. 3) Pre: MIC 201 or 211.

**MIC 334 Virology** (3 crs.) An introduction to the basic aspects of virus structure, classification, and replication as these relate to viruses as agents of infectious disease. (Lec. 3) Pre: MIC 201 or 211.

**MIC 409 Marine Micrograzers** (2 crs.) Practical experience with collection, cultivation and identification of diverse marine and coastal heterotrophic protists of the Phylum Ciliophora, using phase, fluorescence and electron microscopy, digital still micrography, videomicroscopy, genetic fingerprinting. (Lab. 4) Pre: two semesters of biology laboratory courses.

**MIC 413 Advanced Microbiology Lecture I** (3 crs.) The physiology, genetics, developmental, and molecular biology of microorganisms. (Lec. 3) Pre: MIC 211, credit or concurrent enrollment in BCH 311 and BIO 352, or permission of instructor.

**MIC 414 Advanced Microbiology Lecture II** (3 crs.) The structural, developmental, and physiological diversity of microorganisms; symbiotic relationships, molecular basis of ecology, and the role of microorganisms in the soil and water environment. (Lec. 3) Pre: MIC 211, credit or concurrent enrollment in BCH 311, or permission of instructor.

**MIC 415 Advanced Microbiology Laboratory I** (2 crs.) Introduction to techniques and methods for advanced study of microbial genetics, physiology, molecular, and developmental biology of microorganisms. (Lab. 6) Pre: concurrent enrollment in 413 or permission of instructor.

**MIC 416 Advanced Microbiology Laboratory II** (2 crs.) Techniques and methods for the advanced study of microorganisms with emphasis on the study of representative groups of microorganisms and the application of these techniques to soil and aquatic environments. (Lab. 6) Pre: concurrent enrollment in 414 or permission of instructor.

**MIC 422 Biotechnology Manufacturing for the Life Sciences** (3 crs.) Cross-listed as (MIC), MLS 422. The use of genetically altered microorganisms and eukaryotic cells for the production of therapeutic agents and vaccines. Upstream and downstream processing, Good Manufacturing processes. (Lec. 3/

Online) Pre: BCH 311 and an advanced course in microbiology, or permission of instructor.

**MIC 432 Pathogenic Bacteriology** The more important microbial diseases, their etiology, transmission, diagnosis, and control. Laboratory, emphasis on methods of diagnosis. (Lec. 2, Lab. 3) Pre: MIC 201 or 211 or one semester of organic chemistry.

**MIC 435 Introduction to the Biology and Genetics of Cancer** (3 crs.) Cross-listed as (BCH), MIC 435. Comprehensive instruction in the biology, genetics and biochemistry of cellular transformation and cancer. (Lec. 3) Pre: BCH 311 or BCH 352, or permission of instructor.

**MIC 447 Experimental Cell Biology** (2 crs.) Use of eukaryotic microorganisms as humane experimental models to analyze cell physiological processes such as endocytosis, motility, and secretion, using immunocytochemistry, biological assays, fluorescent probes, digital still and video imaging. (Lab. 4) Pre: two semesters of biology laboratory courses.

**MIC 450 Practical Tools for Molecular Sequence Analysis** (3 crs.) Cross-listed as (MIC), BPS 450. Introduction to practical ways to analyze DNA, protein and genome datasets. Students will be introduced to computing environments and publicly available software tools for analysis. (Lec. 2, Lab. 2) Pre: BCH 311 or BIO 352 (or BCH 352) or BIO 341 or permission of instructor. Not for graduate credit.

**MIC 451 Laboratory in Cell Biology** (1 cr.) Cross-listed as (BCH), MIC 451. Analysis of subcellular processes, structures, and molecules using techniques including gel electrophoresis, spectrophotometry ultracentrifugation, and protein purification. Topics range from analysis of gene expression to subcellular localization of enzymatic activity. (Lab. 2) Pre: concurrent enrollment in 453 (or MIC 453) or permission of instructor.

**MIC 453 Cell Biology** (3 crs.) Cross-listed as (BIO), BCH, MIC 453. Structure, replication, and function of eukaryotic cells at subcellular level. Topics considered include cell membranes, cytoplasmic organelles and nuclei, cell division, cellular differentiation, and methods. Emphasis on recent publications. (Lec. 3) Pre: two semesters of biological sciences, BCH 311, junior standing, or permission of instructor.

**MIC 483 Introductory Diagnostic Microbiology** (3 crs.) Cross-listed as (MIC), MLS 483. Diagnosis of infectious diseases by use of microbiology, immunology, and hematologic and clinical chemical methods; organisms covered include viruses, bacteria, fungi, and parasites. (Lec. 3) Pre: MIC 201 or 211. Open only to medical laboratory science, microbiology, and cell and molecular biology majors or permission of instructor.

**MIC 491 Research in Microbiology** (1-6 crs.) Special problems in microbiology. Student required to outline a problem, carry on

experimental work, and present conclusions in a report. (Independent Study) Open only to seniors in microbiology. A maximum of 6 credits can be taken for major credit.

**MIC 492 Research in Microbiology** (1-6 crs.) Special problems in microbiology. Student required to outline a problem, carry on experimental work, and present conclusions in a report. (Independent Study) Open only to seniors in microbiology. A maximum of 6 credits can be taken for major credit.

**MIC 495 Seminar In Microbiology** (1 cr.) Preparation and presentation of papers on selected subject in microbiology. (Seminar) S/U credit.

**MIC 499 Biotechnology Internship PRA** (3-12 crs.) Professional field experience in biotechnology. The experience will be defined by a job description and learning contract arranged by the MIC internship coordinator, student intern, and relevant agency. (Practicum) Pre: junior or senior standing and approval by the MIC internship coordinator and department chairperson. A maximum of 12 credits can be taken as major credit. Not for graduate credit.

**MIC 506 Biology of Eukaryotic Microorganisms/Protists** (3 crs.) The biology of free-living and parasitic eukaryotic microorganisms is explored, with an emphasis on systematics, evolution, cell physiology, development, reproduction and molecular biology of those species most commonly used in research at the present time. (Lec. 3) Pre: two semesters of biology.

**MIC 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

**MIC 513 Advanced Clinical Immunology** (3 crs.) Cross-listed as (MLS), MIC 513. Theory, application, and techniques used in clinical immunology: immunochemistry, serology, immunohematology, immunopathology. (Lec. 3) Pre: MLS 406 or MIC 533 or equivalent.

**MIC 521 Recent Advances in Cell and Molecular Biology** (2 crs.) Cross-listed as (BIO), MIC 521. Reading and discussion of current literature (original research papers and review articles) in the area of molecular cell biology, and presentation of oral reports. Final written report or exam. Emphasis on eukaryotic cells. (Lec. 2) Pre: At least one of the following courses or an equivalent course emphasizing cell structure and function -- MIC 453, BCH 437, 453, 481, BIO 437, 453, or permission of instructor. May be repeated for a maximum of 4 credits.

**MIC 522 Bioinformatics I** (3-4 crs.) Cross-listed as (CSC), STA, MIC, BCH, CSC 522, BPS 542. Integrates computing, statistical,

and biological sciences, algorithms, and data analysis/management. Multidisciplinary student research teams. Modeling dynamic biological processes. Extra project work for 4 credits. (Lec. 3, Project 3) Pre: major in a computing, statistical, or biological science or permission of instructor.

**MIC 533 Immunology** (3 crs.) Introduction to the cellular, molecular, and genetic basis of the immune system, and the role of the immune system in immunity to infection, tumor and transplantation immunobiology, and immunopathology. (Lec. 3) Pre: MIC 201 or 211.

**MIC 534 Animal Virology** (3 crs.) Cross-listed as (AFS), MIC 534. Basic properties, classification, and evolution of animal viruses. Individual agents are studied in detail. (Lec. 3) Pre: MIC 432, 533, or permission of chairperson.

**MIC 538 Epidemiology of Infectious Diseases** (3 crs.) Cross-listed as (MIC), AFS, AVS 538. Principles of epidemiology, interrelationships of host, environment, and agent in infectious diseases. (Lec. 3)

**MIC 550 Practical Tools for Molecular Sequence Analysis** (3 crs.) Cross-listed as (MIC), BPS 550. Students will be introduced to practical ways to analyze DNA, protein and genome datasets. Students will be introduced to computing environments and publicly available software tools for analysis. Pre: BCH 311 or BIO/BCH 352 or BIO 341 or permission of instructor.

**MIC 552 Microbial Genetics** (3 crs.) Cross-listed as (BCH), MIC 552. Recent research on the mechanism of mutation, genetic recombination, the genetic code, transposons, regulations, genetic engineering and regulation of DNA, RNA, and protein synthesis in microbial systems. (Lec. 3) Pre: MIC 201, BIO 352, and BCH 311.

**MIC 561 Recent Advances in Molecular Cloning** (1 cr.) Reports of readings concerning the latest developments in techniques of molecular cloning and their applications in the study of various biological systems. (Lec. 1) Pre: MIC 552 or permission of instructor. May be repeated.

**MIC 571 Insect Microbiology** (3 crs.) Cross-listed as (ENT), MIC 571. A two-part investigation of insect-microbe associations, concentrating on the comparative pathobiology of microbial agents in the insect host and the transmission of disease organisms by the insect vectors. (Lec. 3) Pre: ENT 385 and MIC 211, or permission of instructor. In alternate years.

**MIC 576 Marine Microbial Ecology** (4 crs.) Cross-listed as (OCG), MIC 576. Examines role of microbes in the oceans and their impact on oceanographic processes and biogeochemical cycles. Emphasis is on bacteria and their interactions with other marine organisms and the marine environment. Laboratory exercises make use of modern techniques to study metabolic rates and community

structure. (Lec. 3, Lab. 3) Pre: permission of instructor.

**MIC 591 Special Problems in Clinical Microbiology** (1-6 crs.) Cross-listed as (MLS), MIC 591. Intensive tutorial work, research, and readings in clinical microbiology. (Independent Study) Pre: graduate standing and permission of chairperson.

**MIC 593 The Literature of Bacteriology** (1 cr.) Thorough study of original literature of some phase of bacteriology. Written abstracts or papers on assigned topics are discussed in weekly conferences with instructor. (Independent Study)

**MIC 594 The Literature of Bacteriology** (1 cr.) Thorough study of original literature of some phase of bacteriology. Written abstracts or papers on assigned topics are discussed in weekly conferences with instructor. (Independent Study)

**MIC 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**MIC 654 Advances in Immunology** (2 crs.) Reports on assigned readings concerning latest developments in the field of cellular and humoral immunity presented and discussed by students. Research paper and critical review of a scientific paper required. (Lec. 2) Pre: MIC 533, BCH 311, or permission of instructor. May be repeated for a maximum of 4 credits. In alternate years.

**MIC 656 Mechanisms of Bacterial Pathogenesis** (3 crs.) Study of recent research on the molecular mechanisms of pathogenesis. Students expected to participate in roundtable discussions of recent pertinent literature. (Lec. 3) Pre: MIC 432, 552, and BCH 311. In alternate years.

**MIC 691 Special Problems in Microbiology** (3 crs.) Assigned research on an advanced level. Student required to outline problem, conduct the necessary literature and experimental work, and present observations and conclusions in a report. (Independent Study) Pre: graduate standing.

**MIC 692 Special Problems in Microbiology** (3 crs.) Assigned research on an advanced level. Student required to outline problem, conduct the necessary literature and experimental work, and present observations and conclusions in a report. (Independent Study) Pre: graduate standing.

**MIC 695 Graduate Seminar** (1 cr.) Cross-listed as (MIC), BCH 695. Reports of research in progress or completed. (Seminar) Required of all graduate students in microbiology. S/U credit.

**MIC 696 Graduate Seminar** (1 cr.) Cross-listed as (BCH), MIC 696. Reports of research in progress or completed. (Seminar) Required of all graduate students in microbiology. S/U credit.

**MIC 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**MIC 930 Workshop in Microbiology Topics for Teachers WRK** (0-3 crs.) Especially designed for teachers of biology. Basic topics of microbiology from an advanced or pedagogical perspective. (Workshop)

## MLS | Medical Laboratory Science

**MLS 102 Introduction to Clinical Laboratory Science** (1 cr.) An introduction to the health care and medical laboratory fields including specialty areas of medical laboratory science, professional organizations, credentialing, and the health care team approach. (Lec. 1)

**MLS 195 Biotechnology Manufacturing Methods** (5 crs.) Introduction to biotechnology manufacturing methods including cell culture separation, purification. (Lec. 3, Lab. 4) Pre: enrollment in biotechnology manufacturing option.

**MLS 199 Biotechnology Manufacturing Internship PRA** (1-12 crs.) Professional field experience in biotechnology manufacturing. The experience will be defined by a job description and learning contract arranged by the internship coordinator, student intern and relevant agency. (Practicum) Pre: enrollment in the biotechnology manufacturing option. May be repeated for a maximum of 12 credits.

**MLS 405 Molecular Pathology PRA** (2 crs.) An introduction to pathology. The correlation among pathological processes and clinical symptoms and the course of disease is studied. (Practicum)

**MLS 406 Clinical Immunology PRA** (2 crs.) Formation, structure, and action of antigens and antibodies. Methods of immunization. The laboratory emphasizes serological procedures in the diagnosis of disease. (Practicum)

**MLS 409 Clinical Microbiology I PRA** (4 crs.) The relationship of bacteria and bacterial diseases of humans, with emphasis on the application of procedures to medical diagnosis. Fungi, viruses, the rickettsias, and human parasites are also studied. (Practicum)

**MLS 410 Clinical Microbiology II PRA** (4 crs.) Continuation of MLS 409. (Practicum)

**MLS 411 Clinical Chemistry I PRA** (4 crs.) The chemistry of body constituents and their relationship to diagnosis of human disease. Principles and methods of analysis are emphasized. (Practicum)

**MLS 412 Clinical Chemistry II PRA** (4 crs.) Continuation of MLS 411. (Practicum)

**MLS 413 Immunohematology I PRA** (2 crs.) Instruction in drawing and processing

blood and in ascertaining compatibility. Donor-recipient blood and tissue reactions are studied in detail. (Practicum)

**MLS 414 Immunohematology II PRA** (2 crs.) Continuation of MLS 413. (Practicum)

**MLS 415 Hematology I PRA** (3 crs.) Morphology of the blood and blood-forming organs and the study of abnormalities associated with disease. The dynamics and diagnostic tests of hemostasis are also discussed. (Practicum)

**MLS 416 Hematology II PRA** (3 crs.) Continuation of MLS 415. (Practicum)

**MLS 422 Biotechnology Manufacturing for the Life Sciences** (3 crs.) Cross-listed as (MIC), MLS 422. The use of genetically altered microorganisms and eukaryotic cells for the production of therapeutic agents and vaccines. Upstream and downstream processing, Good Manufacturing processes. (Lec. 3/ Online) Pre: BCH 311 and an advanced course in microbiology, or permission of instructor.

**MLS 451 Professional Topics in Clinical Laboratory Science PRA** (2 crs.) Professional topics in the medical laboratory sciences, including research methods, education, management, occupational health, public health, regulatory affairs, professionalism and ethics. (Practicum)

**MLS 483 Introductory Diagnostic Microbiology** (3 crs.) Cross-listed as (MIC), MLS 483. Diagnosis of infectious diseases by use of microbiology, immunology, and hematologic and clinical chemical methods; organisms covered include viruses, bacteria, fungi, and parasites. (Lec. 3) Pre: MIC 201 or 211. Open only to medical laboratory science, microbiology, and cell and molecular biology majors or permission of instructor.

**MLS 501 Advanced Clinical Microbiology I** (3 crs.) Cross-listed as (MIC), MLS 501. Current methodology employed in the processing of clinical microbiology specimens, isolation and identification of pathogenic microorganisms, and determination of antimicrobial susceptibility. (Lec. 3) Pre: MLS 409 or MIC 432 or equivalent.

**MLS 502 Advanced Clinical Chemistry I** (3 crs.) The pathophysiologic mechanisms as they correlate to clinical chemistry data. Topics include mechanisms of pathology and analytical techniques. (Lec. 3) Pre: MLS 411 or equivalent.

**MLS 510 Clinical Laboratory Management** (3 crs.) Supervisory management principles applicable to the clinical laboratory. Includes the processes of supervision, decision making, job performance and evaluation, communications, organizational behavior, and labor relations in the modern laboratory. (Lec. 3) Pre: MLS 400-level medical laboratory science internship or equivalent.

**MLS 512 Special Problems in Clinical Laboratory Science** (3 crs.) Assigned research on an advanced level. Students required to outline problem, conduct the necessary

research or experimental work, and present observations and conclusions in a written and oral report. (Independent Study) Pre: MLS 400-level medical laboratory science internship or equivalent.

**MLS 513 Advanced Clinical Immunology** (3 crs.) Cross-listed as (MLS), MIC 513. Theory, application, and techniques used in clinical immunology: immunochemistry, serology, immunohematology, immunopathology. (Lec. 3) Pre: MLS 406 or MIC 533 or equivalent.

**MLS 520 Advanced Hematology** (3 crs.) Special problems, advanced techniques, and methodology in hematology; laboratory approach emphasized. (Lec. 3) Pre: MLS 415 or equivalent.

**MLS 530 Recent Advances in Blood Banking and Transfusion Medicine** (3 crs.) Immunohematology, blood banking, and transfusion medicine with emphasis on recent advances. Techniques used for tissue typing and organ transplantation. (Lec. 3) Pre: MLS 413 or equivalent.

**MLS 541 Advanced Clinical Microbiology II** (3 crs.) Current research and clinical methodology in clinical mycology, parasitology, mycobacteriology, epidemiology, and infectious disease serology. (Lec. 3) Pre: MLS 409 or MIC 432 or equivalent.

**MLS 543 Advanced Clinical Chemistry II** (3 crs.) A comprehensive study of pathophysiologic mechanisms as they relate to clinical chemistry. Topics include immunochemistry, automation, enzymology, pharmacology, and endocrinology. (Lec. 3) Pre: MLS 411 or equivalent.

**MLS 551 Topics in Biochemistry for the Clinical Scientist** (3 crs.) Cross-listed as (BCH), MLS 551. Description of the major components of biochemistry as it relates to the medical sciences. Major concepts include molecular genetics, regulatory biochemistry, and medically related applied biochemistry. (Lec. 3) Offered every third year.

**MLS 561 Introduction To Cytotechnology PRA** (3 crs.) A review of cell and tissue structure, principles of microscopy, and cytological staining methods; overview of organization and management of cytology labs. (Practicum)

**MLS 562 Special Topics In Cytotechnology PRA** (3 crs.) Special projects in cytology, cytopathology, or cytotechnology. Students will investigate or review a topic and present a written and oral report. (Practicum)

**MLS 563 Cytopathology PRA** (3 crs.) Cytopathology and clinical aspects of cervical dysplasia, carcinoma in situ, and invasive squamous cell carcinoma. Endometrial and endocervical carcinoma and other genital tract cancers will be considered. (Practicum)

**MLS 564 Medical Cytology PRA** (3 crs.) Benign and malignant cytology of the gastrointestinal, respiratory, and urinary tracts; study of exfoliative cells in urine, serious

effusions, cerebrospinal fluid, and breast secretions. (Practicum)

**MLS 565 Cytology Practicum I PRA** (6 crs.) Microscopic evaluation and screening of benign cytological smears from cervical dysplasia, carcinoma in situ, and invasive malignant tumors of the female genital tract. (Practicum)

**MLS 566 Cytology Practicum II PRA** (6 crs.) Microscopic evaluation and screening of cytological smears from the gastrointestinal, urinary, respiratory, and central nervous systems and from other body fluids. (Practicum)

**MLS 571 Biotechnology Product Evaluation and Development** (3 crs.) Cross-listed as (MLS 571), BPS 536. The process through which candidate products produced using recombinant DNA technology are evaluated for safety and efficacy, including conductance of clinical trials, economic issues, and regulatory affairs. (Lec. 3/Online) Pre: graduate standing and permission of chairperson.

**MLS 590 Special Problems in Clinical Chemistry** (1-6 crs.) Intensive tutorial work, research, and readings in clinical chemistry. (Independent Study) Pre: graduate standing and permission of chairperson.

**MLS 591 Special Problems in Clinical Microbiology** (1-6 crs.) Cross-listed as (MLS), MIC 591. Intensive tutorial work, research, and readings in clinical microbiology. (Independent Study) Pre: graduate standing and permission of chairperson.

**MLS 593 Special Problems in Immunohematology** (1-6 crs.) Intensive tutorial work, research, and readings in immunohematology. (Independent Study) Pre: graduate standing and permission of chairperson.

**MLS 594 Special Problems in Biotechnology** (1-3 crs.) Intensive tutorial work, research, and readings in biotechnology. (Independent Study) Pre: graduate standing and permission of chairperson.

## MSL | Military Science and Leadership

**MSL 101 Introduction to Leadership I** (1 cr.) Introduction to leadership dimensions while presenting a big picture understanding of a leadership development program. Students may participate in events including rappelling and land navigation. No military obligation is associated with this course. Open to all levels. (Lec. 1)

**MSL 102 Introduction to Leadership II** (1 cr.) Overview of leadership fundamentals such as problem-solving, public speaking, providing feedback, and using effective writing skills. Topics include skills such as first aid, marksmanship, survival and orienteering. No military obligation is associated with this course. Open to all levels.

**MSL 105 Introduction to Military Physical Fitness PRA** (1 cr.) A Boot Camp style

fitness program for students with little or no previous experience. Students learn the fundamentals of physical fitness and how physical training is conducted in the US Army. (Practicum) No prior military experience is required. Pre: medical release signed by the student's physician. S/U

**MSL 201 Leadership and Military History** (3 crs.) Study of innovative leadership styles and Army tactics by examining key battles throughout history. Case studies provide context for learning ethical decision making and Warrior Ethos as they apply in the contemporary operating environment. Open to all levels. (Lec. 3)

**MSL 202 Leadership and Team Building** (3 crs.) Examines the challenges of leading teams in the complex contemporary operating environment (COE). Highlights dimensions of terrain analysis, patrolling, and operation orders in the context of military operations. Open to all levels. (Lec. 3)

**MSL 300 Leadership Training Internship PRA** (6 crs.) Four-week paid summer internship held at Fort Knox, KY. Upon completion, the student will receive 6 credits and meet the requirements of the 100- and 200-level studies and qualify for continued studies in leadership development. (Practicum) Pre: permission of department.

**MSL 301 Advanced Leadership Management** (3 crs.) Integrates the principles and practices of leadership and personal development to prepare students for the U.S. Army's Leadership Development and Assessment program. (Lec. 3) Pre: permission of department.

**MSL 302 Advanced Leadership Management II** (3 crs.) Builds on the foundation of MSL 301. Focuses on developing students' situational leadership abilities to enable them to succeed in demanding, realistic, and stressful practical exercises requiring mental and physical agility. (Lec. 3) Pre: permission of department.

**MSL 401 Adaptive Leadership** (3 crs.) Students experience opportunities in planning and leading student operations to develop as adaptive leaders. Classroom and situational leadership experiences designed to prepare for first workplace experience. (Lec. 3) Pre: MSL 301 and 302 or permission of department. Not for graduate credit.

**MSL 402 Adaptive Leadership in a Complex World** (3 crs.) Explores the dynamics of leading in complex situations. Study differences in cultural customs and courtesies, law of land warfare, and rules of engagement in the face of international terrorism. (Lec. 3) Pre: MSL 301 and 302 and 401 or permission of department. Not for graduate credit.

**MSL 403 Army Topics - Military History** (3 crs.) Development of an approved project under faculty supervision. (Independent Study/Online) Pre: permission of chairperson. Not for graduate credit.

## MTH | Mathematics

**MTH 099 Basic Algebra and Trigonometry** (3 crs.) Review of basic algebra and trigonometry: operations of real numbers and algebraic expressions, negative and fractional exponents, polynomials and fractional expressions, equations and systems of equations, inequalities, right triangle trigonometry and applications. (Lec. 3) For students not sufficiently prepared to take other mathematics courses. Credits may not be used toward the minimum credits required for graduation or for General Education. S/U only.

**MTH 101 Introduction to College Algebra** (3 crs.) Introduction to algebraic manipulation, solving equations and inequalities in one variable. Plotting points and graphing elementary functions. Interpreting and expressing mathematics. Intended for STEM majors who are not prepared to take MTH 111. (Lec. 3)

**MTH 105 Elementary Mathematical Codebreaking** (3 crs.) Use of technology to break codes, including those enciphered by substitution, polyalphabetic, polygraphic, and transposition ciphers. Mathematical topics include modular arithmetic, linear systems, probability. (Lec. 3/Online) Only high school mathematics required. (MQ)

**MTH 106 Mathematics of Social Choice and Finance** (3 crs.) Voting methods, apportionment problems, and mathematics of everyday finance. Emphasis on development of reasoning ability as well as manipulative techniques. (Lec.3/Online) Not open to students with credit in MTH 108 or MTH 109 and not for major credit in mathematics. (MQ)

**MTH 107 Introduction to Finite Mathematics** (3 crs.) Concepts and processes of modern mathematics concerned with sets, the theory of probability, and statistics. Role of these concepts in today's social and physical sciences. (Lec. 3) Pre: passing a placement test. Not open to mathematics majors. (MQ)

**MTH 108 Topics in Mathematics** (3 crs.) Introduces the nonmathematics student to the spirit of mathematics and its applications. Presupposes no mathematical background beyond University admission requirements. Emphasis is on development of reasoning ability as well as manipulative techniques. (Lec. 3/Online) Pre: passing a placement test. Not open to students with credit in MTH 106 or MTH 109 and not for major credit in mathematics. (MQ)

**MTH 108H Honors Section of MTH 108: Topics in Mathematics** (3 crs.) Honors Section of MTH 108: Topics in Mathematics. (Lec. 3/Online) (MQ) Pre: Must have a 3.30 overall GPA. Not open to students with credit in MTH 106 or MTH 109 and not for major credit in mathematics.

**MTH 109 Politics and Mathematics** (3 crs.) Elementary mathematical treatments of voting systems and voting paradoxes; models of escalation, conflict, and deter-

rence, measures of political power, etc. (Lec. 3) (MQ) Not open for students with credit in MTH 106 or MTH 108 and not for major credit in mathematics.

**MTH 110 Mathematical Foundations for Business Analysis** (3 crs.) Equations of first and second degree. Inequalities. Exponential and logarithmic functions. Emphasis on business applications. Introduction to linear algebra and matrices. Introduction to spreadsheets. Designed for students who want to strengthen their background in math before BUS 111. (Lec. 3). Not for credit for mathematics majors and not for general education credit

**MTH 111 Precalculus** (3 crs.) Equations of first and second degree, systems of equations. Inequalities. Functions and graphs. Exponential, logarithmic, and trigonometric functions. Applications. Introduction to analytic geometry. Complex numbers. Designed for students who need to strengthen their background in mathematics below calculus. (Lec. 3) Pre: passing a placement test or C- or better in MTH 101. Not for credit for mathematics majors. (MQ)

**MTH 131 Applied Calculus I** (3 crs.) Basic topics in calculus for students who do not need all the topics in 141. Limits, derivatives, and integrals of algebraic, logarithmic, and exponential functions. Applications including graphing, maxima and minima problems, etc. (Lec. 3/Online) Pre: passing a placement test or C- or better in MTH 111. Not for major credit in mathematics. Not open to students with credit or concurrent enrollment in 141. (MQ)

**MTH 132 Applied Calculus II** (3 crs.) Continuation of MTH 131. Topics related to trigonometric functions, integration by parts and partial fractions, partial derivatives, infinite series. Applications to problems such as optimization, probability theory, simple differential equations. (Lec. 3) Pre: MTH 131 or 141 or permission of chairperson. Not for major credit in mathematics. Not open to students with credit or concurrent enrollment in 142.

**MTH 141 Introductory Calculus With Analytic Geometry** (4 crs.) Topics in analytic geometry, functions and their graphs, limits, the derivative, applications to finding rates of change and extrema and to graphing, the integral, and applications. (Lec. 3, Rec. 1) Completion of four units of high school mathematics, including trigonometry, recommended. Pre: passing a placement test or C- or better in MTH 111. Not open to students with credit in MTH 131 or concurrent enrollment in MTH 131. (MQ)

**MTH 142 Intermediate Calculus With Analytic Geometry** (4 crs.) Continues the study of calculus for the elementary algebraic and transcendental functions of one variable. Topics include the technique of integration, improper integrals, indeterminate forms, and calculus using polar coordinates. (Lec. 3, Rec. 1) Pre: C- or better in MTH 141 or permission

of chairperson. Not open to students with credit or concurrent enrollment in 132. (MQ)

**MTH 142H Honors Section: MTH 142: Intermediate Calculus with Analytic Geometry** (4 crs.) Honors Section: MTH 142: Intermediate Calculus with Analytic Geometry. (Lec. 3, Rec. 1) Pre: Overall gpa 3.30 and MTH 141, or permission of instructor. Not open to students with credit or concurrent enrollment in MTH 132. (MQ)

**MTH 208 Numeracy for Teachers** (4 crs.) Conceptual understanding supporting mathematical ideas presented in current, standards-based elementary mathematics education. An in-depth look at problem solving, number systems, functions, relations, and geometry. This course is appropriate for elementary teachers and teachers in non-STEM fields. (Lec. 3, Rec. 1) (MQ)

**MTH 215 Introduction to Linear Algebra** (3 crs.) Detailed study of finite dimensional vector spaces, linear transformations, matrices, determinants and systems of linear equations. (Lec. 3) Pre: C- or better in MTH 131, 141, or equivalent.

**MTH 243 Calculus for Functions of Several Variables** (3 crs.) Topics include coordinates for space, vector geometry, partial derivatives, directional derivatives, extrema, Lagrange multipliers, and multiple integrals. (Lec. 3) Pre: C- or better in MTH 142.

**MTH 244 Differential Equations** (3 crs.) Classification and solution of differential equations involving one independent variable. Applications to the physical sciences. Basics for further study in applied mathematics and for advanced work in physics and engineering. (Lec. 3) Pre: MTH 142.

**MTH 307 Introduction to Mathematical Rigor** (3 crs.) Introduction to the language of rigorous mathematics: logic, set theory, functions and relations, cardinality, induction, methods of proof. Emphasis on precise written and oral presentation of mathematical arguments. (Lec. 3) Pre: MTH 142.

**MTH 316 Algebra** (3 crs.) Theory and structure of groups. Topics from ring theory, principal ideal domains, unique factorization domains, polynomial rings, field extensions, and Galois theory. (Lec. 3) Pre: MTH 215 and 307.

**MTH 322 Concepts of Geometry** (3 crs.) Survey of geometrical systems including non-Euclidean, affine, and projective spaces and finite geometries. A modern view of Euclidean geometry using both synthetic and analytic methods. (Lec. 3) Pre: MTH 215 or permission of instructor.

**MTH 362 Advanced Engineering Mathematics I** (3 crs.) Algebra of complex numbers, matrices, determinants, quadratic forms. Linear differential equations with constant coefficients. Partial differential equations. (Lec. 3) Pre: MTH 142. Not for major credit in mathematics.

**MTH 381 History of Mathematics** (3 crs.) General survey course in development and philosophy of mathematics. Provides a cultural background and foundation for advanced study in various branches of the subject. (Lec. 3) Pre: MTH 142 or equivalent.

**MTH 382 Number Theory** (3 crs.) Some of the arithmetic properties of the integers including number theoretic functions, congruences, diophantine equations, quadratic residues, and classically important problems. (Lec. 3) Pre: MTH 141 or permission of instructor.

**MTH 391 Special Problems** (1-3 crs.) Advanced work under the supervision of a faculty member and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**MTH 393 Undergraduate Seminar** (1 cr.) Preparation and presentation of selected topics in oral and written form. (Seminar) Pre: permission of chairperson.

**MTH 418 Matrix Analysis** (3 crs.) Canonical forms, functions of matrices, characteristic roots, applications to problems in physics and engineering. (Lec. 3) Pre: MTH 215 or 362 or permission of instructor.

**MTH 420 Re-examining Mathematical Foundations for Teachers** (3 crs.) Connects ideas covered in upper level math courses to topics taught in secondary school. Designed for teachers. (Lec. 3) Pre: MTH 316 or permission.

**MTH 435 Mathematical Analysis and Topology I** (4 crs.) The first of two courses providing rigorous introduction to mathematical analysis (theory of calculus) and metric space topology as a basis for advanced work in mathematics. (Lec. 4) Pre: MTH 215 and 243 and 307 or permission of instructor.

**MTH 436 Mathematical Analysis and Topology II** (4 crs.) The second of two courses providing rigorous introduction to mathematical analysis (theory of calculus) and metric space topology as a basis for advanced work in mathematics. (Lec. 4) Pre: MTH 435 or permission of instructor.

**MTH 437 Advanced Calculus and Application I** (3 crs.) Sequences, limits, continuity, differentiability, Riemann integrals, functions of several variables, multiple integrals, space curves, line integrals, surface integrals, Green's theorem, Stokes' theorem, series, improper integrals, uniform convergence, Fourier series, Laplace transforms. Applications to physics and engineering emphasized. (Lec. 3) Pre: MTH 243, credit or concurrent enrollment in MTH 215 or 362.

**MTH 438 Advanced Calculus and Application II** (3 crs.) Sequences, limits, continuity, differentiability, Riemann integrals, functions of several variables, multiple integrals, space curves, line integrals, surface integrals, Green's theorem, Stokes' theorem, series, improper integrals, uniform convergence, Fourier series, Laplace transforms. Applications to

physics and engineering emphasized. (Lec. 3) Pre: MTH 437.

**MTH 441 Introduction to Partial Differential Equations** (3 crs.) One-dimensional wave equation. Linear second order partial differential equations in two variables. Separation of variables and Fourier series. Nonhomogeneous boundary value problems. Green's functions. (Lec. 3) Pre: MTH 244 or 442.

**MTH 442 Introduction to Difference Equations** (3 crs.) Introduction to linear and nonlinear difference equations; basic theory, z-transforms, stability analysis, and applications. (Lec. 3) Pre: MTH 243. Offered spring semesters.

**MTH 447 Discrete Mathematical Structures** (3 crs.) Cross-listed as (MTH), CSC 447. Concepts and techniques in discrete mathematics. Finite and infinite sets, graphs, techniques of counting, Boolean algebra and applied logic, recursion equations. (Lec. 3) Pre: junior standing or better in physical or mathematical sciences, or in engineering, or permission of instructor.

**MTH 451 Introduction to Probability and Statistics** (3 crs.) Theoretical basis and fundamental tools of probability and statistics. Probability spaces, properties of probability, distributions, expectations, some common distributions and elementary limit theorems. (Lec. 3) Pre: MTH 243 or equivalent.

**MTH 452 Mathematical Statistics** (3 crs.) Continuation of MTH 451 in the direction of statistics. Basic principles of statistical testing and estimation, linear regression and correlation. (Lec. 3) Pre: MTH 451. Offered spring semesters.

**MTH 455 Introduction to Chaotic Dynamical Systems** (3 crs.) Introduction to nonlinear dynamical systems on the real line and/or the plane. (Lec. 3) Pre: MTH 243 or permission of instructor.

**MTH 462 Functions of a Complex Variable** (3 crs.) First course in the theory of functions of a single complex variable, including analytic functions, power series, residues and poles, complex integration, conformal mapping and applications. (Lec. 3) Pre: MTH 243 or equivalent. Offered alternate fall semesters.

**MTH 471 Introduction to Numerical Analysis** (3 crs.) Computer arithmetic, interpolation, numerical approximation of derivatives, integral numerical ODE, and other topics. (Lec. 3) Pre: MTH 243 or permission of instructor.

**MTH 472 Numerical Linear Algebra** (3 crs.) Systems of linear equations, least squares, approximation, eigenvalue problems. (Lec. 3) Pre: MTH 243 and 215, or permission of instructor. Offered in fall semesters of even-numbered years.

**MTH 492 Special Problems** (1-3 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual

requirements of the student. (Independent Study) Pre: permission of chairperson.

**MTH 513 Linear Algebra** (4 crs.) Linear spaces and transformations, eigenvalues and eigenvectors, invariant subspaces, inner products, orthogonal projections, norms, minimizations, spectral theorem, the Cayley-Hamilton, Jordan canonical form, and singular value decomposition. (Lec. 4)

**MTH 515 Algebra I** (3 crs.) Groups, rings, modules, commutative algebra. (Lec. 3) Pre: MTH 316. In alternate years.

**MTH 516 Algebra II** (3 crs.) Groups, rings, modules, commutative algebra. (Lec. 3) Pre: MTH 515. In alternate years.

**MTH 525 Topology** (3 crs.) Topological spaces, separation properties, connectedness, compactness, uniformities. Function spaces, spaces of continuous functions, and complete spaces. (Lec. 3) Pre: MTH 435 or equivalent. In alternate years.

**MTH 535 Measure Theory and Integration** (3 crs.) Elements of topology and linear analysis. Lebesgue measure and integration in  $\mathbb{R}$ , in  $\mathbb{R}^n$ , and in abstract spaces. Convergence theorems. Bounded variation, absolute continuity, and differentiation. Lebesgue-Stieltjes integral. Fubini and Tonelli theorems. The classical Banach spaces. (Lec. 3) Pre: MTH 435.

**MTH 536 Measure Theory and Integration** (3 crs.) Elements of topology and linear analysis. Lebesgue measure and integration in  $\mathbb{R}$ , in  $\mathbb{R}^n$ , and in abstract spaces. Convergence theorems. Bounded variation, absolute continuity, and differentiation. Lebesgue-Stieltjes integral. Fubini and Tonelli theorems. The classical Banach spaces. (Lec. 3) Pre: MTH 535.

**MTH 542 Global Character of Difference Equations I** (3 crs.) Global character, periodic behavior, and asymptotic nature of solutions of difference equations and systems of difference equations with applications. Recent topics on rational equations and rational systems in higher dimensions. (Lec. 3) Pre: MTH 435 and 436.

**MTH 543 Global Character of Difference Equations II** (3 crs.) Global character, periodic behavior, and asymptotic nature of solutions of difference equations and systems of difference equations with applications. Recent topics on rational equations and rational systems in higher dimensions. (Lec. 3) Pre: MTH 435 and 436.

**MTH 545 Ordinary Differential Equations I** (3 crs.) Existence and uniqueness theorems. Continuous dependence on parameters and initial conditions. Singularities of the first and second kinds, self-adjoint eigenvalue problems on a finite interval. Oscillation and comparison theorems. Introduction to delay and difference equations. Elements of stability theory of Lyapunov's second method. (Lec. 3) Pre: MTH 435. In alternate years.

**MTH 546 Ordinary Differential Equations II** (3 crs.) Existence and uniqueness theorems. Continuous dependence on parameters and initial conditions. Singularities of the first and second kinds, self-adjoint eigenvalue problems on a finite interval. Oscillation and comparison theorems. Introduction to delay and difference equations. Elements of stability theory of Lyapunov's second method. (Lec. 3) Pre: MTH 545. In alternate years.

**MTH 547 Combinatorics** (3 crs.) Cross-listed as (MTH), CSC 547. Enumeration: generation functions, recurrence relations, classical counting numbers, inclusion-exclusion, finite set systems and designs. Polya theory, coding theory, and Ramsey theory. Finite fields and algebraic methods. (Lec. 3) Pre: MTH 316. Offered alternate fall semesters.

**MTH 548 Graph Theory** (3 crs.) Cross-listed as (MTH), CSC 548. Basic concepts and techniques of graph theory as well as some of their applications. Topics include: connectivity, matchings, colorings, extremal problems, Ramsey theory, planar graphs, algebraic techniques. (Lec. 3) Pre: MTH 316.

**MTH 550 Probability and Stochastic Processes** (3 crs.) Review of probability theory. Generating functions, renewal theory, Markov chains and processes, Brownian motions, stationary processes. (Lec. 3) Pre: MTH 435 or 437; and MTH 451. In alternate years.

**MTH 551 Mathematical Statistics** (3 crs.) Theory of estimation and hypothesis testing. Large sample methods. Regression and analysis of variance. (Lec. 3) Pre: MTH 550. In alternate years.

**MTH 555 Dynamical Systems** (3 crs.) The objective of this course is to develop the theory of Topological Dynamical Systems, that is the study of iterated continuous mappings from a topological space to itself. (Lec. 3) Pre: MTH 435 or permission of instructor.

**MTH 562 Complex Function Theory** (3 crs.) Rigorous development of theory of functions. Topology of plane, complex integration, singularities, conformal mapping. (Lec. 3) Pre: (MTH 435 and 436); or (MTH 437 and 438). In alternate years.

**MTH 571 Numerical Analysis** (3 crs.) Computer arithmetic, interpolation, numerical approximation of derivatives and integrals, numerical ODE, and other topics. (Lec. 3) Pre: MTH 243.

**MTH 572 Numerical Partial Differential Equations** (3 crs.) Further numerical methods of solution of simultaneous equations, partial differential equations, integral equations. Error analysis. (Lec. 3)

**MTH 591 Special Problems** (1-3 crs.) Advanced work under the supervision of a member of the department arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**MTH 592 Special Problems** (1-3 crs.) Advanced work under the supervision of a

member of the department arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**MTH 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**MTH 629 Functional Analysis I** (3 crs.) Banach and Hilbert spaces, basic theory. Bounded linear operators, spectral theory. Applications to analysis. Application to a special topic such as differential operators, semigroups and abstract differential equations, theory of distributions, or ergodic theory. (Lec. 3) Pre: MTH 436 or permission of instructor.

**MTH 630 Functional Analysis II** (3 crs.) Banach and Hilbert spaces, basic theory. Bounded linear operators, spectral theory. Applications to analysis. Application to a special topic such as differential operators, semigroups and abstract differential equations, theory of distributions, or ergodic theory. (Lec. 3) Pre: MTH 629 or permission of instructor.

**MTH 656 Probability on Discrete Structures** (3 crs.) Rigorous development of the fundamental concepts and techniques for analyzing random discrete structures. Topics to include: random graphs and networks, measure concentration, phase transitions, random walks, and pseudorandomness. (Lec. 3) Pre: MTH 550 or permission of the instructor.

**MTH 691 Special Topics I** (3 crs.) Advanced topics of current research in mathematics will be presented with a view to expose the students to the frontiers of the subject. (Independent Study) Pre: permission of chairperson.

**MTH 692 Special Topics II** (3 crs.) Advanced topics of current research in mathematics will be presented with a view to expose the students to the frontiers of the subject. (Independent Study) Pre: permission of chairperson.

**MTH 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**MTH 930 Workshop In Mathematics Topics For Teachers WRK** (0-3 crs.) Especially designed for teachers of mathematics. Basic topics of mathematics from an advanced or pedagogical perspective. (Workshop) Pre: teacher certification. Not for degree credit.

## MUS | Music

**MUS 101 Introduction to Music** (3 crs.) Fosters a better understanding and appreciation of the world's great music. Consideration of musical styles, techniques, and forms from the listener's standpoint. (Lec. 3/Online) (A) [D]

**MUS 106 History of Jazz** (3 crs.) The nature and origin of jazz and its development as an American folk idiom: European and African heritages, blues, ragtime, dixieland, boogie-woogie, swing, bop, cool, funky, gospel, jazz-rock, free-form, and progressive. (Lec. 3/Online) (A) [D]

**MUS 109 Basics of Singing** (1 cr.) Basic singing technique, tone production, interpretation and introduction to song literature for those not enrolled in MUS 110 - 510 Applied Music. (Lab. 2) Pre: must not be registered for MUS 110, 210, 310, 410 or 510.

**MUS 110A Applied Music - Voice** (1-3 crs.) Private instruction in performance at the freshman level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and recital performances. Music convocation performance is encouraged but not required. (Studio) Pre: audition and permission of chairperson. May be repeated for credit.

**MUS 110B Applied Music - Piano** (1-3 crs.) Private instruction in performance at the freshman level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and recital performances. Music convocation performance is encouraged but not required. (Studio) Pre: audition and permission of chairperson. May be repeated for credit.

**MUS 110C Applied Music - Organ** (1-3 crs.) Private instruction in performance at the freshman level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and recital performances. Music convocation performance is encouraged but not required. (Studio) Pre: audition and permission of chairperson. May be repeated for credit.

**MUS 110D Applied Music - Harpsichord** (1-3 crs.) Private instruction in performance at the freshman level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and recital performances. Music convocation performance is encouraged but not required. (Studio) Pre: audition and permission of chairperson. May be repeated for credit.

**MUS 110E Applied Music - Violin** (1-3 crs.) Private instruction in performance at the freshman level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and recital performances. Music convocation performance is encouraged but not required. (Studio) Pre: audition and permission of chairperson. May be repeated for credit.





profession. Development of an individualized plan for music study including articulation of learning and career goals. Introduction to skill areas including research and writing about music, basic musicianship, and appreciation of music literature. (Lec. 1) For music majors and minors. May be substituted for URI 101.

**MUS 120 Music Theory and Sight-Singing I** (2 crs.) Development of basic music theory concepts as well as basic sight-singing, rhythmic and ear training skills. Scales, modes, intervals, rhythmic notation, and triads. (Lec. 2) Pre: Taken concurrently with MUS 119. Permission of instructor or chairperson required if not taken concurrently with MUS 119. For music majors and minors.

**MUS 121 Music Theory II** (2 crs.) Rhythmic, melodic, and harmonic elements of music. Part writing, analysis, and keyboard work involving primary triads. (Lec. 1.5, Lab. 1) Pre: MUS 119 and 120 or permission of instructor. Concurrent or previous keyboard experience.

**MUS 122 Ear Training and Sight-singing II** (2 crs.) Sight-singing in major and minor keys, including outlines of tonic and dominant harmonies. Rhythmic reading, aural recognition, with notation of material of 121. (Lec. 1.5, Lab. 1) Pre: MUS 121. May be taken concurrently.

**MUS 169 Percussion Methods** (1 cr.) Basic principles in performance and pedagogy of percussion instruments. (Lab. 1) Pre: Open to music education majors or permission of instructor.

**MUS 170 Guitar Methods** (1 cr.) Basic principles in performance and pedagogy of the guitar. (Lab. 1) Pre: Open to music education majors or permission of instructor.

**MUS 171 Class Piano I** (1 cr.) Development of basic techniques and musicianship for effective use of the piano. This course will emphasize proficiency 1. (Lab. 2) Pre: credit or concurrent enrollment in 120 or permission of instructor.

**MUS 172 Class Piano II** (1 cr.) Further development of basic techniques and musicianship for effective use of the piano. Skills in transposition, sight-reading accompaniments, and melody harmonization with improvised accompaniment. This course will emphasize proficiencies 2 and 3. (Lab. 2) Pre: MUS 171 or permission of instructor.

**MUS 173 Voice Methods** (1 cr.) Basic principles and pedagogy of singing, physiology, breathing, tone production, diction. (Lab. 1) Pre: Open to music education majors or permission of instructor.

**MUS 175 String Methods** (1 cr.) Basic principles in performance and pedagogy of string instruments. (Lab. 1) Pre: Open to music education majors or permission of instructor.

**MUS 177 Woodwind Methods** (1 cr.) Basic principles in performance and pedagogy of

woodwind instruments. (Lab. 1) Pre: Open to music education majors or permission of instructor.

**MUS 179 Brass Methods** (1 cr.) Basic principles in performance and pedagogy of brass instruments. (Lab. 1) Pre: Open to music education majors or permission of instructor.

**MUS 210A Applied Music - Voice** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210B Applied Music - Piano** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210C Applied Music - Organ** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210D Applied Music - Harpsichord** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210E Applied Music - Violin** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210F Applied Music - Viola** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210G Applied Music - Violoncello** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time,

and higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210H Applied Music - Contra Bass** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210I Applied Music - Flute** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210J Applied Music - Oboe** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210K Applied Music - Clarinet** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210L Applied Music - Bassoon** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210M Applied Music - Saxophone** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210N Applied Music - Trumpet** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 2100 Applied Music - French**

**Horn** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210P Applied Music - Trombone**

(1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210Q Applied Music - Euphonium/**

**baritone** (1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210R Applied Music - Tuba**

(1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210S Applied Music - Percussion**

(1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210T Applied Music - Guitar**

(1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210U Applied Music - Harp**

(1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210V Applied Music - Composition**

(1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week

and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 210W Applied Music - Jazz**

(1-3 crs.) Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: MUS 110 or equivalent. May be repeated for credit.

**MUS 221 History of Music I**

(1-3 crs.) Historical development of classical and popular music in European and non-European cultures: world music, Medieval, and Renaissance eras. (Lec. 1-3) Pre: MUS 121 or equivalent competency. May be taken for 1 or 2 credits only with permission of instructor prior to registration.

**MUS 222 History of Music II**

(1-3 crs.) Continuation of MUS 221: Baroque, Classical, and Romantic eras. (Lec. 1-3) Pre: MUS 225 or equivalent competency and MUS 221 or consent of instructor. May be taken for 1 or 2 credits only with permission of instructor prior to registration.

**MUS 225 Music Theory III**

(2 crs.) Continuation of MUS 121, covering all diatonic triads, dominant and supertonic seventh chords, and modulation to closely related keys. (Lec. 1.5, Lab. 1) Pre: MUS 121 and 122.

**MUS 226 Ear Training and Sight-singing**

**III** (2 crs.) Continuation of MUS 122. Covering all diatonic triads, dominant and supertonic seventh chords, and modulation to closely related keys. (Lec. 1.5, Lab. 1) Pre: MUS 122 and 225; 225 may be taken concurrently.

**MUS 227 Music Theory IV**

(2 crs.) Advanced harmonic practice approached through form and analysis, keyboard and part writing, including original work. (Lec. 1.5, Lab. 1) Pre: MUS 225 or equivalent.

**MUS 228 Ear Training and Sight-singing**

**IV** (2 crs.) Advanced rhythmic, melodic, and harmonic practice approached through sight-singing and dictation including computer-aided instruction. (Lec. 1.5, Lab. 1) Pre: MUS 226 or equivalent.

**MUS 235 Introduction to Music Teaching**

(2 crs.) Overview of music teaching in schools and studios. History, philosophy, curriculum, learning theory, and current topics in music teaching as they relate to the broader field of education. Includes experiences where students engage in observation and practice beginning music teaching skills. (Lec. 3) Pre: MUS 110 or MUS 119 or permission of instructor.

**MUS 238 General Music Methods and**

**Materials** (3 crs.) Teaching methods, instructional materials, and evaluation procedures for general music, grades K-12. Learner characteristics and development of children and adolescents. (Lec. 3) Pre: sophomore standing in music.

**MUS 271 Class Piano III** (1 cr.) Further development of basic keyboard performance skills in sight-reading and harmonization. This course will emphasize proficiencies 4 and 5. (Lab. 2) Pre: MUS 172 or equivalent. Open to music majors only.

**MUS 272 Class Piano IV** (1 cr.) Continuation of MUS 271. Further development of keyboard performance skills in sight-reading and harmonization. This course will emphasize proficiencies 6 and 7. (Lab. 2) Pre: MUS 271 or equivalent. Open to music majors only.

**MUS 280 Mid-program Portfolio In**

**Music** (0 crs.) Individual accomplishment of activities and experiences, demonstrating interest and competency in music at the midpoint in the student's program of studies as a music major. (Portfolio) Pre: sophomore standing in music.

**MUS 283 Vocal Diction** (3 crs.) Basic phonetics (International Phonetic Alphabet). Enunciation in the foreign languages most frequently encountered in vocal and choral literature (Italian, French, German, and Latin). English diction in singing. (Lec. 3) In alternate years.

**MUS 290 University Pep Band REH** (0-1 cr.) Rehearsal and performance of a wide variety of rock, jazz, rhythm and blues, marches, popular and other contemporary music for home and away URI basketball games. (Rehearsal 2) may be repeated for credit. Pre: audition and permission of instructor.

**MUS 291 University Marching Band** (0-2 crs.) Rehearsal and performance of music, drill, and shows for URI football games. (Rehearsal 8) May be repeated for credit. S/U only for 0 credit.

**MUS 292 Concert Band** (0-1 cr.) Study and performance of concert band music. Open to all students. (Rehearsal 3) May be repeated for a total of 3 credits general education. S/U only for 0 credit. (A) [D]

**MUS 293 University Chorus REH** (0-1 crs.) May be repeated for credit. May be repeated for a total of 3 credits for General Education. S/U only for 0 credit. (Rehearsal 3) (A) [D]

**MUS 300 Music Convocation**

(0-1 cr.) Study of repertory and techniques of concert presentation through attendance of student recitals and presentations by faculty and visiting artists. (Lab.) Attendance at 75 percent of events required. May be repeated.

**MUS 310A Applied Music - Voice**

(2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310B Applied Music - Piano** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an

hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310C Applied Music - Organ** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310D Applied Music - Harpsichord** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310E Applied Music - Violin** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310F Applied Music - Viola** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310G Applied Music - Violoncello** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310H Applied Music - Contra Bass** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310I Applied Music - Flute** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310J Applied Music - Oboe** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an

hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310K Applied Music - Clarinet** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310L Applied Music - Bassoon** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310M Applied Music - Saxophone** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310N Applied Music - Trumpet** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310O Applied Music - French Horn** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310P Applied Music - Trombone** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310Q Applied Music - Euphonium/Baritone** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310R Applied Music - Tuba** (2-4 crs.) Private instruction in performance at junior

level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310S Applied Music - Percussion** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310T Applied Music - Guitar** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310U Applied Music - Harp** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310V Applied Music - Composition** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 310W Applied Music - Jazz** (2-4 crs.) Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: MUS 210 or equivalent. May be repeated for credit.

**MUS 311 Basic Conducting** (2 crs.) A course in elementary conducting techniques including baton techniques and score study as well as the organization of instrumental and choral rehearsals. Pre: credit or concurrent enrollment in MUS 225 and MUS 226.

**MUS 312 Advanced Conducting** (3 crs.) A study of problems and approaches to instrumental and choral conducting based on advanced baton techniques. Principles of interpretation and the art of communication through practical experience with departmental organizations. (Lec. 3) Pre: MUS 311.

**MUS 322 History of Music III** (1-3 crs.) Continuation of MUS 221 and 222: European, African-American, Hispanic, and other contributions to the classical and popular music of the 20th century. (Lec.1-3) Pre: MUS 121 or equivalent competency and 221 or consent

of instructor. May be taken for 1 or 2 credits only with permission of instructor prior to registration.

**MUS 339 Choral Methods and Materials** (3 crs.) Organization and administration of choral music programs in elementary and secondary schools, focusing on materials, procedures, policies, and teaching methods. (Lec. 3) Pre: EDC 250 or the equivalent; MUS 272 or successful completion of all piano proficiencies.

**MUS 340 Instrumental Methods and Materials** (3 crs.) Organization and administration of the instrumental music program in elementary and secondary schools, focusing on materials, procedures, policies, and teaching methods. (Lec. 3) Pre: EDC 250.

**MUS 341 Field Experiences in Music Education** (1 cr.) Supervised field experience and seminar for students to observe music teaching practices in music-teaching settings and apply methodology. (Lab. 2) Pre: MUS 235 and junior standing or permission of instructor.

**MUS 350 Junior Recital** (0-1 cr.) Performance of a public program at least 20 minutes in duration after faculty examination. (Studio) Pre: concurrent enrollment in MUS 310.

**MUS 371 Piano Accompanying** (1 cr.) Development of sight-reading skills. Preparation and performance of accompaniments. (Lec. 1) Pre: permission of piano faculty. May be repeated.

**MUS 391 Jazz Studio Laboratory** (1 cr.) Studies in jazz performance practices, pedagogy, and literature. Historical perspectives, stylistic concepts and repertoire from 1917 to the present developed in the ensemble setting. (Lab. 3) Pre: concurrent enrollment in MUS 310 or 410.

**MUS 394 Symphonic Wind Ensemble PRA** (0-1 crs.) (Rehearsal 3) Pre: audition and permission of instructor. May be repeated for credit. S/U only for 0 credit.

**MUS 395 Concert Chorus PRA** (0-1 cr.) (Rehearsal 3) Pre: audition and permission of instructor. May be repeated for credit. S/U only for 0 credit.

**MUS 396 Jazz Studio Ensemble** (0-1 cr.) Performance and study of jazz and studio music as related to professional experience. (Rehearsal 3) Pre: audition and permission of instructor. S/U only for 0 credit.

**MUS 397 University Symphony Orchestra** (0-1 cr.) Study and performance of standard and modern repertoire for the orchestra. (Rehearsal 3) Pre: audition and permission of instructor. May be repeated for credit. S/U only for 0 credit.

**MUS 398B Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard,

string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398G Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398J Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398K Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398M Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398O Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398P Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398S Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398V Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398W Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 398Z Chamber Music Ensembles** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 407 The Symphony** (3 crs.) Study of the development of orchestration and of formal procedures such as the sonata, rondo, and variations. Includes works by composers such as Haydn, Beethoven, Brahms, and Tchaikovsky. (Lec. 3) Pre: MUS 222. Offered every seventh semester.

**MUS 408 The Opera** (3 crs.) History of opera from its beginnings in Italy in the 17th century to the present, including works by composers such as Monteverdi, Purcell, Mozart, Wagner, Verdi, and Puccini. Pre: credit or concurrent enrollment in MUS 222 or the ability to read music. Offered every seventh semester.

**MUS 410A Applied Music - Voice** (2-4 crs.) Private instruction in performance at the senior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and senior recital or music convocation performance. (Studio) Pre: MUS 310 or equivalent. May be repeated for credit. Not for graduate credit, except MUS 410V (Composition).

**MUS 410B Applied Music - Piano** (2-4 crs.) Private instruction in performance at the senior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and senior recital or music convocation performance. (Studio) Pre: MUS 310 or equivalent. May be repeated for credit. Not for graduate credit, except MUS 410V (Composition).

**MUS 410C Applied Music - Organ** (2-4 crs.) Private instruction in performance at the senior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and senior recital or



**MUS 416 Form and Analysis** (3 crs.) Critical study of the structure of tonal music. Works of various composers are analyzed with reference to motive and phrase as generative elements in design. (Lec. 3) Pre: MUS 227 or equivalent. In alternate years.

**MUS 417 Instrumentation and Choral Arranging** (3 crs.) Range, timbre, transpositions, and other characteristics of instruments, singly and in combination. Elements of choral arranging. Exercises with attention to part writing, harmony, and form. Setting of a small piece of music for orchestra, band, or chorus required. Pre: credit or concurrent enrollment in MUS 227 or equivalent. In alternate years.

**MUS 420 Eighteenth-Century Counterpoint** (3 crs.) Tonal polyphony in the style of J.S. Bach. Includes creative exercises in writing counterpoint in Baroque style and the study of representative compositions such as the inventions and fugues of Bach. (Lec. 3/Online) Pre: MUS 227 and 228. In alternate years.

**MUS 421 Aesthetics of Electro-Acoustic Music Composition** (3 crs.) Study and application of electronic music composition, and exploration of aesthetic goals since 1945 through analysis of compositional and technological procedures, culminating in a major composition electro-acoustic project. (Lec. 2, Lab. 2) Pre: MUS 235 or equivalent. In alternate years.

**MUS 424 Jazz Theory and Improvisation** (3 crs.) An intensive study and practice of the formal elements of jazz improvisation. (Lec. 1, Lab. 4) Pre: MUS 391.

**MUS 430 The Renaissance Era** (3 crs.) Music at European courts and cathedrals (1400-1600), including vocal masses, motets, madrigals, and chansons, and instrumental canzonas, ricercars, toccatas, and variations of Dufay, Josquin, Palestrina, Gabrieli, et al. (Lec. 3) Pre: MUS 221 or the ability to read music. Offered every seventh semester.

**MUS 431 The Baroque Era** (3 crs.) Music of 1600-1750, from the rise in Italy of opera, oratorio, idiomatic instrumental music, the sonata, and the concerto, through the works of German masters Bach and Handel. (Lec. 3) Pre: MUS 222 or the ability to read music. Offered every seventh semester.

**MUS 432 The Classic Era** (3 crs.) Music of 1750-1825, beginning with the founders of the Classical style, including D. Scarlatti, Gluck, and the sons of Bach, and culminating in the works of Haydn, Mozart, and Beethoven. (Lec. 3) Pre: MUS 222. Offered every seventh semester.

**MUS 433 The Romantic Era** (3 crs.) Music of 1825-1900, with emphasis on topics central to the era, including program music, nationalism, piano virtuosity, opera, lieder, the cyclic symphony, and turn-of-the-century Viennese post-Romanticism. (Lec. 3) Pre: MUS 222 or the ability to read music. Offered every seventh semester.

**MUS 434 The Modern Era** (3 crs.) Music of the modern era, with emphasis on changing aesthetics as revealed through the analysis of selected compositions. (Lec. 3) Pre: MUS 227 or the ability to read music. Offered every seventh semester.

**MUS 442 Directed Study in Applied Music Pedagogy** (2 crs.) Research in materials and approaches for studio teaching. Pre: 4 credits in MUS 210. In alternate years.

**MUS 450 Senior Recital** (0-1 cr.) Performance of a public program at least 20 minutes in duration after faculty examination. Pre: concurrent enrollment in MUS 410. Not for graduate credit.

**MUS 480 Graduation Portfolio PRA Seminar covering topics and the development of a graduation portfolio appropriate to the student's degree program. The portfolio shows accomplishments from throughout the degree program and achievement of competencies indicating potential success as a graduate.** (Portfolio) Pre: MUS 280 or permission of chairperson and senior standing in music. For music education majors, concurrent enrollment in EDC 484 required. To be taken during the last semester of coursework in the major. May be repeated. Not for graduate credit.

**MUS 485 Opera Workshop** (0-1 cr.) Coordination of music and drama. Singing, performing, and acting techniques on stage. Possible experience in conducting, coaching, directing, and stage management. Development of professional standards and attitudes. Preparation and presentation of scenes from various operas. Primarily for students in voice. (Rehearsal 2) Pre: audition and/or permission of instructor. May be repeated for credit.

**MUS 490 Independent Study** (1-3 crs.) Preparation of a project under the guidance of a member of the appropriate faculty. (Independent Study) Pre: acceptance by faculty member who will be the project advisor and approval of chairperson. May be repeated for credit.

**MUS 510A Applied Music - Voice** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510B Applied Music - Piano** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510C Applied Music - Organ** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes,

and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510D Applied Music - Harpsichord** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510E Applied Music - Violin** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510F Applied Music - Viola** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510G Applied Music - Violoncello** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510H Applied Music - Contra Bass** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510I Applied Music - Flute** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510J Applied Music - Oboe** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510K Applied Music - Clarinet** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency

appropriate to the selected M.M. degree. May be repeated.

**MUS 510L Applied Music - Bassoon** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510M Applied Music - Saxophone** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510N Applied Music - Trumpet** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510O Applied Music - French Horn** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510P Applied Music - Trombone** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510Q Applied Music - Euphonium/Baritone** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510R Applied Music - Tuba** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510S Applied Music - Percussion** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510T Applied Music - Guitar** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510U Applied Music - Harp** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510V Applied Music - Composition** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510W Applied Music - Jazz** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. May be repeated.

**MUS 510Y Applied Music - Choral Conducting** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. There is no fee for choral or instrumental conducting. May be repeated.

**MUS 510Z Applied Music - Instrumental Conducting** (2, 3, 4, or 6 crs.) Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. There is no fee for choral or instrumental conducting. May be repeated.

**MUS 540 Foundations of Music Education** (3 crs.) Examination of the broad influences upon music education. Historical, philosophical, sociological, psychological, and curricular foundations. (Lec. 3) Pre: graduate standing in music. Offered every third semester.

**MUS 545 Musical Learning, Evaluation, and Assessment** (3 crs.) A study of cognitive, psychomotor, and affective learning in music. The ways in which musical learning may be evaluated and assessed. The needs of special populations will be included. (Lec. 3) Pre: graduate standing in music. Offered every third semester.

**MUS 548 Research in Music** (3 crs.) Study of research techniques as applied to the art of music. Major project procedures and data collection and examination in the following research categories: historical, philosophical, and empirical. (Lec. 3) Pre: graduate standing in music. Offered every third semester.

**MUS 550 Graduate Performance Recital** (0-1 cr.) Performance of advanced repertoire of various styles in a public program at least 55 minutes in duration for the M.M. in performance and 45 minutes in duration for the M.M. in music education after faculty acceptance. (Studio) Pre: concurrent enrollment in MUS 510 and 6 or more credits in MUS 510 for the M.M. in performance or 4 or more credits in 510 for the M.M. in music education.

**MUS 552 Graduate Composition Recital** (0-1 cr.) A juried recital of at least 40 minutes of original compositions prepared by the composer. (Studio) Pre: concurrent enrollment in MUS 510V and 3 or more credits in MUS 510V.

**MUS 567 Seminar in Performance and Pedagogy** (2 crs.) Study of performance literature, practice, and pedagogy. Research projects and supervised teaching experience appropriate to the major performance area. (Lec. 2) Pre: concurrent enrollment in MUS 550. In alternate years.

**MUS 570 Graduate Project** (3 crs.) Independent study resulting in a major essay, composition, or orchestration. (Independent Study) Pre: MUS 548 and permission of chairperson.

**MUS 571 Special Topics in Music** (1-3 crs.) Exploration of advanced topics not covered by the standard graduate curriculum but of interest to faculty and students in a particular semester. Possible topics include performance, music history, music theory, composition, and music education. (Lec. 1-3) May be repeated for credit with a different topic.

**MUS 579 Experiential Learning in Music PRA** (2 crs.) Developing competence through an individual and/or collaborative experiential activity involving music research, performance, service, and/or teaching in university and community settings. May include professional music studio or computer lab work. Student will work with his or her major professor or with the director of graduate studies. (Practicum) Pre: graduate standing and previous or concurrent enrollment in MUS 580.

**MUS 580 Master Of Music Portfolio I** (0 crs.) Planning individual activities and experiences demonstrating competence in music at the graduate level. Should be taken in the first semester of matriculation. Student will work with his or her major professor or with the director of graduate studies. (3 common Seminars) Pre: graduate standing in music. Not required for students whose bachelor's degree is from URI. S/U only.

**MUS 581 Master Of Music Portfolio II** (1 cr.) Individual accomplishment of activities and experiences demonstrating competence at the graduate level of music. Achievement of professional behaviors indicating significant growth in areas of specialization. Oral presentation required. Should be taken in final semester of study. Student will work with his or her major professor or with the director of graduate studies. (3 common Seminars) Pre: graduate standing in music. S/U only.

**MUS 583 Vocal Diction** (3 crs.) Phonetics (International Phonetic Alphabet). Enunciation in the foreign languages most encountered in vocal literature (French, Italian, and German). English diction in singing. (Lec. 3) In alternate years.

**MUS 590 Piano Accompanying** (1 cr.) Development of sight-reading skills. Preparation and performance of accompaniments of major works. (Studio 1) Pre: permission of piano faculty. May be repeated for a maximum of 3 credits.

**MUS 591 Independent Study** (1-3 crs.) Preparation of an advanced project under the guidance of a member of the appropriate faculty. May be repeated for credit. Pre: acceptance by faculty member who will be the project advisor and approval of chairperson.

**MUS 593 University Chorus** (0-1 cr.) (Rehearsal 3) Pre: audition at graduate level of performance. May be repeated.

**MUS 594 Symphonic Wind Ensemble** (0-1 cr.) (Rehearsal 3) Pre: audition at graduate level of performance.

**MUS 595 Concert Choir** (0-1 cr.) (Rehearsal 3) Pre: audition at graduate level of performance.

**MUS 596 Jazz And Studio Ensemble** (0-1 cr.) Study and performance of jazz and studio music, with leadership roles in improvisation and performance. (Rehearsal 3) Pre: audition at graduate level of performance.

**MUS 597 University Symphony** (0-1 cr.) (Rehearsal 3) Pre: audition at graduate level of performance. May be repeated.

**MUS 598B Chamber Music Ensemble-brass** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598G Chamber Music Ensemble-guitar** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598J Chamber Music Ensemble-jazz** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598K Chamber Music Ensemble-keyboard** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598M Chamber Music Ensemble-mixed** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598P Chamber Music Ensemble-percussion** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598S Chamber Music Ensemble-string** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598V Chamber Music Ensemble-vocal** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 598W Chamber Music Ensemble-woodwind** (0-1 cr.) Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar,

jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**MUS 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: MUS 548. May be repeated. S/U credit.

## NES | New England Studies

**NES 400 Special Topics In New England Studies** (1-3 crs.) Specialized topics in the study of New England offered by specialists in the field. (Seminar)

## NEU | Neuroscience

**NEU 502 Introduction to Neurobiology** (3 crs.) Cross-listed as (BIO), NEU 502. Fundamental processes in neurobiology with emphasis on cellular and membrane mechanisms of nerve functioning. (Lec 3). Pre: BIO 201 and MTH 141, or permission of instructor.

**NEU 503 Introduction to the Neurosciences** (4 crs.) This survey course will introduce basic neuroscience areas, including gross and microscopic anatomy, neural development, membrane physiology, sensory and motor systems, language, cognition, neuropharmacology, neuroengineering, and psychological disorders. (Lec. 3; Rec. 1) Pre: Graduate standing or permission of the instructor.

**NEU 504 Neuroethics** (1 cr.) Neuroethics is the study of ethical issues regarding research in neuroscience. Students will learn the implications of neuroscience research for human self-understanding, ethics and policy. (Seminar 1) Pre: graduate standing or permission of the instructor.

**NEU 581 Neurosciences Colloquium** (1 cr.) Program of invited speakers, who will present original research topics in neurosciences field. Credit available to graduate students in the Interdisciplinary Neurosciences Program (INP) and graduate students and upper level undergraduates from other programs. (Seminar)

**NEU 582 Neurosciences Colloquium** (1 cr.) Program of invited speakers, who will present original research topics in neurosciences field. Credit available to graduate students in the Interdisciplinary Neurosciences Program (INP) and graduate students and upper level undergraduates from other programs. (Seminar)

**NEU 587 Seminar In Neurobiology** (1 cr.) Cross-listed as (NEU), BIO 587. Survey of current literature in the neurosciences. Topics include molecular and behavioral electrophysiology, ion channels, nerve net modelling, ultrastructure of excitable cells, receptor and pharmacological neurobiology of invertebrates and vertebrates. (Seminar) Pre: graduate standing or one advanced neuroscience course.



**NEU 591 Special Projects in Neurosciences** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**NEU 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: Graduate standing in the Interdisciplinary Neuroscience Program. S/U credit.

**NEU 699 Neuroscience Doctoral Dissertation Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: graduate standing in the Ph.D. program. S/U credit.

## NFS | Nutrition and Food Sciences

**NFS 110 Introduction To Nutrition And Dietetics** (1 cr.) Description of the educational and experiential requirements of a registered dietitian and a nutritionist. Career opportunities discussed. Designed for students entering the nutrition and dietetics major. (Lec. 1)

**NFS 207 General Nutrition** (3 crs.) Fundamental concepts of the science of nutrition with application to the individual, community, and world. (Lec. 3) Not open to students with credit in NFS 210. (N)

**NFS 210 Applied General Nutrition** (4 crs.) Fundamental concepts of the science of nutrition with application to the individual, community, and world. Weekly laboratory experience collecting and interpreting dietary intake, anthropometric measures, and clinical values. (Lec. 3, Lab. 2) Not open to students with credit in NFS 207. (N)

**NFS 212 Public Health Nutrition** (3 crs.) This course will provide an introduction to the concepts of public health emphasizing the distinction between population-based and individual-based approaches to prevention using nutrition and diet related conditions as examples. (Lec. 3) Pre: NFS 207 or NFS 210.

**NFS 276 Food, Nutrition, and People** (3 crs.) Practical applications of nutrition policy. Current issues in the socioeconomic, cultural, and psychological influences on food and nutrition behavior. (Lec. 3) Pre: NFS 210 or 207.

**NFS 336** (227) **Scientific Principles of Food I** (4 cr.) Chemical, physical, sensory, and nutritional properties of food related to processes used in food preparation. Emphasis on water, carbohydrates, lipids, and the sensory evaluation of food. (Lec. 3, Lab. 2) Pre: NFS 210 and CHM 124.

**NFS 337 Scientific Principles of Food II** (4 crs.) Chemical, physical, sensory, and

nutritional properties of food related to processes used in food preparation. Emphasis on proteins, scientific principles of baked goods, and research applications. (Lec. 3, Lab. 2) Pre: NFS 336.

**NFS 360 Nutrition in Exercise and Sport** (3 crs.) Relationships among diet, physical activity, health, and performance. Metabolism and requirements of nutrients in physically active individuals. Applications to energy balance, body composition, various population groups, fitness levels, and conditions. (Lec. 3) Pre: NFS 207 or 210, and KIN 275 or BIO 242.

**NFS 375 Food-Service Management I** (3 crs.) Administrative responsibilities in planning, organizing, staffing, leading, and evaluating food-service systems. Emphasis on menu planning, purchasing, and food cost control. (Lec. 3) Pre: NFS 212 or 276.

**NFS 376 Food-service Management II** (4 crs.) Administrative responsibilities in planning, organizing, staffing, leading, and evaluating food-service systems. Emphasis on food production and labor cost control. Experience in a food-service facility. (Lec. 3, Lab. 2) Pre: NFS 375.

**NFS 394 Nutrition in the Life Cycle I** (3 crs.) Current issues in maternal, child, and adolescent nutrition with emphasis on nutrient requirements and food habit development; delivery of cost-effective nutrition services and the application of the principles of menu planning. (Lec. 3) Pre: NFS 212 or 276. Service learning.

**NFS 395 Nutrition in the Life Cycle II** (3 crs.) Current issues in nutrition for the adult and older adult with emphasis on nutrient requirements related to physiological changes; screening initiatives; program development to reduce risk of nutrition-related diseases. (Lec. 3) Pre: NFS 394. Service learning.

**NFS 410 Professional Issues In Nutrition And Dietetics** (1 cr.) Professional issues in the field of nutrition and dietetics. Topics include career choices; evaluation of journal articles; and registration, licensing, and certification. (Lec. 1) Pre: NFS 395 and senior standing. Not for graduate credit.

**NFS 431 Chemistry of Food and Nutra-ceuticals** (3 crs.) Chemical and functional properties of major food components, changes in nutritional properties during processing and storage, and nutraceuticals and functional foods. (Lec. 3) Pre: CHM 124 and 227 or permission of instructor.

**NFS 434 Aquatic Food Quality and Processing** (4 crs.) Cross-listed as (NFS), NFS 434. Physicochemical and nutritional characteristics of aquatic fish and shellfish; quality assessment and control; principles and applications in handling and processing fish from harvesting to production; and discussion of current issues. (Lec. 3, Lab. 3)

**NFS 440 Macronutrient Metabolism** (3 crs.) Chemistry and metabolism of carbohydrate, protein, and fat. Advanced study

of the impact of macronutrients on human metabolism, health, and disease. (Lec. 3) Pre: NFS 210, BIO 242, BCH 211 or BCH 311, or permission of instructor.

**NFS 441 Micronutrient Nutrition** (3 crs.) Utilization and requirements for micronutrients in human nutrition. Micronutrients covered will include vitamins, minerals, phytochemicals, and herbal supplements. (Lec. 3) Pre: NFS 210, BIO 242, BCH 211, or permission of instructor.

**NFS 443 Nutrition Assessment** (4 crs.) Evaluation of nutritional status by dietary assessment, anthropometric measures, and nutrition-related health indicators. Practice in body composition assessment, interpreting dietary and laboratory data, and nutrition counseling. (Lec. 3, Lab. 2) Pre: NFS 210 and 395, or permission of instructor.

**NFS 444 Nutrition and Disease** (3 crs.) Effects of disease on metabolism and nutritional requirements; implications for dietary change, and factors affecting acceptance of such change. (Lec. 3). Pre: NFS 441, 443 or enrollment in Pharm.D. program

**NFS 451 Field Experience in Nutrition and Food Science PRA** (1-3 crs.) Individual supervised field experience and seminar in community, educational, government, health-oriented, and commercial activities and services related to food science and nutrition. (Practicum) Pre: NFS 394, 395 or permission of instructor. May be repeated for a maximum of 6 credits. Not for graduate credit in food science and nutrition.

**NFS 458 Nutrition Education** (3 crs.) Principles and practices of teaching individuals and groups to translate nutrition knowledge into action. Emphasis on research in and evaluation of nutrition education. (Lec. 3) Pre: NFS 395, 440, or permission of instructor.

**NFS 491 Special Projects** (1-3 crs.) Advanced work under supervision of a staff member. Arranged to suit individual requirements of student. (Independent Study) Pre: senior standing and permission of instructor. May be repeated for up to 6 credits. Not for graduate credit.

**NFS 495 Applied Nutrition Practicum PRA** (1-3 crs.) Mentor students enrolled in NFS 207 or 210 to gain experience and practice basic nutrition assessment skills including dietary analysis, anthropometric measures, and clinical laboratory values. May be repeated for up to 6 credits. (Practicum) Pre: NFS 207 or 210. Not for graduate credit.

**NFS 504 Food Systems, Sustainability, and Health** (3 crs.) Cross-listed as (NFS), AVS 504. Scientific analysis of animal and human health and nutrition in various food systems. Interdisciplinary discussion on food systems and sustainability. (Lec. 3) Pre: graduate student in good standing or permission of instructor.

**NFS 505 Methods In Nutrition Research** (3 crs.) Theory and laboratory experience in research methodology related to nu-

trition. Critical review of articles, completion of laboratory projects, and preparation of a research proposal. (Lec. 2, Lab. 2) Pre: NFS 444 and STA 308 or permission of instructor.

**NFS 506 Nutrition In The Community** (3 crs.) Exploration of the role of the nutrition professional in community needs assessment, intervention development and evaluation, and in forming domestic nutrition policy. (Lec. 3) Pre: Graduate standing or permission of instructor.

**NFS 507 Applied Nutrition I** (1 cr.) Selected topics in applied nutrition with an emphasis on medical nutrition therapy. (Lec. 1) Pre: NFS 444 or permission of instructor.

**NFS 508 Applied Nutrition II** (1 cr.) Selected topics in applied nutrition with an emphasis on community nutrition and food service management. (Lec. 1) Pre: NFS 506 or permission of instructor.

**NFS 511 Seminar in Nutrition and Food Science I** (1 cr.) Reports and discussions of current topics in food science and nutrition, as well as oral reports of theses and dissertation research topics in progress. (Seminar) Pre: graduate standing or permission of chairperson.

**NFS 512 Seminar in Nutrition and Food Science II** (1 cr.) Critical review of oral presentations given in NFS 511. Provides student with experience in communicative skills necessary to evaluate and critique scientific presentations. Attendance is required of all graduate students in residence when not enrolled in NFS 511. (Seminar) Pre: graduate standing. S/U credit.

**NFS 528 Lipoprotein Metabolism in Health and Disease** (3 crs.) Chemistry and metabolism of sterols and lipoproteins in health and disease including heart disease and inborn errors of metabolism; dietary and drug treatments on cholesterol and lipoprotein metabolism. (Lec. 3) Pre: graduate standing in Nutrition and Food Science, or permission of instructor.

**NFS 551 Macronutrients in Human Nutrition** (3 crs.) Digestion, absorption, and metabolic role of macronutrients and their interrelationships. Influence of environmental and physiological factors on nutrient use and energy balance. Critical review of the literature. (Lec. 3) Pre: NFS 440, 441, BIO 242, and BCH 211 or BCH 311, or permission of instructor.

**NFS 552 Micronutrients in Human Nutrition** (3 crs.) Absorption, metabolism, and role of micronutrients and their interrelationships. Critical review of the literature and implications for public policy. (Lec. 3) Pre: NFS 440, 441, BIO 242, and BCH 211 or BCH 311, or permission of instructor.

**NFS 580 Experiential Learning in Nutrition and Food Sciences PRA** (1-6 crs.) Supervised learning in a nutrition-related setting. (Practicum 1-6) Pre: Acceptance into the M.S. nutrition program.

**NFS 581 Internship In General Medical Nutrition Therapy PRA** (1-3 crs.) Supervised practice in medical nutrition therapy in a hospital setting. (Practicum) Pre: Acceptance into the combined nutrition dietetic internship program.

**NFS 582 Internship In Advanced Medical Nutrition Therapy PRA** (1-3 crs.) Supervised advanced practice in medical nutrition therapy in a hospital setting. (Practicum) Pre: Acceptance into the combined nutrition dietetic internship program.

**NFS 583 Internship in Food Service Management PRA** (1-3 crs.) Supervised practice in food service management in a hospital setting. (Practicum) Pre: Acceptance into the combined nutrition dietetic internship program.

**NFS 584 Internship In Community Nutrition PRA** (1-3 crs.) Supervised practice in community nutrition in a variety of community settings. (Practicum) Pre: Acceptance into the combined nutrition dietetic internship program.

**NFS 591 Research Problems** (1-4 crs.) Advanced work under supervision of a staff member. Arranged to suit individual requirements of students. (Independent Study) Pre: permission of chairperson. May be repeated for up to 6 credits.

**NFS 599 Master's Thesis Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**NFS 691 Research In Nutrition and Food Sciences** (1-3 crs.) Assigned research on an advanced level. Students are required to outline the problem, conduct the necessary literature survey and experimental work, and present their observations and conclusions in a report. (Independent Study) May be repeated for up to 6 credits.

**NFS 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## NRS | Natural Resources Science

**NRS 100 Natural Resource Conservation** (3 crs.) Introduction to humans' use and management of natural resources: land, food, forest, wildlife, water, minerals, and air, with a survey of contemporary resource-use problems in environmental pollution. (Lec. 3) (N)

**NRS 101 Freshman Inquiry into Natural Resources Science** (1 cr.) Introduction for freshmen to the opportunities, careers, research activities, applied outreach, and educational programs in the Department of Natural Resources Science. Interact weekly with faculty. Explore hands-on modules. (Lec. 1) S/U credit.

**NRS 190 Issues in Biotechnology** (3 crs.) Cross-listed as (AFS), BCH, MIC, NRS, PLS 190. Introduction to modern biotechnology in medical, pharmaceutical, forensic, agricultural, marine, and environmental applications. Consideration of ethical, environmental, health, and social issues. (Lec. 3/Online) (N)

**NRS 200 Seminar In Natural Resources** (1 cr.) Review and discussion of research, management, and other topics in natural resources. Speakers expose students to issues that natural resources professionals are concerned with and the work that they do. Pre: 100.

**NRS 212 Introduction to Soil Science** (4 crs.) Physical, biological, and chemical properties of soils and their practical application to environmental science. Introduction to soil genesis, classification, and land-use and conservation issues. (Lec. 3/Practicum 2/Online)

**NRS 223 Conservation Biology** (4 crs.) Conservation of biological diversity in a world dominated by humans. Conservation biology theory, application; ecosystem conservation; landscape ecology principles. (Lec. 3, Online 1) Pre: NRS 100, BIO 101 or 102.

**NRS 300 Introduction to Global Issues In Sustainable Development** (3 crs.) Role of the United States in development assistance to foreign nations. Topics include foreign aid, sustainable development, transfer of technology, and international career opportunities. (Lec. 3) (FC) [D]

**NRS 301 Introduction To Forest Science** (3 crs.) Development and importance of forestry; forest regions; tree characteristics and identification with emphasis on Northeastern species; forest environment; tree growth and site productivity. (Lec. 2, Lab. 2) Pre: BIO 102.

**NRS 302 Fundamentals Of Forest Management** (3 crs.) Wood properties, timber harvesting, measurement and utilization of forest products; establishment, tending, and protection of forest stands; silvicultural systems; forest inventory procedures and management plans. (Lec. 2, Lab. 2) Pre: NRS 301.

**NRS 304 Field Ornithology** (3 crs.) Identification, field study techniques, habitats, and basic biology of birds. Emphasis on field identification of local species. (Lec. 2, Lab. 3) Pre: BIO 101 and permission of instructor.

**NRS 305 Principles of Wildlife Ecology and Management** (3 crs.) Application of ecological knowledge to the management of wild vertebrate populations and the habitat upon which they depend. (Lec. 3) Pre: NRS 223 and BIO 101 and 102, and 262.

**NRS 309 Wildlife Management Techniques Laboratory** (3 crs.) Application of practical field techniques for quantification and evaluation of wildlife and habitats. Methods of field identification, sampling, and data analysis. (Lab. 4, Project 3) Service learning. Pre: NRS 223 and 305.

**NRS 324 Mammalogy** (4 crs.) Classification, distribution, field study techniques, ecology, behavior, and biology of mammals. Emphasis on New England species, but includes mammals of the world. (Lec. 3, Lab. 3) Pre: BIO 101 and permission of instructor. In alternate years.

**NRS 351 Soil Morphology Practicum PRA** (2 crs.) Seven weeks of practical experience in the description of soil profiles under field conditions. Field trips to observe, describe, and interpret morphological properties as utilized in soil judging. (Practicum) Pre: NRS 212 or permission of instructor. May be repeated for credit with permission of chairperson.

**NRS 395 Research Apprenticeship in Natural Resources Science PRA** (1-3 crs.) Supervised experience for qualified undergraduates who assist NRS faculty and graduate students in departmental research projects. Tasks may include literature review, research design, installation of sampling plots and equipment, laboratory analyses, data collection, and data analysis. (Practicum) Pre: sophomore to senior standing and permission of instructor. Limited to NRS majors. May be repeated for a maximum of 6 credits. S/U credit.

**NRS 397 Natural Resources Internship PRA** (1-6 crs.) Supervised work experience in forestry, wildlife management, soil science, water resources, environmental education, or related areas of natural resources management. (Practicum) Pre: NRS 100, NRS 212 and approval of chairperson. Open only to NRS majors. May be repeated for a maximum of 6 credits. S/U credit.

**NRS 401 Foundations in Restoration Ecology** (4 crs.) Overview of factors involved with implementing an ecological restoration. Will synthesize the physical, biological, and human factors that determine restoration success. Includes weekly field/lab sessions. (Lec. 3, Lab. 3) Pre: NRS 223 or BIO 262, or permission of instructor. Not for graduate credit.

**NRS 402 Wildlife Biometrics** (3 crs.) Presentation of statistical design and analysis of ecological field measurements. Emphasis on quantitative measurements and data analyses used in wildlife population research. Capstone. (Lec. 2, Lab. 3) Pre: BIO 262, NRS 223, STA 308 or 409, and permission of instructor. In alternate years.

**NRS 403 Wildlife Biometrics Field Investigations PRA** (1 cr.) Independent field study of wildlife populations using modern quantitative measurements and data analyses. Emphasis on experimental design, data collection and recording, statistical analysis, data interpretation, and reporting. (Practicum) Capstone. Not for graduate credit.

**NRS 406 Wetland Wildlife Management** (4 crs.) Introduction to management of wetland wildlife. Emphasis on management techniques used for major wetland types, waterfowl, furbearers and nongame

wildlife. (Lec. 2, Lab 4) Pre: NRS 223 and permission of instructor.

**NRS 407 Endangered Species Conservation** (3 crs.) Programs for the protection of species under the Endangered Species Act and global approaches to conservation of biodiversity in human-dominated landscapes. (Lec. 3) Pre: BIO 101 and NRS 100.

**NRS 409 Concepts in GIS and Remote Sensing** (4 crs.) Discussion of the unique properties of geospatial data, geospatial data structures, accessing existing spatial data, and applications of GIS and remote sensing in the environmental sciences. (Lec. 3, Rec. 1) Pre: junior or senior standing or permission of the instructor. Not for graduate credit.

**NRS 410 Fundamentals of GIS** (3 crs.) Emphasis on using a geographic information system (GIS) to create a geographically referenced spatial database, spatial topology, data visualization, computer-assisted map making, and spatial data query and analysis. (Lab. 3, Online 2)

**NRS 411 Population and Environmental Change** (3 crs.) Overview and analysis of the major scientific and policy issues concerning human population growth and environmental change. (Lec. 3) Recommended for upper level undergraduates. Not for graduate credit.

**NRS 412 Soil-Water Chemistry** (3 crs.) Biogeochemistry of soil-water interactions. Soil composition, the exchange and sorption of elements, trace element behavior, redox reactions and control of these factors on availability and loss. (Lec. 3) Pre: NRS 212 and CHM 124 and 126 or permission of instructor. In alternate years.

**NRS 414 Climate Change Science and Policy** (3 crs.) Overview and analysis of the science and policy issues concerning climate change and global warming. (Lec. 3) Pre: GEO 305 or permission of instructor. Not for graduate credit.

**NRS 415 Remote Sensing Of The Environment** (3 crs.) Introduction to fundamentals of airborne and space-borne remote sensing. Emphasis on remote sensing applications in terrestrial environmental and natural resources studies. (Lec. 2, Lab. 2)

**NRS 417 Herpetology** (4 crs.) Cross-listed as (NRS), BIO 417. Introduces students to the biology, ecology, conservation, and management of reptiles and amphibians, including global perspectives, and field methods for studying amphibians and reptiles of north-eastern North America. (Lec. 2, Lab. 4) Pre: BIO 101/103 and 102/104; and NRS 223 or BIO 262, and permission of instructor. Not for graduate credit.

**NRS 423 Wetland Ecology** (4 crs.) Formation, development, and distinguishing features of inland and coastal wetlands. Topics include classification, geology, hydrology, soils, plant ecology, vegetation dynamics. Primary emphasis on wetlands of the glaciated Northeast. Capstone. (Lec. 2, Lab. 4)

Pre: BIO 262, GEO 103, NRS 223, concurrent enrollment in NRS 425 or 525, and permission of instructor.

**NRS 424 Wetlands and Land Use** (4 crs.) Survey of wetland values, exploitation, current status, and legal protection. Emphasis on critical issues including wetland evaluation, impact assessment, mitigation procedures. Field trips provide examples of wetland use conflicts. Capstone. (Lec. 2, Lab. 4) Pre: NRS 423 or permission of instructor.

**NRS 425 Wetland Field Investigations PRA** (1 cr.) Independent field study of a diverse freshwater wetland ecosystem, with emphasis on aerial photo-interpretation, wetland classification, and in-depth examination of glacial geology, hydrology, plant ecology, and soils. (Practicum) Capstone. Pre: concurrent enrollment in 423. Not for graduate credit.

**NRS 426 Soil Microbiology** (3 crs.) Occurrence, metabolism and ecology of soil microorganisms, with emphasis on nutrient cycling, soil pathogens, transformation of organic and inorganic pollutants, and soil biotechnology. (Lec. 3) Pre: NRS 212 or permission of instructor.

**NRS 445 Invasive Species Research, Management, and Policy** (4 crs.) Overview of the major invasive alien species issues in the research, management, and policy arenas. Includes weekly field/lab sessions. (Lec. 3, Lab. 3) Pre: NRS 223 or BIO 262 or permission of instructor. Not for graduate credit.

**NRS 450 Soil Conservation and Land Use** (3 crs.) Application of soil survey interpretation as a tool in soil and water conservation and land use planning. Implications of soil properties and problems for land use considered with emphasis on urbanizing situations. Capstone. (Lec. 3) Pre: NRS 212 or permission of instructor.

**NRS 452 Soil, Water, And Land Use Investigations PRA** (1 cr.) Independent field and laboratory study of soil and water topics related to land use issues. (Practicum) Capstone. Pre: concurrent enrollment in NRS 450.

**NRS 461** (361) Watershed Hydrology and Management (4 crs.) Detailed study of the watershed processes that govern the hydrology and quality of surface water. Emphasis on methods and analyses employed for watershed management. (Lec. 3, Lab. 3) Pre: NRS 212, STA 308 or 409 or permission of instructor.

**NRS 471 Soil Morphology and Mapping** (4 crs.) A detailed study of the morphological properties of soils and their distribution on the landscape. Practical experience in describing soil profiles and preparing soil maps. (Lec. 2, Lab. 4)

**NRS 480 Colloquium** (2 crs.) Student-directed projects for reflection on educational accomplishments, exploration of post-graduate opportunities, and formulation of long-term professional goals. Requires comple-

tion of four major projects. (Seminar) Pre: junior standing. Not for graduate credit.

**NRS 482 Innovative Subsurface Remediation Technologies** (4 crs.) Cross-listed as (GEO), NRS, EVS, CVE 482. Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. (Lec. 4) Pre: permission of instructor. In alternate years. Not for graduate credit.

**NRS 484 Environmental Hydrogeology** (4 crs.) Cross-listed as (GEO), NRS, EVS, CVE 484. Physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab. 2) Pre: GEO 483 or CVE 588 or NRS 510, or permission of instructor. Not for graduate credit. Offered every other year.

**NRS 485 Salt Marsh Ecology** (4 crs.) Cross-listed as (BIO), NRS 485. Structure and function of salt marsh ecosystems, including biogeochemistry, in the context of global change. Seminar-style discussions of primary scientific literature, laboratory and field exercises, and an independent research poster. (Lec. 2, Lab 4) Pre: BIO 262 or NRS 223 and 2 semesters of chemistry or permission of instructor. BIO 360 recommended. Not for graduate credit.

**NRS 487 International Development Internship PRA** (1-6 crs.) Supervised participation in programs related to sustainable international development. Minimum 35 hours of internship per credit. (Practicum) Pre: NRS 300 and/or permission of instructor. Not for graduate credit. S/U only.

**NRS 491 Special Projects** (1-3 crs.) Special work to meet the needs of individual students in natural resources. (Independent Study) Pre: permission of chairperson.

**NRS 492 Special Projects** (1-3 crs.) Special work to meet the needs of individual students in natural resources. (Independent Study) Pre: permission of chairperson.

**NRS 492H Honors section of NRS 492: Special Projects** (1-3 crs.) Honors section of NRS 492: Special Projects. (Independent Study) Pre: permission of chairperson. Pre: must have a 3.30 overall GPA.

**NRS 495 Advanced Natural Resources Apprenticeship PRA** (3 crs.) Collaboration with faculty and graduate students in departmental research, including supervision and mentoring of students enrolled in NRS 395. Emphasis on independent decision-making and leadership of undergraduate research teams. Limited to majors. May be repeated for a maximum of 6 credits. (Practicum) Pre: NRS 395 and permission of instructor. S/U only. Not for graduate credit.

**NRS 496 International Development Seminar** (3 crs.) Seminar in sustainable international development for advanced-level students interested in international development. (Seminar) Pre: NRS 300 and/

or permission of instructor. Not for graduate credit.

**NRS 497 Natural Resources Cooperative Internship PRA** (6-12 crs.) Supervised work experience with a governmental agency, nongovernmental organization, or private company in the environmental field. Capstone. (Practicum) Pre: senior standing and permission of department. Not for graduate credit.

**NRS 498 Teaching Practicum In Natural Resources Science PRA** (1-3 crs.) Teaching experience for qualified undergraduates through actual involvement in planning and assisting in NRS courses. May include supervised participation in a discussion group, assisting in a laboratory or field course, or tutoring. (Practicum) Pre: senior standing, previous enrollment in the course to be taught, and permission of instructor. Limited to NRS majors. May be repeated for a maximum of 3 credits. Not for graduate credit. S/U only.

**NRS 499 Senior Thesis In Natural Resources Science** (6 crs.) In-depth research or outreach effort reviewed by a faculty committee and culminating in a thesis written in scientific journal format. Oral presentation to the committee required. Capstone. (Independent Study) Pre: GPA of at least 3.25, successful completion of NRS 491 or 492 and permission of department chairperson. Not for graduate credit.

**NRS 501 Foundations of Restoration Ecology** (4 crs.) Overview of factors involved with implementing an ecological restoration. Will synthesize the physical, biological and human factors that determine restoration success. Includes weekly field/lab sessions. (Lec. 3/Lab. 3) Pre: NRS 223 or BIO 262, or permission of instructor.

**NRS 503 Wildlife Biometrics Field Investigations PRA** (1 cr.) Independent field study of wildlife populations using modern quantitative measurements and data analyses. Emphasis on experimental design, data collection and recording, statistical analysis, data interpretation, and reporting. (Practicum) Pre: concurrent enrollment in 402.

**NRS 505 Biology and Management of Migratory Birds** (2 crs.) Current programs, problems, and techniques for managing migratory game and nongame birds. Emphasis on basic biology of the species, habitat management, and harvest management. (Seminar) Pre: NRS 305 or permission of instructor. In alternate years.

**NRS 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

**NRS 509 Concepts of GIS and Remote Sensing in Environmental Science** (4

crs.) Unique properties of geospatial data, accessing existing GIS and remote sensing data, and applications of GIS and remote sensing in the environmental sciences. Uses in ecology, conservation, soil science, geohydrology, and conservation biology. (Lec. 3, Rec. 1) Pre: graduate standing or permission of instructor.

**NRS 511 Population and Environment Change** (3 crs.) Overview and analysis of the major scientific and policy issues concerning human population growth and environmental change. (Lec. 3)

**NRS 514 Climate Change Science and Policy** (3 crs.) Overview and analysis of the science and policy issues concerning climate change and global warming. (Lec. 3) Pre: for graduate students, none; for undergraduates GEO 305 or permission of instructor.

**NRS 516 Remote Sensing in Natural Resources Mapping** (3 crs.) Digital remote sensing in environmental and natural resource studies. Emphasis on satellite remote sensing image rectification, georeferencing, classification, and integration with GIS. (Lec. 2, Lab. 2) Pre: NRS 415 or permission of instructor.

**NRS 517 Herpetology** (4 crs.) Cross-listed as (NRS), BIO 517. This course provides an in-depth background on the biology, ecology, conservation, and management of reptiles and amphibians, including field methods for studying amphibians and reptiles of north-eastern North America. (Lec. 2, Lab. 4) Pre: graduate student in biological and environmental sciences and permission of instructor.

**NRS 518 Ecohydrology** (3 crs.) Relationships between hydrology and the diversity, structure, and function of ecosystems. Topics include methods of study; interaction of watershed dynamics and flow regimes upon wetlands and fluvial systems. (Lec. 3) Pre: NRS 361 or NRS 461 or permission of instructor.

**NRS 520 Quantitative Techniques in Natural Resource Research** (3 crs.) Cross-listed as (NRS), EEC 520. Research design, database management, and analysis and interpretation of natural resource data. Emphasis on hands-on experience of quantitative and computerized techniques commonly used by natural resource scientists. (Lec. 2, Lab 2) Pre: STA 308 and permission of instructor.

**NRS 522 Advanced Gis Analysis Of Environmental Data** (3 crs.) Discussion and application of terrain modeling, spatial statistics, proximity analysis, remote sensing/GIS linkages, and environmental data integration. Emphasis on ecological data at watershed/landscape scales. Capstone. (Lec. 1, Lab. 6) Pre: NRS 410 or permission of instructor.

**NRS 524 Application Of Advanced Spatial Analysis PRA** (1 cr.) Independent application of spatial data analysis to derive solutions to environmental problems, with emphasis on GIS data integration, vector and raster modeling, and visualization of analytical and quantitative results. Capstone.

(Practicum) Pre: concurrent enrollment in NRS 522.

**NRS 525 Wetland Field Investigations PRA** (1 cr.) Independent field study of a diverse freshwater wetland ecosystem, with emphasis on aerial photo-interpretation, wetland classification, and in-depth examination of glacial geology, hydrology, plant ecology and soils. (Practicum) Pre: concurrent enrollment in 423.

**NRS 526 Microbial Ecology of Soils and Sediments** (3 crs.) Occurrence and activity of microorganisms in soils and sediments, including wetlands. Environmental physiology of microbes; habitat interactions; methods of study; importance of microbial processes to ecosystem productivity, pollutant degradation, and atmospheric chemistry. (Lec. 3) Pre: NRS 212, MIC 211, or permission of instructor.

**NRS 527 Marine Protected Areas: An Interdisciplinary Analysis** (3 crs.) Cross-listed as (MAF), NRS 527. Examination of the ecological, political, social, cultural, and economic factors influencing the use of MPAs (Lec. 3) Pre: permission of instructor.

**NRS 532 Conservation Biology And Resource Economics** (2 crs.) Cross-listed as (NRS), EEC 542. Examination of different components of conservation of biological diversity. Topics include minimum viable populations, ecology and economics of reserve design, reintroductions, causes of extinction, and the ecosystem conservation strategies. (Seminar) Pre: BIO 262, EEC 105 or permission of instructor.

**NRS 533 Landscape Pattern And Change** (3 crs.) Remote sensing perspective of landscape characterization; landscape dynamics; spatiotemporal land-use and land-cover change; modeling and analysis of landscape by integration of remote sensing, GIS, GPS, and in situ data. (Lec. 2, Lab. 2) Pre: NRS 415 or permission of instructor.

**NRS 534 Ecology of Fragmented Landscapes** (2 crs.) Presentation of the concepts of landscape ecology with emphasis on populations of plants and animals in fragmented habitats. Topics discussed include habitat corridors, fluxes of energy and species along habitat edges, shape analysis, and stability of populations in habitat patches. (Lec. 2) Pre: BIO 262 or permission of instructor. In alternate years.

**NRS 538 Physiological Ecology of Wild Terrestrial Vertebrates** (3 crs.) Relationships between animal physiology and the ecology and dynamics of wild vertebrate populations, including birds, mammals, reptiles, and amphibians. (Lec. 3) Pre: NRS 305 or permission of instructor.

**NRS 545 Invasive Species Research, Management, and Policy** (4 crs.) Overview of the major invasive alien species issues in the research, management, and policy arenas. Includes weekly field/lab sessions. (Lec. 3, Lab. 3) Pre: BIO 262 or NRS 223, or permission of instructor.

**NRS 551 Seminar In Marine Ecology** (1 cr.) Cross-listed as (BIO), NRS 551. Readings and discussion on current research involving ecological interactions of marine species. (Seminar) Pre: permission of instructor. May be repeated.

**NRS 555 Applied Coastal Ecology** (2 crs.) Resource management problems in coastal national parks. Topics include air and water pollution, barrier island erosion, deer overpopulation, Lyme disease, and ecosystem restoration. Examples of conflicting land-management mandates and research needs discussed. Optional field trips. (Lec. 2) Pre: advanced course work or experience in topical fields or permission of instructor. Offered in even-numbered years.

**NRS 563 Biology and Ecology of Fishes** (4 crs.) Cross-listed as (BIO), NRS 563. Exploration of the functional biology and ecology of marine and freshwater fishes through lecture and discussion of primary literature. Laboratory involves specimen study, field trips, and a research project. (Lec. 3, Lab. 3) Pre: BIO 366 or equivalent, or permission of instructor.

**NRS 567 Soil Genesis And Classification** (3 crs.) Development of soils as influenced by physical, chemical, biological, and climatic factors. Processes of soil formation presented relative to soil taxonomy and geographic distribution. (Lec. 3) Pre: NRS 471 or permission of instructor.

**NRS 568 Recent Advances in Natural Resources Science** (3 crs.) Critical analysis and presentation of technical reports on recent advances in natural resources science. Topics will vary according to instructor and background of students. (Lec. 3) Pre: graduate standing or permission of instructor.

**NRS 583 Innovative Subsurface Remediation Technologies** (4 crs.) Cross-listed as (GEO), EVS 582, NRS 583. Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. Offered alternate years (Lec. 4) Pre: permission of instructor.

**NRS 584 Environmental Hydrogeology** (4 crs.) Cross-listed as (GEO), EVS, NRS 584. Develop an understanding of the physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab 2) Pre: GEO 483 or CVE 588 or NRS 510 or permission of instructor.

**NRS 585 Salt Marsh Ecology** (4 crs.) Cross-listed as (BIO), NRS 585. Structure and function of salt marsh ecosystems, including biogeochemistry, in the context of global change. Seminar-style discussions, weekly assignments, written and oral presentations of independent proposal and research project. (Lec. 2, Lab. 4) Pre: permission of instructor. Prior undergraduate coursework equivalent to a course in ecology and 2 semesters of chemistry is expected.

**NRS 591 Special Problems** (1-3 crs.) Advanced independent research projects supervised by members of the research staff and unrelated to Master's or Doctoral research. Projects developed to meet individual needs. (Independent Study) Pre: permission of chairperson.

**NRS 592 Special Problems** (1-3 crs.) Advanced independent research projects supervised by members of the research staff and unrelated to Master's or Doctoral research. Projects developed to meet individual needs. (Independent Study) Pre: permission of chairperson.

**NRS 600 Graduate Seminar In Natural Resources** (1 cr.) Presentation of proposed, ongoing, or completed research by NRS graduate students. Discussion among graduate students, faculty, and staff, with emphasis on research design, methods, and interpretation of results. (Seminar) Pre: graduate standing in NRS. All graduate students must enroll at least twice; full-time students are expected to enroll each spring. S/U credit.

## NUE | Nuclear Engineering

**NUE 391 Reactor Operations I** (3 crs.) Research reactor theory and operations, fundamentals of fission chain reacting systems, reactivity and feedback, fundamentals of radiation safety and protection, application of radiation measurement instruments. (Lec. 3) Pre: permission of instructor.

**NUE 392 Reactor Operations II** (3 crs.) Hands-on reactor operation, control rod analysis for approach to criticality, reactor cooling system operational analysis, application of radiation measurement instruments. Second of a two-course sequence. (Lec. 2, Lab. 1) Pre: NUE 391 and permission of instructor.

## NUR | Nursing

**NUR 100** (103) Foundations of Professional Practice (3 crs.) Introduction to the role of nurses in professional caring. Concepts include communication, teaching, and ethical decision making with analysis of the interrelationship between client, nurse, and ecosystem influences. (Lec. 3) Pre: NUR code or permission of instructor.

**NUR 114 Responsible Health Care** (3 crs.) This course will explore contemporary health care issues from various societal viewpoints through collaborative group work. Using a problem-based learning approach, student will pose solutions to an actual health-related issue. (Lec. 3) (S) [D]

**NUR 143 Sustainable Solutions for Global Health Problems** (3 crs.) Cross-listed as (PHP), NUR, PLS 143. Teams of students will study a global health problem and research, write, and present a sustainable solution that integrates human innovation with existing technology. (Lec. 3) (N) (S) [D]

**NUR 150 Human Sexuality** (3 crs.)

Interdisciplinary approach to the study of individual and societal determinants in the development, integration, and expression of human sexuality and a code of sexual behavior. (Lec. 3/Online) (S) [D]

**NUR 150H Honors Section of NUR 150: Human Sexuality** (3 crs.) Honors Section of NUR 150: Human Sexuality (Lec. 3/Online) Pre: must have a 3.30 overall GPA. (S) [D]

**NUR 160 Exploring Global Health** (3 crs.) Introduction to major global health problems including their distribution, web of causation, and effective strategies for addressing these problems at individual, community, societal, and global levels. (Lec. 3) Intended for freshmen. (S) [D]

**NUR 203 Comprehensive Health Assessment** (3 crs.) Introduces the techniques of history taking and systematic health assessment of individuals across the life span. Recognition of normal findings is emphasized. (Lec. 2, Lab. 3) Pre: BIO 242 and 244, NUR 100, CHM 124 or MIC 201, any WRT course (104, 106, or higher if the student tests out), and permission of instructor.

**NUR 213 Pathophysiology** (3 crs.) Examination of basic concepts of pathophysiology and the related levels of prevention, etiology, pathogenesis, and clinical manifestations underlying alterations according to biological processes across the life span. (Lec. 3) Pre: MIC 201, NUR 203.

**NUR 233 Foundations of Nursing Practice with Older Adults** (3 crs.) Foundational concepts of professional nursing practice emphasizing levels of prevention and nursing care focusing on the older adult in wellness and illness. (Lec. 3) Pre: NUR 203, NFS 207, MIC 201 and credit or concurrent enrollment in NUR 213.

**NUR 234 Practicum in Foundations of Nursing with Older Adults** Practicum emphasizing foundational concepts of basic nursing and levels of prevention focusing on the older adult client in wellness and illness. (Lab 9) Pre: previous or concurrent enrollment in 233.

**NUR 246 Transition to Baccalaureate Nursing Education** (2 crs.) Introduction to baccalaureate-nursing education. Development of professional nursing practice explored. Reflective practice, advanced roles and evidence based practice explored. Factors affecting clinical judgment and current issues in practice addressed. (Seminar 2) Pre: Licensed Registered Nurse, or new graduate from RN program.

**NUR 253 Nursing Research** (3 crs.) Introduction to principles of scientific inquiry and analytical thinking common to problem solving in nursing. Research process and implications to knowledge development, utilization and evidence based practice are explored. (Lec. 3) Pre: NUR 203 and STA 220 or PSY 200 or permission of instructor.

**NUR 323 Medical-Surgical Nursing** (6 crs.) Concepts of medical-surgical nursing with emphasis on nursing strategies and utilizing levels of prevention in management of adults with acute and chronic illness, including the impact of illness on their families. (Lec. 6) Pre: NUR 213, 233, 234 and 253; credit or concurrent enrollment in NUR 324.

**NUR 324 Medical-Surgical Nursing Practicum** (3 crs.) Application of clinical practice strategies in the management of adults with acute and chronic illness and the impact on their families. (Lab. 9) Service learning. Pre: credit or concurrent enrollment in NUR 323.

**NUR 333 Psychiatric Mental Health Nursing** (3 crs.) Nursing strategies to support and care for persons with limitations in psychosocial functioning in the context of family and community; psychiatric and/or mental health. (Lec. 3) Pre: BPS 333, NUR 323 and 324; credit or concurrent enrollment in NUR 334, 343, and 344.

**NUR 334 Practicum In Psychiatric Mental Health Nursing** (3 crs.) Application of the nursing process and the use of self as the therapeutic agent with individuals and groups of clients. Emphasis on developing nursing strategies for psychiatric and/or mental health care. (Lab. 9) Service learning. Pre: credit or concurrent enrollment in NUR 333.

**NUR 343 Nursing in Childbearing and Reproductive Health** (3 crs.) Emphasis on the nursing management of childbearing families and reproductive health issues across the life span. (Lec. 3) Pre: BPS 333 and credit or concurrent enrollment in NUR 333, 334, and 344.

**NUR 344 Practicum In Childbearing And Reproductive Health Nursing** (3 crs.) Application of the nursing process in the care of individuals and families with childbearing and reproductive experiences. (Lab. 9) Service learning. Pre: credit or concurrent enrollment in NUR 343.

**NUR 346 Organizational & System Leadership in Health Care PRA** (4 crs.) Leadership strategies will be explored. Issues of practice including communication, conflict resolution, care transitions, teamwork and collaboration will be analyzed. Theories of leadership and evaluation will be emphasized. (Practicum/Seminar) Service learning. Pre: Licensed Registered Nurse. NUR 246 and NUR 253, or prior approval from faculty.

**NUR 360 Impact of Death on Behavior** (3 crs.) Cross-listed as (NUR), THN 360. Seminar to explore the human experience of dying and the issue of quality of life. Group discussion focuses on the effect that individual and social values and medical and social structures have on one's grief response and bereavement process. (Lec. 3) (L) [D]

**NUR 360H Honors Section of NUR/THN 360: Impact of Death on Behavior** (3 crs.) Cross-listed as (NUR), THN 360H. Honors Section of NUR/THN 360: Impact of Death on

Behavior. (Lec. 3) Pre: must have a 3.30 overall GPA. (L) [D]

**NUR 390 Directed Study** (1-3 crs.) Cross-listed as (NUR), THN 390. Research study or individual scholarly project relating to the nursing major. Faculty guidance in problem delineation and in development, implementation, and evaluation of the project. (Independent Study) Pre: admission to the College of Nursing and prior faculty approval. S/U credit.

**NUR 424 Exploring Loss through Creative Arts Therapies** (3 crs.) Cross-listed as (THN), NUR 424. Exploration and assessment of the merits of incorporating creative arts processes (imagery, story, metaphor, music, and movement) with individuals who are experiencing loss, grief and dying. (Seminar 3) Pre: one prior thanatology course or permission of instructor.

**NUR 425 Spirituality of Loss and Death** (3 crs.) Cross-listed as (THN), NUR 425. Examination of major belief systems and spirituality during loss, death and grief. Emphasis on spiritual issues and ethnic, cultural, gender, and age differences, as well as the role of professional helpers. (Seminar 3) Pre: one prior thanatology course or permission of instructor.

**NUR 433 Nursing of Children** (3 crs.) Examines theories and strategies that promote or restore health and prevent or manage illness in infants, children and adolescents; includes family-centered concepts and supportive management during end-of-life care. (Lec. 3) Pre: NUR 333, 334, 343, 344; credit or concurrent enrollment in NUR 434.

**NUR 434 Practicum in Nursing of Children** (3 crs.) Synthesis of pediatric knowledge and the application of the nursing process in the care of ill children and their families. (Lab. 9) Service learning. Pre: credit or concurrent enrollment in NUR 433.

**NUR 443 Community Health Nursing** (3 crs.) Analysis of concepts related to public health and nursing care of clients in the home and the community with emphasis on vulnerable and high-risk populations. (Lec. 3) Pre: credit or concurrent enrollment in NUR 433 and 434 (NUR 246 and 253 for R.N. students).

**NUR 444 Practicum in Nursing of Vulnerable Populations** (3 crs.) Application of the nursing process in the home and community with emphasis on vulnerable and high-risk populations. In-depth analysis of a selected population, including utilization of epidemiological and public health principles. (Lab. 9) Pre: credit or concurrent enrollment in NUR 433, 434, and 443 (NUR 246 and 253 for R.N. students). Service learning.

**NUR 446 Directed Study for Registered Nurse Students** (1-4 crs.) Clinical advanced study or individual scholarly project related to the nursing major. Faculty guidance in problem delineation and in development, implementation, and evaluation of the proj-

ect. (Independent Study) Pre: NUR 246 and NUR 253. Not for graduate credit.

**NUR 459 Perspectives on Male and Female Sexuality** (3 crs.) Examination of the multifaceted perspectives (somatic, emotional, ethical, cultural) on male and female sexuality. Topics include history and recent developments in sexology research, therapy, role and gender issues. (Lec. 3) Pre: NUR 150 or permission of instructor.

**NUR 463 Advanced Medical-Surgical Nursing** (3 crs.) Study of nursing care problems and nursing management of adults with acute and chronic complex illnesses, including the impact on their families. (Lec. 3) Pre: NUR 433, 434, 443, 444; credit or concurrent enrollment in 464.

**NUR 464 Practicum in Advanced Medical-Surgical Nursing** (3 crs.) Application of the nursing process to adults across the lifespan with acute and chronic complex illnesses including the impact on their families in selected clinical situations. (Lab. 9) Pre: credit or concurrent enrollment in NUR 463.

**NUR 467 Independent Study in Human Sexuality** (2-6 crs.) A specifically designed learning experience for the theoretical study of human sexuality and related practice strategies. (Independent Study) Pre: NUR 150 or equivalent; permission of instructor.

**NUR 468 Practicum In Theories Of Human Sexuality PRA** (2-6 crs.) A specifically designed practicum involving the application of theory and development of practice strategies in specific areas within the field of human sexuality. (Practicum) Pre: NUR 150 and 467 or equivalent; permission of instructor.

**NUR 474 Leadership in Contemporary Nursing Practice** (3 crs.) Examination of theories, issues, and concepts related to contemporary nursing practice. Emphasis on the application of principles of leadership and professionalism in a clinical experience. (Lec. 1, Lab. 6) Pre: credit or concurrent enrollment in NUR 464.

**NUR 500 General Study Of Nursing Knowledge For Nursing Practice** (4 crs.) Introduction to the essential features of nursing knowledge and its development in relation to nursing practice. Study of approaches to nursing knowledge development, and major conceptual/theoretical knowledge in nursing. (Lec. 3, Lab. 2) Pre: graduate standing.

**NUR 503 Advanced Adult Physical Assessment** (4 crs.) Expansion of basic nursing health assessment skills, including: comprehensive health history, physical examination and psychological and social assessment. (Lec. 3, Lab. 1) Pre: Admission to the graduate nursing program and permission of the instructor; other students may be admitted with permission of instructor.

**NUR 504 Advanced Pediatric Physical Assessment** (1 cr.) Application of advanced physical and health assessment skills to

children. Includes assessment of growth and development, psychosocial, cognitive and physical well being of children of all age groups. (Lec. 1) Pre: Admission to the family nurse practitioner program, previous or concurrent enrollment in NUR 503 and permission of instructor.

**NUR 505 Nursing Research** (3 crs.) An overview and analysis of current research in nursing with special focus on patient care. Students will design a research project. (Seminar) Pre: a course in statistics, credit or concurrent enrollment in 500, or permission of instructor.

**NUR 506 Independent Study** (1-6 crs.) Cross-listed as (NUR), THN 506. Intensive study of a specific area of interest, a problem or issue in nursing under guidance of the faculty. (Independent Study) Pre: permission of graduate faculty or coordinator of thanatology.

**NUR 507 Theories Of Practice For Nursing** (3 crs.) Analysis of general theories of practice for nursing and their applicability to various areas of clinical practice. (Seminar) Pre: NUR 500 or permission of instructor.

**NUR 508 Physical Assessment of Older Adults** (1 cr.) Applying a developmental framework, expands and refines history taking and physical exam techniques learned in NUR 503 and utilizes additional assessment tools to conduct a comprehensive evaluation of older adult clients. (Lec. 1) Pre: Concurrent or prior completion of NUR 503 and permission of instructor.

**NUR 509 Advanced Assessment for Acute Care NP Practice** (2 crs.) Expands and refines history taking, physical assessment and documentation techniques for comprehensive evaluations of acutely and critically ill adults. Pre: Admission to the Nurse Practitioner program, NUR 503 and permission of the instructor.

**NUR 510 Nursing Leadership In The Health Policy Process** (3 crs.) Study of nurses' participation in the health policy process. Focus on theories for the development of nursing leaders. Analysis and application of creative nursing strategies for the enhancement of health care. (Seminar) Pre: enrollment in the M.S. program in nursing.

**NUR 511 Advanced Mental Health Nursing I** (3 crs.) Investigation of theories of healthy and psychopathological patterns of individual behavior from a mental health perspective. (Seminar) Pre: NUR 500 and credit or concurrent enrollment in NUR 512.

**NUR 512 Practicum In Advanced Mental Health Nursing I PRA** (3 crs.) Field experience to develop competence in the practice of advanced mental health nursing. Emphasis on application of relevant theories in solving individuals' mental health problems. (Practicum) Pre: NUR 500 and concurrent enrollment in NUR 511.

**NUR 515 Practicum in Advanced Psychiatric Mental Health Nursing PRA** (3 crs.)

Field experience to further develop clinical competence in the practice of mental health nursing. Emphasis is placed on the utilization of intervention strategies based on knowledge of psychiatric illness. (Practicum) Pre: NUR 511, 512.

**NUR 516 Advanced Mental Health Nursing II** (3 crs.) Theoretical analysis of current modes of advanced mental health intervention in order to explain strategies for solution of family, group, and community problems. (Seminar) Pre: NUR 511, 512, and concurrent enrollment in 517.

**NUR 517 Practicum in Advanced Psychiatric Mental Health Nursing III PRA** (3 crs.) Field experience to develop clinical competence in the practice of advanced mental health nursing in providing client care, consultation, education, and research. (Practicum) Pre: NUR 515.

**NUR 519 Psychopharmacotherapeutics for Advanced Practice Nursing** (3 crs.) Integration of psychopharmacotherapeutics and decision making with human pathophysiology utilizing case management approach to prescription of medications. Discussion of legal, ethical and professional issues related to advanced practice role. (Seminar) Pre: Graduate standing in nursing or permission of instructor

**NUR 520 Graduate Study Seminar** (1 cr.) A seminar designed to facilitate the synthesis and examination of information learned in the master's program about nursing knowledge development, advancement of nursing practice, and leadership role development. (Seminar) Pre: completion of 30 graduate program credits and concurrent enrollment in the final sequence of concentration courses. S/U credit.

**NUR 523 Contemporary Thanatology** (3 crs.) Interdisciplinary approach to trends, problems, theories, and strategies in thanatology. Explores effects of professional's personal beliefs and attitudes on care provided to dying clients across the life span and their families. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**NUR 524 Exploring Loss Through Creative Arts Therapy** (3 crs.) Cross-listed as (NUR), THN 524. Exploration and assessment of the merits of incorporating creative arts processes (imagery, story, metaphor, music, and movement) with individuals who are experiencing loss, grief and dying. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**NUR 525 Spirituality of Loss and Death for the Helping Professions** (3 crs.) Examination of major belief systems and spirituality during loss, death and grief. Emphasis on spiritual issues and ethnicity, culture, gender and developmental stage. Role of professional dealing with spiritual concerns. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**NUR 526 Loss Across the Life Span** (3 crs.)

Content provides a basis both for personal development and professional growth. Personal experience, selected readings, and personal reflections will provide direction for examining the multidimensional aspects of loss. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**NUR 527 Symptom Management in End-of-Life Care** (3 crs.) Principles of nursing care at the end-of-life. Strategies for assessing and managing symptoms along with complementary therapies across age groups. (Lec. 3) Pre: senior standing in nursing or registered nurse (others by permission of instructor).

**NUR 529 Special Topics in Thanatology** (1-3 crs.) Selected areas of study pertinent to loss, dying and grief. Instruction may be offered in class seminar or clinical settings according to specific needs and purposes. May be repeated for credit with a change in topic. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**NUR 531 Primary Health Care Nursing I** (3 crs.) Theoretical knowledge and skills for the development of nursing strategies in analyzing, managing, and preventing health-related problems common to primary health care clients. (Seminar) Pre: NUR 500, 503, and 504.

**NUR 532 Practicum In Primary Health Care Nursing I PRA** (3 crs.) Clinical application of theoretical knowledge and skills as presented in NUR 531. Service learning. (Practicum) Pre: concurrent enrollment in NUR 531.

**NUR 533 Primary Health Care Nursing II** (3 crs.) Theoretical study for the development of increased nursing competency in primary care practice. Emphasis on health care strategies to assist individuals and families in coping with health-related problems. (Seminar) Pre: NUR 531, 532, and concurrent enrollment in 534.

**NUR 534 Practicum In Primary Health Care Nursing II PRA** (6 crs.) Application of theoretical knowledge and skills for the development of nursing strategies for health promotion and management of health-related problems common to families. (Practicum) Pre: NUR 531, 532, and concurrent enrollment in NUR 533.

**NUR 535 Advanced Pathophysiology** (3 crs.) Cross-listed as (NUR), PHT 535. An in-depth study of pathophysiological phenomena across the life span from the biological life processes perspective. Clinical decision making based on the synthesis of this knowledge and current research findings will be explored. (Lec. 3) Pre: for nursing students: admission to graduate program in nursing or permission of instructor; PHT 500 and 1st year standing in the D.P.T. program for physical therapy students.

**NUR 538 Learning Theories and Strategies for Health Professionals** (3 crs.)

The study of selected learning theories and strategies and their application in health professions. Emphasis will be on expanding the scope of teaching as professionals. (Lec. 3) Pre: NUR 500 or permission of instructor. In alternate years.

**NUR 539 Application Of Learning Theories In Professional Practice PRA** (3 crs.) Field project in the application of learning theories and strategies in professional practice. Emphasis on gaining knowledge of the application of strategies and outcome evaluation in practice and educational settings. (Practicum) Pre: credit or concurrent enrollment in NUR 538 or permission of instructor. In alternate years.

**NUR 541 Advanced Study of Teaching in Nursing Education and Practice** (3 crs.) Advanced study of educational theories and strategies having application in nursing education and practice. Emphasis will be on role development, instructional design, methods, and evaluation. (Lec. 3) Pre: NUR 507, 539, or permission of instructor. In alternate years.

**NUR 542 Practicum in Nursing Education and Practice PRA** (6 crs.) A field experience designed to develop competence in teaching. Emphasis is placed on the instructional design component and the utilization of strategies based on theoretical knowledge. (Practicum) Pre: permission of instructor or credit or concurrent enrollment in NUR 541. In alternate years.

**NUR 549 Evidence-Based Strategies in Health Care Program Evaluation** (3 crs.) Analysis and application of evidenced-based methods, translation of research into practice, and evaluation of practice to improve health care outcomes. (Lec. 3)

**NUR 550 Theoretical Study of the Clinical Nurse Leader Role** (3 crs.) In-depth study of concepts of leadership central to hospital based, unit level practice of the CNL: advanced organizational communication, horizontal leadership, lateral integration of care, role analysis and implementation. (Seminar) Pre: NUR 505, 507, 510, or permission of instructor.

**NUR 551 Theoretical Study of Nursing Administration/Leadership** (3 crs.) Study of concepts, theories and strategies underpinning planning, decision-making and quality improvement activities in health care administration/leadership. Emphasis on theories, concepts and issues that explain and advance strategies in nursing administration. (Seminar) Pre: NUR 505, 507, two restricted electives, or permission of instructor. In alternate years.

**NUR 552 Practicum In Nursing Administration PRA** (6 crs.) Field experience in nursing administration. Emphasis on role development and the examination, development, and implementation of strategies in nursing administration. (Practicum) Pre: credit or concurrent enrollment in NUR 551. In alternate years.

**NUR 561 Adult-Gerontological Nurse Practitioner/Clinical Nurse Specialist I** (3 crs.)

Theories of aging, health promotion and maintenance, age-related changes, and health problems common to adults and older adults focusing on assessment, diagnosis, therapeutic, and preventive strategies. (Lec. 3) Pre: NUR 500, 508 and permission of instructor.

**NUR 562 Adult-Gerontological Nurse Practitioner/Clinical Nurse Specialist I Practicum PRA** (3 crs.)

Application of theoretical knowledge and skills for development of adult-gerontological nurse practitioner/clinical nurse specialist strategies emphasizing health promotion and illness management of healthy adults and older adults, those with minimal functional limitations, and families. (Practicum) Pre: credit or concurrent enrollment in NUR 561 or permission of instructor.

**NUR 563 Adult-Gerontological Nurse Practitioner/Clinical Nurse Specialist II** (3 crs.)

Theoretical knowledge and skills for development of strategies for care of adults and older adults with complex health problems and functional limitations at the individual, family, group, organization, community, and societal levels. (Lec. 3) Pre: NUR 562.

**NUR 564 Adult-Gerontological Nurse Practitioner/Clinical Nurse Specialist II Practicum PRA** (6 crs.)

Development of adult-gerontological nurse practitioner/clinical nurse specialist competency in care of adults and older adults with complex health problems and functional limitations focusing on strategies at the individual, family, group, organization, community, and societal levels. (Practicum) Pre: credit or concurrent enrollment in NUR 563.

**NUR 565 Acute Care Nurse Practitioner I: Adult** (3 crs.)

Didactic knowledge and clinical decision-making skills necessary to manage health conditions common to the acutely or critically ill adult in emergency departments, acute and critical care units. Pre: admission to the acute care area of emphasis within the nurse practitioner program; NUR 509 and permission of instructor. Must be taken concurrently with NUR 566.

**NUR 566 Acute Care Nurse Practitioner Practicum I: Adult PRA** (3 crs.)

Application of clinical decision making skills necessary to the management of adults who are acutely or critically ill in hospital emergency, acute and critical care units. Pre: NUR 509 and permission of instructor. Must be taken concurrently with NUR 565.

**NUR 567 Acute Care Nurse Practitioner II: Adult** (3 crs.)

This course builds on the principles learned in ACNP I. The focus is on the management of chronic illness exacerbations in adults who require care in a sub-acute, acute or critical care setting, using principles of family-centered care. Pre: NUR 566 and permission of instructor. Must be taken concurrently with NUR 568.



**NUR 568 Acute Care Nurse Practitioner Practicum II: Adult PRA** (6 crs.) Individually precepted clinical experiences with the focus on developing management skills in the care of adults with exacerbations of chronic illnesses who are hospitalized in acute care facilities. Pre: NUR 566 and permission of instructor. Must be taken concurrently with NUR 567.

**NUR 571 Theoretical Study Of Well Women'S Health Care** (3 crs.) A study of major theories, client issues, and nurse-midwifery strategies used in the care of well women seeking gynecological health care. (Seminar) Pre: NUR 500.

**NUR 572 Practicum: Theoretical Study of Well Women's Health Care PRA** (3 crs.) Clinical application of the theoretical knowledge and interventions in the care of well women in ambulatory health care settings. (Practicum) Pre: credit or concurrent enrollment in NUR 571.

**NUR 573 Theoretical Study of the Child-bearing Woman and Her Family** (3 crs.) Within a systems perspective, theories are utilized to examine client issues related to the normal childbirth experience. Knowledge and skills relevant to nurse-midwifery strategies of normal childbirth are emphasized. (Seminar) Pre: credit or concurrent enrollment in NUR 571, 572; concurrent enrollment in NUR 574.

**NUR 574 Practicum: Theoretical Study of Childbearing Woman and Her Family PRA** (3 crs.) Theoretical application of nurse-midwifery strategies during the normal childbirth experience. Knowledge and skills relevant to patient care are emphasized. (Practicum) Pre: concurrent enrollment in NUR 573.

**NUR 575 Advanced Practice: Collaborative Nurse-Midwifery** (3 crs.) Within a systems perspective, theories are utilized to examine client issues of the at-risk childbirth experience. Expanded nurse-midwifery strategies related to collaborative practice within the community are emphasized. (Seminar) Pre: concurrent enrollment in NUR 576.

**NUR 576 Advanced Practice: Collaborative Nurse-midwifery Practicum PRA** (6 crs.) Field study of the clinical application of theoretical knowledge and skills in the at-risk childbirth experience. Use of collaborative practice and the management process within communities is emphasized. (Practicum) Pre: concurrent enrollment in NUR 575.

**NUR 577 Practice And Integration Of Nurse-midwifery PRA** (5 crs.) Comprehensive and practical application of clinical skills and theoretical knowledge in nurse-midwifery. Complete integration of the nurse-midwifery role with the client, family, and community. (Practicum) Pre: NUR 575 and 576.

**NUR 582 Pharmacotherapeutics in Advanced Practice Nursing** (3 crs.) Integration of pharmacotherapeutic and decision-making

theories with human pathophysiology. Case management approach to the prescription of medications in primary health care across the life span. (Lec. 3) Pre: matriculation into master's program in nursing or permission of instructor.

**NUR 584 Psychopharmacotherapeutics for Child/Adolescent APRNS** (3 crs.) Integration of psychopharmacotherapeutics and decision-making theories with human pathophysiology utilizing case management approach to prescription of medications. Discussion of ethical, legal, professional issues related to APRN role. (Lec. 3) Pre: graduate standing or permission of instructor.

**NUR 585 Advanced Child/Adolescent Psychiatric Mental Health Nursing I** (3 crs.) Theoretical knowledge and skills for assessing, preventing, and diagnosing common clinical problems emergent in the practice of child and adolescent advanced psychiatric mental health nursing. (Lec. 3) Pre: NUR 500 and 584; 586 must be taken concurrently.

**NUR 586 Practicum in Advanced Child/Adolescent Psychiatric Mental Health Nursing I** (3 crs.) Clinical practicum to develop competence in the assessment and diagnosis of children and adolescents with psychiatric mental health problems. (Lab. 9)

**NUR 587 Advanced Child/Adolescent Psychiatric Mental Health Nursing II** (3 crs.) Analysis and evaluation of theories and concepts that serve as the basis for psychiatric mental health nursing strategies for children and adolescents who present with complex psychiatric mental health problems. (Lec. 3) Pre: NUR 586; 588 must be taken concurrently.

**NUR 588 Practicum in Advanced Child/Adolescent Psychiatric Mental Health Nursing II** (6 crs.) A clinical practicum to develop competence in the treatment of children and adolescents with complex psychiatric mental health problems. (Lab. 9) Pre: NUR 587 must be taken concurrently.

**NUR 590 Directed Study/Practice in Advanced Clinical Nursing** (1-6 crs.) In-depth and supervised clinical practice in a specialized area of nursing. (Independent Study) Service Learning. May be repeated with different topic. Pre: graduate standing and permission of graduate faculty.

**NUR 602 Construction of Nursing Theory I: Inductive Process** (4 crs.) Study of inductive approaches to generating theory relevant to nursing science. Examination of multidisciplinary strategies for generation of theory from field data. (Seminar) Pre: enrollment in the Ph.D. program in nursing or permission of instructor.

**NUR 603 Construction of Nursing Theory II: Deductive Process** (3 crs.) Study of deductive theory-building as applied to nursing science. Focus on the nature of deductive theories and the application of deductive process to nursing theory construction. (Seminar) Pre: enrollment in the Ph.D. program in nursing or permission of instructor.

**NUR 611 Theories and Research in the Nursing Domains** (3 crs.) Study of Kim's nursing knowledge domains: client, client-nurse, practice, environment. Emphasis is on identification of phenomena of interest, concepts of interest, evaluating theories and related research for further theory development. (Lec. 3) Pre: Enrollment in PhD program or permission of the instructor.

**NUR 651 Advanced Methods in Nursing Research I** (3 crs.) In-depth study of approaches used in qualitative research including philosophical underpinnings and research design, and their potential application to knowledge development in nursing practice. (Seminar) Pre: enrollment in the Ph.D. or D.N.P. program in nursing, advanced statistics course, or permission of instructor.

**NUR 652 Advanced Methods In Nursing Research II** (3 crs.) In-depth study of application of theories and methods in sampling, research design, data collection, and data analysis for quantitative and evaluative research in nursing. (Seminar) Pre: enrollment in the Ph.D. or D.N.P. program in nursing, NUR 651, or permission of instructor.

**NUR 653 Measurement and Instrument Development in Nursing Research** (3 crs.) In-depth study of theories and methods relevant to measurement and instrument development for nursing and health sciences. Emphasis on measurement as an ongoing process of successive approximation, refinement, and validation. (Seminar) Pre: completion of NUR 652 or permission of instructor.

**NUR 660 Philosophical and Theoretical Bases of Health Research** (3 crs.) Presentation of the philosophical and theoretical bases of contemporary healthcare research. (Seminar) Pre: enrollment in the Ph.D. or D.N.P. program in Nursing, or permission of instructor.

**NUR 671 Role Development In Nursing Research** (3 crs.) In-depth examination of the role of the nurse researcher as a member of a multidisciplinary team and in academia. Emphasis on theories and issues related to researcher role development. (Seminar) Pre: doctoral standing in nursing, NUR 602 or 603, and 660.

**NUR 680 Informatics in Health Care Settings** (3 crs.) Theory and application of nursing science, computer science and information science for decision making, practice management and communication in health care settings. (Lec. 3) Pre: D.N.P. enrollment or permission of instructor.

**NUR 686 Doctor of Nursing Practice Role Development PRA** (1-6 crs.) Implement the role of the doctorally prepared advanced practice nurse in selected clinical settings. Practicum experiences will be related to research, informatics, leadership, evidence-based practice, and health care policy. Pre: Enrollment in D.N.P. program and concurrent enrollment in NUR 549, 651, 652, 680, 688 or HDF 527, or permission of instructor.

May be repeated with a different focus for a maximum of 6 credits.

**NUR 688 D.N.P. Capstone Practicum and Project PRA** (7 crs.) A synthesis of prior practicums in the student's area of interest, applying theoretical knowledge and research findings at the individual, professional, organizational, and societal levels culminating in a final written and defensible capstone project. Pre: MBA 540, HDF 527, and 5 credits of NUR 686; concurrent enrollment in NUR 686.

**NUR 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**NUR 995 Reading and Research in Nursing** (1-6 crs.) Advanced work by individual student on a selected issue in nursing under the direction of a faculty member. (Independent Study) Pre: graduate standing. S/U credit.

## NVP | Nonviolence and Peace Studies

**NVP 200 Nonviolence and Peace Studies Colloquium** (1 cr.) A series of speakers introduce a range of issues in nonviolence and peace studies. (Lec. 1)

**NVP 425 Peace Psychology** (3 crs.) Cross-listed as (PSY), NVP 425. Peace psychology combines aspects of cognitive, social, clinical and cross-cultural psychology that bear on the prevention of violence and the promotion of constructive nonviolent behavior. (Lec. 3/Online) Pre: Prior coursework in psychology, or permission of instructor. Prior coursework in another social science is recommended.

**NVP 500 Theory and Research on Nonviolence and Peace** (3 crs.) Cross-listed as (NVP), PSY 500. Surveys selected issues in the interdisciplinary field of Nonviolence and Peace Studies. It focuses on human problem solving in potentially violent situations, and the creation of conditions for peace. (Online)

## OCE | Ocean Engineering

**OCE 101 Introduction to Ocean Engineering** (1 cr.) Overview of ocean engineering topics pointing out the common areas with other engineering branches but emphasizing specific ocean applications. (Seminar)

**OCE 205 Ocean Engineering Design Tools** (4 crs.) An introduction to design and analysis tools for ocean engineering including computer aided design (CAD) in two- and three-dimensions, circuit layout and analysis, hydrodynamic modeling, mathematical computation, visualization, and algorithm development. (Lec. 3, Lab. 1) Pre: EGR 106 or permission of instructor.

**OCE 206 Ocean Instrumentation and Design** (4 crs.) Introductory lecture/lab course in ocean instrumentation covering theory, design, and implementation of basic circuits through electronic subsystems used in robotic ocean instruments and autonomous underwater vehicles (AUVs). (Lec. 3, Lab. 1) Pre: OCE 205, PHY 204 and PHY 274 (or PHY 204H, 274H), or permission of instructor.

**OCE 301 Fundamentals of Ocean Mechanics** (4 crs.) Mathematical methods for the analysis of ocean phenomena; Fourier analysis; partial differential equations for modeling water wave and underwater acoustics; vector calculus in wave mechanics; fundamental probability theory and applied statistics. (Lec. 3) Pre: MTH 244 and OCE 205 or permission of instructor.

**OCE 310 Basic Ocean Measurement** (3 crs.) Basic ocean measurement and instrumentation exercises using boats and laboratories. Includes cruise design, navigation and mapping systems, sonar systems, water quality sensors, wave spectra, computer data acquisition, and signal processing. (Lec. 1, Lab. 2) Pre: OCE 206 or permission of instructor.

**OCE 311 Coastal Measurements And Applications** (4 crs.) Exercises in basic coastal measurement from vessels, in situ, and in the laboratory. Experiments in measuring currents, surface elevation, wave and wave forces, geotechnical properties and applications, and acoustic propagation. (Lec. 2, Lab. 4) Pre: OCE 310, or permission of instructor.

**OCE 360 Robotic Ocean Instrumentation Design** (3 crs.) Design of robotic ocean instrumentation systems featuring team-based, hands-on projects. Includes power, sensor, communication, propulsion and control system design for remotely operated and autonomous ocean instruments and underwater vehicles. (Lec. 2, Lab. 3)

**OCE 408 Introduction to Engineering Wave Mechanics and Littoral Processes** (4 crs.) Description of coastal area. Linear wave theory and applications. Sediment transport and beach dynamics. Coastal protection methods. Coastal engineering problem solving with Matlab. (Lec. 4) Pre: PHY 205, MCE 354 and OCE 301, or permission of instructor of coastal area.

**OCE 416 Ocean Engineering Professional Practice** (2 crs.) Introduction to professional practice in Ocean Engineering, including contemporary issues in the field, career planning and placement, life long learning strategies, professional licensure process, publication and presentation, and project management. (Lec. 2)

**OCE 421 Marine Structure Design** (3 crs.) Review of wave mechanics; design breaker; probability and random variables; probabilistic wave elevation height models; short-term and long-term wave statistics; probability distribution models for extreme events; selection of design waves and water levels; wave run-up and overtopping; design of

rubble mound structures; design of vertical breakwaters/seawalls; wave forces on vertical piles. (Lec. 3) Pre: OCE 408 or permission of instructor.

**OCE 422 Offshore Structure Design** (3 crs.) Cross-listed as (OCE), CVE 422. Introduction to offshore structures, structural modeling, structural dynamic analysis, structural design for storms, structural design against fatigue failure. (Lec. 3) Pre: OCE 421. Not for graduate credit.

**OCE 425 Coastal Experiments** (4 crs.) Basic coastal measurement techniques for coastal management. Experimental (field and laboratory) measurements of physical and geological parameters. Major student designed, operated, and reported experiment addressing a practical problem. (Lec. 2, Lab. 4) Not for credit in ocean engineering. Pre: MTH 107 or 108 or equivalent.

**OCE 467 Design of Remotely Operated Vehicles** (3 crs.) This course will provide the students with the fundamental elements of remotely operated vehicle (ROV) design, and the specifics of ROV components. (Lec. 3) Pre: OCE 360 or permission of instructor.

**OCE 471 Underwater Acoustics** (4 crs.) Vibrations, the acoustic wave equation, duct acoustics, and sound pressure levels and spectra. Underwater acoustics including transducers, arrays, surface and bottom scattering, and ray propagation. (Lec. 3) Pre: OCE 301 and PHY 205. Not for graduate credit.

**OCE 472 Sonar Systems Design** (3 crs.) Fundamentals of design of sonar systems. Effects of sound propagation in deep and shallow oceans, noise, scattering on system performance. Array, transducer, and signal design. Passive and active sonar applications. (Lec. 3) Pre: 471.

**OCE 483 Shallow Foundations** (3 crs.) Cross-listed as (CVE), OCE 483. Applications of geotechnical engineering principles to analysis and design of shallow foundations. Foundation types, lateral earth pressures, bearing capacity, settlement, gravity retaining walls, cantilever sheet pile walls. (Lec. 3) Pre: CVE 381.

**OCE 491 Special Problems I** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. Not for graduate credit.

**OCE 492 Special Problems II** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. Not for graduate credit.

**OCE 495 Ocean Systems Design Project I** (3 crs.) Capstone design of an ocean system under the direction of a faculty advisor. Project must include engineering, economic, environmental, safety, and societal considerations. This is first of a two-course ocean engineering design sequence. Pre: senior

standing and permission of instructor. Not for graduate credit.

**OCE 496 Ocean Systems Design Project II** (3 crs.) Capstone design of an ocean system under the direction of a faculty advisor. Project must include engineering, economic, environmental, safety, and societal considerations. This is second of a two-course ocean engineering design sequence. Pre: permission of instructor. Not for graduate credit.

**OCE 500 Ocean Engineering Design Studies** (1-6 crs.) Off-campus ocean engineering design studies. Must include significant hands-on (laboratory or field) experience, use of engineering design tools, and the design, development, test and evaluation of hardware/software systems. Pre: Junior standing in Ocean Engineering and permission of department chair.

**OCE 506 Numerical Models and Data Analysis in Ocean Sciences** (3 crs.) Cross-listed as (OCG), OCE 506. An introduction to numerical methods in all disciplines of oceanography and ocean engineering. Topics include model formulation, analysis, and simulation; data analysis and parameter estimation. Problem solving with Matlab and C in the weekly computer laboratory. (Lec. 2, Lab. 3)

**OCE 510 Engineering Ocean Mechanics** (3 crs.) Fundamental equations of estuarine and coastal hydrodynamics. Scaling of governing equations. Long period waves including seiches, tides, storm surges, and tsunamis. Wind- and estuarine-induced circulation. Pollutant and sediment transport. (Lec. 3) Pre: MCE 354 or equivalent.

**OCE 512 Ocean Waves and Storm Surge Modeling** (3 crs.) Cross-listed as (OCG), OCE 512. Wind wave generation, evolution, and dissipation. Statistical description of surface waves. Interaction between waves and currents. Wave prediction models. Observational methods of waves. Storm surge models and prediction. (Lec. 3) Pre: OCE 408 or equivalent, or permission of instructor.

**OCE 514 Engineering Wave Mechanics and Nearshore Processes** (3 crs.) Linear water wave boundary value problem. Engineering wave properties. Nonlinear waves (long waves, Stokes waves, stream function waves). Nearshore hydrodynamics and wave breaking. Fully nonlinear transient waves. (Lec. 3) Pre: MCE 455 or equivalent.

**OCE 516 Biomimetics in Ocean Engineering** (3 crs.) Biologically-inspired design mechanics in ocean engineering applications. Topics include unsteady propulsion (fish swimming), dynamic lift, high-speed maneuvering, energy extraction, drag reduction, and optimization. Pre: EGR 515 or permission of instructor. (Lec. 3)

**OCE 522 Dynamics of Waves and Structures** (3 crs.) Deterministic analysis for SADOOF structures; MDOF dynamic analysis; distributed-parameter systems; linear and second-order Stokes wave theories; wave

forces on cylinders; chaotic vibration of marine structures. (Lec. 3) Pre: MCE 464 or permission of instructor.

**OCE 534 Corrosion and Corrosion Control** (3 crs.) Cross-listed as (CHE), OCE 534. Chemical nature of metals, electrochemical nature of corrosion. Types of corrosion, influence of environment, methods of corrosion control. Behavior of engineering materials in corrosion with emphasis on industrial and ocean environments. (Lec. 3) Pre: permission of instructor.

**OCE 550 Ocean Systems Engineering** (3 crs.) Cross-listed as (OCE), ELE 550. Introduction to the design of systems for use in the ocean environment with emphasis on interaction of various subsystem disciplines to achieve total system performance characteristics. Introduction to detection, localization, classification and time measurement strategies including Global Positioning system, underwater Acoustics Positioning and control, wireless acoustic and electromagnetic communication, and remote time transfer. Examples will include mobile, fixed, autonomous, distributed and networked sensors. Pre: MTH 451 or equivalent.

**OCE 555 Modern Oceanographic Imaging and Mapping Techniques** (3 crs.) Cross-listed as (OCG), OCE 555. Overview of current imaging and mapping techniques used in oceanography and ocean engineering including; photographic and laser imaging, side scan and multibeam sonar; underwater vehicle navigation and map making. (Lec. 3) Pre: undergraduates - OCE 471 or permission of instructor; graduate students - none, this is an overview course appropriate for science-focused graduate students.

**OCE 560 Introduction to Data Collection Systems** (3 crs.) Practical problems of data collection. Probes and sensors, interfaces, signal conditioning, and storage. Examples found among the current research areas within ocean engineering will be emphasized. (Lec. 3) Pre: graduate standing in engineering or permission of instructor. In alternate years.

**OCE 561 Introduction to the Analysis of Oceanographic Data** (3 crs.) Design of oceanic experiments to determine spatial and temporal sampling rate, precision, accuracy, signal-to-noise ratio, etc. Description of typical ocean data collection and analysis systems. Development of relevant techniques. (Lec. 3) Pre: ISE 411, MTH 451, or equivalent.

**OCE 562 Modeling, Simulation and Control of Marine Vehicles** (3 crs.) Design of control systems for surface and underwater vehicles; Development of linear and nonlinear maneuvering models; heading and sea-keeping autopilots; waypoint navigation; thruster and control surface modeling. (Lec. 3) Pre: EGR 515 or permission of instructor.

**OCE 565 Ocean Laboratory I** (3 crs.) Measurements, experiments, operation of apparatus in the ocean and in the laboratory.

Statistical theory, planning multivariable experiments, checking of data, etc. (Lec. 1, Lab. 6) Pre: graduate standing in engineering or oceanography, or permission of instructor.

**OCE 571 Underwater Acoustics I** (3 crs.) Cross-listed as (OCE), ELE 571. Introduction to sound generation, transmission, and reception, including vibration of mechanical systems, acoustic waves in fluids, acoustic transducers and arrays, acoustic propagation in the ocean, and sonar systems. (Lec. 3)

**OCE 572 Underwater Acoustic Transducers** (3 crs.) Theory, design, and calibration of electroacoustical transducers including dynamical analogies and equivalent circuits, piezoelectric and magnetostrictive materials, transmitting and receiving responses, reciprocity and acoustic measurements. (Lec. 3) Pre: OCE 471 or equivalent.

**OCE 575 Marine Bioacoustics** (3 crs.) Introduction to marine mammal hearing, sound production, and the uses of sound for communication and echolocation; dolphin sonars; analysis and processing of marine mammal signals including passive tracking; the effects of noise on marine mammals. (Lec. 3) Pre: OCE 471 or permission of instructor.

**OCE 581 Experimental Geomechanics** (3 crs.) Cross-listed as (CVE), OCE 581. Advanced methods and techniques of geotechnical testing. Behavior of granular and cohesive soils with determination of engineering properties. Interpretation, evaluation, and engineering applications of test data. Emphasis on shearing strength, consolidation, bearing capacity, earth pressures, seepage, and slope stability. (Lec. 3) Pre: CVE 381 or equivalent.

**OCE 582 Seabed Geotechnics** (3 crs.) Cross-listed as (OCE), CVE 582. Geotechnical engineering principles as applied to submarine slope stability, bearing capacity, anchoring; emphasis on effective stress principle, compressibility, and shear strength of marine sediments. (Lec. 3) Pre: CVE 381 or equivalent or OCE 311, or permission of instructor.

**OCE 583 Deep Foundations** (3 crs.) Cross-listed as (CVE), OCE 583. Applications of soil mechanics principles to analysis and design of piles and drilled shafts under vertical and lateral loading. Static and dynamic load testing. Introduction to ground improvement technologies. (Lec. 3) Pre: CVE 381 or equivalent.

**OCE 591 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**OCE 592 Special Problems** (1-6 crs.) Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**OCE 599 Master's Thesis Research** (1-9 crs.) Number of credits is determined each

semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**OCE 605 Ocean Engineering Seminar** (1 cr.) Seminar discussions including presentation of papers based on research or literature survey. (Seminar) S/U credit.

**OCE 606 Ocean Engineering Seminar** (1 cr.) Seminar discussions including presentation of papers based on research or literature survey. (Seminar) S/U credit.

**OCE 661 Analysis of Oceanographic Data Systems** (3 crs.) Design of systems for deep-ocean and estuarine data collection and processing. Space-time sampling, multivariate analysis, and convergence of moments as applied to ocean data estimation and system design. Current topics in ocean data systems. (Lec. 3) Pre: OCE 560 or ELE 506 or equivalent.

**OCE 672 Underwater Acoustics II** (3 crs.) Cross-listed as (OCE), ELE 672. Sound transmission in ocean, transducers, active signal design for range and Doppler resolution, ambient and platform noise, classical and wave vector-frequency methods of beamforming, adaptive beamforming, characteristics of targets, and active/passive sonar systems. (Lec. 3) Pre: OCE 571.

**OCE 673 Advanced Course in Underwater Acoustic Propagation** (3 crs.) Analysis of propagation from a concentrated acoustic source in the ocean by methods such as advanced normal mode theory, numerical integration, and Fast Fourier Transforms. Applications to ocean features such as surface ducts, shadow zones, deep-sound channel, etc. (Lec. 3) Pre: OCE 571 or equivalent.

**OCE 676 Acoustic Radiation from Underwater Vibrators** (3 crs.) Fundamentals of acoustic radiation from submerged structures. Radiation from planar, cylindrical, and spherical surfaces. In-vacuo and in-fluid vibration of elastic bodies. Acoustic coincidence and fluid-loading effects on radiation from elastic bodies. (Lec. 3) Pre: OCE 571 or permission of instructor.

**OCE 677 Statistical Sonar Signal Processing** (3 crs.) Cross-listed as (ELE), OCE 677. Basic results in probability and statistics, signal processing, and underwater acoustics are applied to the design of detection, estimation, and tracking in active sonar, passive sonar, and underwater acoustic communication. (Lec. 3) Pre: MTH 451 or ELE 509, ELE 506, and ELE 571 (or OCE 571), or equivalents. ELE 510 is useful and closely related, but not required.

**OCE 691 Special Problems** (1-6 crs.) Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**OCE 692 Special Problems** (1-6 crs.) Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**OCE 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## OCG | Oceanography

**OCG 110 The Ocean Planet** (3 crs.) Cross-listed as (OCG), GEO 110. Introduces the origin and structure of the solar system; interaction of earth's solid interior, oceans' atmosphere and biosphere with emphasis on earth science; energy resources and present environment on Earth. (Lec. 3) (N)

**OCG 123 Oceans, Atmospheres, And Global Change** (4 crs.) The impact of human activities on the oceans, atmospheric composition, and climate set against a background of natural processes in and history of global changes in climate and ecosystems. (Lec. 3, Lab. 3) (N)

**OCG 131 Volcanoes And The Environment** (3 crs.) General introduction to volcanic eruptions and their impact on the global environment and on human activity. Basic principles of the generation of magmas and their eruption at the earth's surface. (Lec. 3) (N)

**OCG 200 Extreme Weather** (3 crs.) Introduction to the observations, theories and forecasts of weather phenomena with focus on extreme weather. Learn the vocabulary and specifics of weather, put these facts together to understand key weather principles and then apply those principles to decision making. (Lec. 3) (N)

**OCG 301 General Oceanography** (3 crs.) Oceanography for undergraduate marine biology majors. General survey of the major disciplines including geological, physical, chemical and biological oceanography integrated into a study of the earth's ocean system. (Lec. 3) Pre: at least one year of biological or physical science with laboratory.

**OCG 420 Deep-sea Biology** (3 crs.) Overview of the biology and ecology of the deep sea, including organisms and habitats, spatial and temporal patterns, physiology and adaptations, energetics, evolution and hydro-thermal vent ecology. (Lec. 3) Pre: one semester general biology (BIO 100, 101, 102, 103, 104, 130, 141) and one semester general chemistry (CHM 101, 103). One semester ecology or oceanography recommended (OCG 123, 301, 451, BIO 455).

**OCG 440 Geological Oceanography** (4 crs.) Origin and evolution of the ocean basin and its margin: morphology, structure, plate tectonics, volcanism, geochemistry, stratigraphy, sedimentation, and paleoceanography. (Lec. 3, Lab. 2) Pre: GEO 103 or permission of instructor. Not for graduate credit.

**OCG 451 Oceanographic Science** (3 crs.) Oceanography for undergraduate science majors. The approach used is to present and apply basic physical, chemical, geological,

and biological principles to the integrated study of the world ocean system. (Lec. 3) Pre: two semesters of MTH 131 and 132 or 141 and 142, one semester of CHM 101 and 102 or 191, one semester of PHY 111 and 185 or 203 and 273 or 213 and 285. A second semester of CHM 112 and 114 or 192 is recommended. Not for graduate credit in oceanography.

**OCG 480 Introduction To Marine Pollution** (3 crs.) An introductory course in marine pollution emphasizing geochemical aspects of the sources, transport, and fate of pollutants in the coastal marine environment. (Lec. 3) Pre: one semester of general chemistry (CHM 101 or 103). One semester of general geosciences (GEO 100 or 103) is recommended. Not for graduate credit.

**OCG 483 Laboratory And Research Problems In Physics** (3 crs.) Cross-listed as (PHY), AST, OCG 483. Research in current areas of physics. Students perform research projects with individual faculty members. Students in physics and physical oceanography may coordinate their research project with a faculty member of the Graduate School of Oceanography. (Lec. 1, Lab. 6) Pre: PHY 381 and 382.

**OCG 484 Laboratory And Research Problems In Physics** (3 crs.) Cross-listed as (PHY), AST, OCG 484. Research in current areas of physics. Students perform research projects with individual faculty members. Students in physics and physical oceanography may coordinate their research project with a faculty member of the Graduate School of Oceanography. (Lec. 1, Lab. 6) Pre: PHY 381 and 382.

**OCG 491 Ocean Studies** (15 crs.) Full-time intensive work experience with Graduate School of Oceanography research at Narragansett Bay Campus. Student expected to participate in research program, seminars, and other activities of Bay Campus. (Independent Study) Pre: junior standing in natural sciences, natural resources, or engineering, and permission of supervising faculty member. Not for graduate credit in oceanography. S/U only.

**OCG 493 Special Problems And Independent Study In Oceanography** (1-6 crs.) Research in oceanography conducted as supervised individual study. (Independent Study) Pre: junior or senior standing in natural science, natural resources, or engineering, and permission of instructor. S/U only.

**OCG 494 Special Problems And Independent Study In Oceanography** (1-6 crs.) Research in oceanography conducted as supervised individual study. (Independent Study) Pre: junior or senior standing in natural science, natural resources, or engineering, and permission of instructor. S/U only.

**OCG 501 Physical Oceanography** (3 crs.) Basic course covering physical properties of seawater, heat budget, distribution of variables, dynamics, water masses and general circulation, waves and tides. (Lec. 3) Pre: PHY 203.

**OCG 505 Marine Analytical Chemistry** (3 crs.) Application of analytical methods to marine problems with emphasis on understanding basic methods and instruments. Combines general principles with practical experience. Students conduct analytical projects in the laboratory. (Lec. 1, Lab. 2)

**OCG 506 Numerical Models and Data Analysis in Ocean Sciences** (3 crs.) Cross-listed as (OCG), OCE 506. An introduction to numerical methods in all disciplines of oceanography and ocean engineering. Topics include model formulation, analysis, and simulation; data analysis and parameter estimation. Problem solving with Matlab and C in the weekly computer laboratory. (Lec. 2, Lab. 3)

**OCG 507 Oceanography for Educators** (3 crs.) Survey of ocean science concepts. Investigation of marine issues that affect the environment. Ten hours in the field. Integration of national science education standards and inquiry based pedagogy. (Lec. 3) Pre: CHM 100 and BIO 113 (or equivalent). A semester of general geology (GEO 100 or 103) and at least one college level math course are recommended.

**OCG 508 Global Environmental Change Education** (3 crs.) Survey of global environmental change issues focusing on environmental systems, related ocean science topics, and local marine and coastal environments. Integration of national science education standards and inquiry-based pedagogy. (Lec. 3) Pre: CHM 100 and BIO 113 (or equivalent). A semester of general geology (GEO 100 or 103) is recommended.

**OCG 510 Descriptive Physical Oceanography** (3 crs.) Observed distributions of temperature, salinity, currents; methods of deducing deep flow; physical properties of seawater; flow in estuaries; practical work in the analysis of oceanographic data; study of recent literature. (Lec. 3) Pre: OCG 501.

**OCG 512 Ocean Waves and Storm Surge Modeling** (3 crs.) Cross-listed as (OCG), OCE 512. Wind wave generation, evolution, and dissipation. Statistical description of surface waves. Interaction between waves and currents. Wave prediction models. Observational methods of waves. Storm surge models and prediction. (Lec. 3) Pre: OCE 408 or equivalent, or permission of instructor.

**OCG 517 Foundations Of Earth System Dynamics** (3 crs.) Introduction to the fundamental principals underlying fluid dynamics as applied to the study of specific problems and processes in earth, marine and environmental sciences. Basics of numerical modeling are covered. (Lec. 3) Pre: MTH 141 and 142, or equivalent.

**OCG 519 Marine Environmental Organic Chemistry** (3 crs.) Cross-coded with (OCG), GEO, CVE 519. Physico-chemical properties of organic compounds, their transformations and environmental fluxes with a focus on marine topics. Offered alternate years. (Lec. 3) Pre: graduate standing or permission of instructor.

**OCG 521 Chemical Oceanography** (3 crs.) Processes regulating the composition of seawater and the distribution of chemical species. The interaction of marine chemistry with the ocean floor, atmosphere, and marine organisms. (Lec. 2, Lab. 2) Pre: CHM 101 and 112 and PHY 213.

**OCG 523 Organic Geochemistry Of Natural Waters** (3 crs.) Chemistry of organic matter in natural waters with emphasis on the marine environment. Topics include a consideration of the origin, nature, and biogeochemical reactions of organic matter in aquatic environments. (Lec. 3) Pre: CHM 228 or permission of instructor.

**OCG 524 Atmospheric Pollution and the Upper Ocean** (3 crs.) Gas and aerosol chemistry and physics; land-air-sea transfer of N, S, C, halogen, and metal compounds; effects of air pollution on the marine atmosphere and upper ocean. (Lec. 3) Pre: BCH 435 or CHE 313 or CHM 431 or MCE 341 or PHY 420 or permission of instructor.

**OCG 525 Chemistry of the Earth** (3 crs.) Cross-listed as (OCG), GEO 525. Analysis of the solid Earth, ocean and atmosphere as a geological/chemical/biological system. Fundamentals of geochemistry will be developed within the context of broad Earth science questions: Earth formation, differentiation, evolution and human impacts. (Lec. 3) Pre: graduate or advanced undergraduate standing in a science major or permission of instructor.

**OCG 533 Graduate Writing In Marine And Environmental Sciences** (3 crs.) Graduate writing in marine and environmental sciences; writing and editing journal articles and abstracts; principles and practice in scientific writing. Pre: graduate standing and WRT 104 or 106, or permission of instructor.

**OCG 535 Climate, Radiation, Gases and Aerosols** (3 crs.) Role of short- and long-wave radiation in climate. Occurrence and consequences of natural and enhanced concentrations of radiatively-active gases. Role of aerosols and associated forcings and feedbacks. (Lec. 3) Pre: PHY 205 or 214, CHM 192 or permission of instructor.

**OCG 540 Geological Oceanography** (4 crs.) Origin and evolution of the ocean basin and its margin: morphology, structure, plate tectonics, volcanism, geochemistry, stratigraphy, sedimentation, and paleoceanography. (Lec. 3, Lab. 2) Pre: GEO 103 or permission of instructor.

**OCG 545 Volcaniclastic Sedimentation** (3 crs.) Generation of volcanic particles by explosive volcanism, the processes by which they are dispersed on land and in the sea, and physical characteristics of their deposits in different volcanic environments. (Lec. 3) Pre: OCG 540 or permission of instructor.

**OCG 555 Modern Oceanographic Imaging and Mapping Techniques** (3 crs.) Cross-listed as (OCG), OCE 555. Overview of current imaging and mapping techniques

used in oceanography and ocean engineering including; photographic and laser imaging, side scan and multibeam sonar; underwater vehicle navigation and map making. (Lec. 3) Pre: undergraduates - OCE 471 or permission of instructor; graduate students - none, this is an overview course appropriate for science-focused graduate students.

**OCG 561 Biological Oceanography** (4 crs.) Dynamics of marine ecosystems; patterns of production and distribution of plankton, benthos, and nekton in relationship to their environment. (Lec. 3, Lab. 2) Pre: general ecology.

**OCG 569 Oceanographic Processes** (3 crs.) Broad survey of general oceanography. The approach is to present and apply basic geological, physical, chemical, and biological principles to the integrated study of the world ocean system. (Lec. 3) Pre: permission of instructor.

**OCG 576 Marine Microbial Ecology** (4 crs.) Cross-listed as (OCG), MIC 576. Examines role of microbes in the oceans and their impact on oceanographic processes and biogeochemical cycles. Emphasis is on bacteria and their interactions with other marine organisms and the marine environment. Laboratory exercises make use of modern techniques to study metabolic rates and community structure. (Lec. 3, Lab. 3) Pre: permission of instructor.

**OCG 580 Introduction To Marine Pollution** (3 crs.) An introductory course in marine pollution emphasizing geochemical aspects of the sources, transport and fate of pollutants in the coastal marine environment. Review papers or research proposals will be required. (Lec. 3) Pre: one semester of general chemistry (CHM 101 or 103). One semester of general geosciences (GEO 100 or 103).

**OCG 591 Individual Study** (1-6 crs.) Individual study of assigned topics or special problems involving literature search and/or original investigation under one or more members of the faculty. (Independent Study)

**OCG 592 Individual Study** (1-6 crs.) Individual study of assigned topics or special problems involving literature search and/or original investigation under one or more members of the faculty. (Independent Study)

**OCG 593 Special Studies** (1-4 crs.) Studies of specialized topics in the marine sciences. (Independent Study)

**OCG 594 Special Studies** (1-4 crs.) Studies of specialized topics in the marine sciences. (Independent Study)

**OCG 599 Master's Thesis Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor. (Independent Study) S/U credit.

**OCG 605 Dynamical Oceanography** (3 crs.) Simple steady-state theories applied to ocean motion. Review of well-known force

balances in oceanography, wind-driven circulation, thermohaline circulation, the thermocline, oceanic boundary layers, nearshore circulation, diffusion. (Lec. 3) Pre: OCG 501.

**OCG 610 Geophysical Fluid Dynamics I** (3 crs.) Natural world fluid dynamics emphasizing ocean circulation. Classical fluid dynamics; GFD fundamentals (rotation and stratification); Taylor-Proudman theorem; potential vorticity; planetary waves; geostrophic contours; shallow water quasi-geostrophic theory; frictional layers. (Lec. 3) Pre: OCG 605 or permission of instructor.

**OCG 611 Geophysical Fluid Dynamics II** (3 crs.) Continuously stratified quasi-geostrophic theory; classical and modern theories of the wind-driven ocean circulation; stability theory; oceanic convection; wave-mean flow interactions; ageostrophic dynamics; topographical effects. (Lec. 3) Pre: OCG 610 or permission of instructor.

**OCG 613 Waves** (3 crs.) Generation, propagation, and decay of surface waves, internal waves, and Rossby waves in the ocean. (Lec. 3) Pre: MCE 550 or permission of instructor.

**OCG 614 Tides** (2 crs.) Generation, propagation, and dissipation of ocean tides. Earth tides. Relation between theory and observation. Tidal analysis. (Lec. 2) Pre: OCG 501.

**OCG 620 Chemical Distributions** (3 crs.) Interdisciplinary study of the processes responsible for oceanic chemical distributions with emphasis on conservative properties, biologically active constituents, and radionuclides. Includes projects involving data-processing analysis. (Lec. 3) Pre: OCG 501, 521, 540, and 561 or permission of instructor.

**OCG 623 Physical Chemistry Of Seawater** (3 crs.) Characterization of dissociation, solubility, and redox equilibria in seawater. Partial molar volumes, conductivity, and diffusion of ions in seawater. Kinetic studies in seawater; effect of temperature, salinity, and pressure on physicochemical properties in seawater. (Lec. 3) Pre: OCG 521 and CHM 432 or permission of instructor.

**OCG 625 Organic Geochemistry Of Sediments** (3 crs.) Chemistry of organic matter in recent to ancient sediments. Topics include the source, characterization, significance, and fate of sedimentary organic compounds with emphasis on the marine environment. (Lec. 3) Pre: OCG 523 or permission of instructor.

**OCG 628 High-Temperature Geochemistry** (3 crs.) Principles and factors governing the distribution of trace elements in volcanic processes. Applications to the study of rock genesis, mantle dynamics, oceanic crust formation, and hotspots. (Lec. 3) Pre: CHM 431 or equivalent, or permission of instructor.

**OCG 631 Seminar In Marine And Atmospheric Chemistry** (1 cr.) Discussion of problems of current interest in marine chemistry. (Seminar) Pre: OCG 521 or permission of instructor. S/U credit.

**OCG 643 Subduction Zones** (3 crs.) Structure, petrology, and geochemistry of subduction zones, island arcs, and other magmatic arcs at convergent plate margins. Petrogenesis of andesites and related magmas. (Lec. 3) Pre: OCG 540 or permission of instructor.

**OCG 645 Petrology Of The Oceanic Crust** (3 crs.) Nature and origin of igneous and metamorphic rocks of the oceanic crust of the earth; mineralogy, petrology, and petrogenesis of seafloor rocks; metamorphism of the ocean crust. (Lec. 3) Pre: graduate standing or permission of instructor.

**OCG 648 Paleooceanography** (3 crs.) Earth history and its relation to global climate. Tools, data, and concepts related to past climate change as observed in the oceanic, ice, and terrestrial records. (Lec. 3) Pre: OCG 540.

**OCG 651 Marine Stratigraphy** (3 crs.) Concepts and methods of biostratigraphy, lithostratigraphy, and chronostratigraphy. Stratigraphic nomenclature. Stratigraphic correlation and completeness. Special focus will be placed on the integration of multiple stratigraphic techniques and their application to the Cretaceous and Cenozoic marine record. Class discussion of advances and problems in recent research articles. (Seminar) Pre: permission of instructor.

**OCG 664 Phytoplankton Ecology** (3 crs.) Cross-listed as (BIO), OCG 664. Biology and ecology of the pelagic marine microscopic algae with emphasis on their adaptations, physiological ecology, distribution, succession, production, and regional and seasonal dynamics. (Lec. 3) Pre: permission of instructor.

**OCG 665 Marine Bio-optics And Remote Sensing** (3 crs.) Bio-optical properties of ocean waters. Major focus is on basic principles of visible-band ocean remote sensing and its application to determining phytoplankton pigment and production at regional to global scales. (Lec. 2, Lab. 2) Pre: OCG 561.

**OCG 669 Marine Fish Ecology And Production** (3 crs.) Functioning of fishes in major world ecosystems is explored through comparison of feeding ecology, bioenergetics, and production rates. (Lec. 3) Pre: OCG 561 or permission of instructor.

**OCG 670 Fish Population Dynamics** (3 crs.) Methods for estimating vital statistics of fish populations, stock assessment theory and methods, analytical and empirical model development, and fisheries forecasting. (Lec. 3) Pre: graduate standing or permission of instructor.

**OCG 673 Fisheries Oceanography** (3 crs.) Physical and biological processes acting at the egg, larval, juvenile, and adult stages of commercially important fish and shellfish. Topics include: growth, survival, and recruitment dynamics; larval dispersal and fish distributions; changes in long-term abundance in relation to climate. (Lec. 3) Pre: graduate standing or permission of instructor. OCG 501, 561 recommended.

**OCG 691 Individual Study** (1-6 crs.) Individual study of assigned topics or special problems involving literature search and/or original investigation under one or more members of the faculty. (Independent Study)

**OCG 692 Individual Study** (1-6 crs.) Individual study of assigned topics or special problems involving literature search and/or original investigation under one or more members of the faculty. (Independent Study)

**OCG 693 Special Studies** (1-4 crs.) Studies of specialized topics in the marine sciences. (Independent Study)

**OCG 694 Special Studies** (1-4 crs.) Studies of specialized topics in the marine sciences. (Independent Study)

**OCG 695 Seminar In Oceanography** (1 cr.) Students give seminar reports on problems and current research in various areas of oceanography. (Seminar) Attendance and registration are required of all graduate students in residence, but no more than 2 credits are allowed for a program of study. S/U credit.

**OCG 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or doctoral committee. (Independent Study) S/U credit.

**OCG 930 Workshop In Oceanography Topics For Teachers WRK** (0-3 crs.) Especially designed for teachers of physical sciences. Basic topics in oceanography from an advanced or pedagogical perspective. (Workshop) Pre: teacher certification.

## OCS | Off Campus Study Undergraduate

**OCS 997 Off Campus Study - Undergraduate** FLD Undergraduate URI students completing approved Off Campus Experience. Fall or Spring Semester.

**OCS 998 Off Campus Study - Undergraduate** FLD Undergraduate URI Students taking approved URI courses elsewhere for URI credit.

**OCS 999 Off Campus Study - Undergraduate** FLD Undergraduate URI students taking approved full-time courses at another institution for transfer credit to URI.

## OCSG | Off Campus Study Graduate

**OCSG 997 Off Campus Study - Graduate** FLD URI Graduate students completing approved Off Campus Experience. Fall or Spring Semester.

**OCSG 998 Off Campus Study - Graduate** FLD URI Graduate Students taking approved URI courses elsewhere for URI credit.

**OCSG 999 Off Campus Study - Graduate** FLD URI Graduate students taking

approved full-time courses at another institution for transfer credit to URI.

## PHC | Pharmacy

**PHC 305 Introduction to Information Technology in Pharmacy** (3 crs.) Introduction to and use of drug information databases in pharmacy and pharmaceutical sciences. (Lec. 3)

**PHC 316 Integrated Pharmacy Lab I** (1 cr.) Medications for use in cardiovascular and renal disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab. 3) Pre: Successful completion of BPS 318, or permission of instructor. Concurrent enrollment in BPS/PHP 310, BPS 334, and PHP 332 is required.

**PHC 327 Interactive Learning Session II** (1 cr.) Small group active learning designed to reinforce progressively the basic science curriculum, promote communication and problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: first-year Doctor of Pharmacy professional student in good standing; or permission of the instructor.

**PHC 415 Integrated Pharmacy Lab II** (1 cr.) Medications for use in infectious and pulmonary disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab. 3) Pre: Successful completion of PHC 316 with a grade of C- or better, or permission of instructor. Concurrent enrollment in PHP/BPS 409, BPS 421, PHP 413 is required.

**PHC 416 Integrated Pharmacy Lab III** (1 cr.) Medications for use in central nervous system and psychiatric disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab. 3) Pre: Successful completion of PHC 415 with a grade of C- or better, or permission of instructor. Concurrent enrollment in PHP/BPS 412, BPS 432, PHP 424 is required.

**PHC 417 Interactive Learning Session III** (1 cr.) Small group active learning designed to reinforce progressively the basic science curriculum, promote communication and problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: second-year Doctor of Pharmacy professional student in good standing; or permission of the instructor.

**PHC 427 Interactive Learning Session IV** (1 cr.) Small group active learning designed to reinforce progressively the basic

science curriculum, promote communication and problem-solving skills, enhance patient assessment, and the delivery of pharmaceutical care. (Seminar) Pre: second-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**PHC 502 Drug Development** (3 crs.) Scientific and regulatory aspects of drug development from discovery to market, exemplified by URI research. (Lec. 3) Pre: graduate standing in Pharmacy. Open to CHE students in pharmaceutical track.

**PHC 515 Integrated Pharmacy Lab IV** (2 crs.) Medications for use in gastrointestinal and endocrine disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab./Rec. 4) Pre: Successful completion of PHC 416 with a grade of C- or better, or permission of instructor. Concurrent enrollment in PHP/BPS 410, BPS 422, PHP 414 is required.

**PHC 516 Integrated Pharmacy Lab V REC** (2 crs.) Medications for use in oncologic and hematologic disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab./Rec. 4) Pre: Successful completion of PHC 515, or permission of instructor. Concurrent enrollment in PHP/BPS 526, BPS 521, PHP 513 is required.

**PHC 517 Interactive Learning Session V** (1 cr.) Small group active learning designed to reinforce progressively the basic science curriculum, promote problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: third-year Doctor of Pharmacy professional student in good standing; or permission of the instructor.

**PHC 520 Pharmaceutical Sciences Journal Club** (1 cr.) Critical reviews of current research reports in the field of pharmaceutical sciences. The students will be evaluated on the basis of their effectiveness in organization, interpretation, and oral presentation, according to criteria already established in the department. (Lec. 1) Pre: graduate standing or in good standing in the P1-P4 years of the Pharm.D. curriculum.

**PHC 527 Interactive Learning Session VI** (1 cr.) Small group active learning designed to reinforce progressively the basic science curriculum, promote communication and problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: third-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**PHC 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent

Study) S/U credit.

**PHC 693 Seminar I** (1 cr.) Seminar discussions including presentation of papers on selected topics in pharmacy. (Seminar) Required of all graduate students, with a maximum of 1 credit allowed per year. May be repeated for a maximum of 2 credits for M.S. candidates. May be repeated for a maximum of 5 credits for Ph.D. candidates.

**PHC 694 Seminar II** (1 cr.) Seminar discussions including presentation of papers on selected topics in pharmacy. (Seminar) Required of all graduate students, with a maximum of 1 credit allowed per year. May be repeated for a maximum of 2 credits for M.S. candidates. May be repeated for a maximum of 5 credits for Ph.D. candidates.

**PHC 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## PHL | Philosophy

**PHL 101 Critical Thinking** (3 crs.) Identification, formulation and evaluation of both inductive and deductive patterns of reasoning. Consideration of topics such as probability, reasoning about causes, fallacies, foundations of argument, and the issues in logical theory. (Lec. 3/Online) (EC) (L)

**PHL 103 Introduction to Philosophy** (3 crs.) Pursues such basic questions as: What is a person? What is knowledge? Are we free? What is moral right and wrong? Does God exist? What is the meaning of death? (Lec. 3/Online) Not open to students with 9 or more credits in philosophy. (L)

**PHL 103H Honors Section of PHL 103: Introduction to Philosophy** (3 crs.) Honors Section of PHL 103: Introduction to Philosophy. (Lec. 3/Online) Pre: 3.30 or above overall GPA. (L)

**PHL 204 Theories of Human Nature** (3 crs.) An introduction to philosophical inquiry by critical examination of some major traditional and contemporary views of human nature as expressed in a variety of religious, literary, scientific, and philosophical writings. (Lec. 3) (L)

**PHL 205 Philosophical Topics** (3 crs.) An intensive study of one or more problems, issues or topics of classical or current interest in philosophy. Emphasis on the analysis and construction of arguments relevant to the topic(s). Small class format. (Lec. 3)

**PHL 210 Women and Moral Rights** (3 crs.) An introduction to the philosophical problems raised by reproduction, affirmative action, pornography, gender roles, and sexism in language through a critical examination of these issues. (Lec. 3) (L) [D]

**PHL 212 Ethics** (3 crs.) Evaluation of major ethical theories. Application of moral reasoning to topics such as virtues and vices,

human dignity, conscience, responsibility, moral dilemmas, and reasons to be moral. (Lec. 3) (L) [D]

**PHL 212H Honors Section of PHL 212: Ethics** (3 crs.) Honors Section of PHL 212: Ethics (Lec. 3) Pre: must have a 3.30 overall GPA. (L) [D]

**PHL 215 Science and Inquiry** (3 crs.) The objective is to survey both the influence of philosophy on science and the influence of science on philosophy, all from a western historical perspective. (Lec. 3) (L)

**PHL 217 Social Philosophy** (3 crs.) A systematic introduction to the philosophical problems of contemporary social relations: models of community, sources of alienation, property and ownership, the meaning of work and technology, human rights and freedom. (Lec. 3/Online) (L) [D]

**PHL 235 Modern Thought: Philosophy and Literature** (3 crs.) Introduction to recent thought in philosophy and literature. Emphasis on Kierkegaard, Marx, Nietzsche, Freud, Sartre, and complementary literary texts. (Lec. 3) (L)

**PHL 235H Honors Section of PHL 235: Modern Thought: Philosophy and Literature** (3 crs.) Honors Section of PHL 235: Modern Thought: Philosophy and Literature. (Lec. 3) Pre: 3.30 overall GPA. (L)

**PHL 314 Ethical Problems in Society and Medicine** (3 crs.) Ethical analysis of topics such as war, capital punishment, sexual morality, suicide, animal rights, honesty and deception, world hunger, discrimination, abortion. (Lec. 3/Online) Pre: PHL 101 or 103 or one 200-level PHL course or permission of instructor. (L)

**PHL 316 Engineering Ethics** (3 crs.) Cross-listed as (PHL), EGR 316. A broad introduction to moral theory and its application to engineering, professionalism, and moral responsibility as an engineer. An understanding of engineering in a societal context. (Lec. 3) Pre: sophomore standing. (L) [D]

**PHL 316H Honors Section of EGR 316: Engineering Ethics** (3 crs.) Cross-listed as (EGR), PHL 316H. Honors Section of EGR 316: Engineering Ethics. (Lec. 3) Pre: must have a 3.30 overall GPA. Sophomore standing. (L) [D]

**PHL 318 Power/Justice: Contemporary Critical Philosophies** (3 crs.) Study of contemporary critical philosophies in the traditions of Marxism, existentialism, postmodernism, and feminism, with emphasis on philosophers such as Habermas and Foucault. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course or permission of instructor.

**PHL 321 Ancient Philosophy** (3 crs.) Survey of major thinkers and schools of thought in Ancient Greece, including selected pre-Socratics, Plato, and Aristotle. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course, or permission of the instructor. (L)

**PHL 322 Medieval Philosophy** (3 crs.) Survey of major thinkers and schools of thought

in the Middle Ages, including Augustine, Anselm, Aquinas, and Ockham. (Lec. 3) (L)

**PHL 323 Modern Philosophy: Descartes to Kant** (3 crs.) Survey of 17th- and 18th-century European philosophy. Includes, but is not limited to, empiricism, rationalism, and Kant's critical philosophy. (Lec. 3) Pre: PHL 101, or 103, or one 200-level PHL course, or permission of instructor. (L) [D]

**PHL 324 Recent European Philosophy** (3 crs.) 19th- and 20th-century British and European continental developments. Discussion of movements such as idealism, utilitarianism, existentialism, and phenomenology and of philosophers such as Hegel, Kierkegaard, Mill, Husserl, Sartre, and Heidegger. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course or permission of instructor.

**PHL 325 American Philosophy** (3 crs.) A study of American philosophy including such movements as puritanism, transcendentalism, pragmatism, naturalism, process-philosophy, realism, and philosophical analysis. (Lec. 3) Pre: PHL 01 or 103 or one 200-level PHL course or permission of instructor. (L) [D]

**PHL 325H Honors Section of PHL 325: American Philosophy** (3 crs.) Honors Section of PHL 325: American Philosophy. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course and 3.30 overall GPA. (L) [D]

**PHL 328 The Philosophy of Religion** (3 crs.) A systematic and critical consideration of such topics as the existence and nature of God, the problem of evil, the relation of faith to reason, religious language, miracles, and immortality. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course or permission of instructor. (L) [D]

**PHL 331 East Asian Thought** (3 crs.) A study of the important philosophical and religious systems of China, Korea, and Japan; emphasis on Chinese traditions. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course or RLS 131 or permission of instructor. (FC) (L) [D]

**PHL 341 Introduction to Metaphysics** (3 crs.) Analyzes topics such as person, mind-body, human action, freedom and determinism, causation, time, space, essence and existence, universals, and types of beings. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course or permission of instructor.

**PHL 342 Knowledge, Belief, and Truth** (3 crs.) Analysis of topics such as knowledge, belief, certainty, doubt, skepticism, faith, the ethics of belief, truth, error, perception, a priori knowledge, subjectivity and objectivity, and memory. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course or permission of instructor.

**PHL 346 Existential Problems in Human Life** (3 crs.) Discussion of ultimate questions of human existence such as meaning in life, personal commitment, human relations, suffering, despair, hope, freedom, authenticity, self-deception, death, God, and immortality. (Lec. 3) Pre: PHL 101 or 103 or one 200-level

PHL course or permission of instructor. (L)

**PHL 355 Philosophy of Art** (3 crs.) Systematic problems arising from reflection on the creation and perception of works of art. (Lec. 3) Pre: PHL 101 or 103 or one 200-level PHL course or permission of instructor. (L)

**PHL 401 Special Problems** (3 crs.) Course may vary from year to year, allowing one or more advanced students to pursue problems of special interest with guidance of instructor in conferences. One or more written papers. (Independent Study) Pre: 3 credits in philosophy and permission of instructor. May be repeated for credit.

**PHL 402 Special Problems** (3 crs.) Course may vary from year to year, allowing one or more advanced students to pursue problems of special interest with guidance of instructor in conferences. One or more written papers. (Independent Study) Pre: 3 credits in philosophy and permission of instructor. May be repeated for credit.

**PHL 451 Symbolic Logic** (3 crs.) Selected topics in modern symbolic logic including calculus of propositions, predicate calculus, and modal logics. Philosophical and mathematical aspects of the subject. (Lec. 3) Pre: PHL 101 or MTH 131 or higher or permission of instructor.

**PHL 452 Philosophy Of Science** (3 crs.) Analysis of the nature and structure of scientific thought. Consideration of issues such as structure and types of scientific explanation, verification and falsification, and unity of the sciences. (Seminar) Pre: PHL 101, 215, or 451, one 300-level PHL course, and 6 credits of natural science; or permission of instructor.

**PHL 453 Philosophy Of The Social Sciences** (3 crs.) Examination of philosophical problems raised by contemporary social sciences: the meaning of scientific knowledge, the nature of understanding of other persons and cultures, the relation of theory and practice. (Seminar) Pre: PHL 101 or 103 or 204 or permission of instructor.

**PHL 490 Senior Seminar In Philosophy** (3 crs.) In-depth study of the major works of a significant Western philosopher or of a major philosophical topic. (Seminar) Pre: senior standing in philosophy or permission of instructor. May be repeated for credit.

**PHL 499 Senior Thesis** (3 crs.) Independent research. Student works in close conjunction with a faculty member on a mutually agreeable topic. Written thesis required. (Independent Study) Pre: senior standing and permission of instructor. Not for graduate credit.

## PHP | Pharmacy Practice

**PHP 114 Responsible Health Care** (3 crs.) This course will explore contemporary health care issues from various societal viewpoints through collaborative group work. Using a problem-based learning approach, student



will pose solutions to an actual health-related issue. (Lec. 3) (S) [D]

**PHP 143 Sustainable Solutions for Global Health Problems** (3 crs.) Cross-listed as (PHP), NUR, PLS 143. Teams of students will study a global health problem and research, write, and present a sustainable solution that integrates human innovation with existing technology. (Lec. 3) (N) (S) [D]

**PHP 201 Introduction to the U.S. Health Care System** (3 crs.) This course introduces the student to the U.S. health care system, cost, quality, and access implications associated with the delivery of health care services and goods. (Lec. 3) Pre: Intended for freshmen and sophomores. Not for program credit for pharmacy majors in the third year or beyond.

**PHP 305 Drug Information and the Analysis of Literature** (3 crs.) Students will evaluate drug information questions using drug information sources and will explore study design and methodology of drug trials to interpret results in the care of patients. (Lec. 3) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**PHP 310 Foundations of Human Disease: Renal and Cardiovascular Diseases** (2 crs.) Cross-listed as (PHP), BPS 310. The etiology, pathogenesis, epidemiology, and symptomatology, and diagnosis of renal and cardiovascular diseases. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**PHP 311 Foundations of Human Disease I: Immunoinflammatory Disease** (2 crs.) Cross-listed as (BPS), PHP 311. The pathogenesis, etiology, epidemiology, symptomatology, and diagnosis of immunoinflammatory and musculo-skeletal diseases. The pharmacology and medicinal chemistry of anti-inflammatory medications, immunosuppressives, and anti-rheumatic drugs. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor. Open to BSPS students.

**PHP 316 Pharmacy Law and Ethics** (3 crs.) Basic principles of law and ethics as applied to federal, state and local acts, regulation, and practices encountered in professional practice. Specific attention to liabilities of pharmacists in decisions; actions involving sale of medicinals, poisons, narcotics. (Lec. 2, Rec. 1) Pre: first-year Doctor of Pharmacy professional student in good standing; or permission of the instructor.

**PHP 317 Pharmacy Practice in Contemporary Health Care** (3 crs.) Introduction to the role and responsibilities of pharmacists in contemporary health care and public health. Provides the foundation necessary for early experiential learning in clinical practice settings and immunization certification training. (Lec. 2, Rec. 1) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of the instructor.

**PHP 317H Honors Section of PHP 317: Pharmacy Practice in Contemporary Health Care** (3 crs.) Honors Section of PHP 317: Pharmacy Practice in Contemporary Health Care. (Lec. 1, Rec. 2) Pre: Admission to the first professional year of the Doctor of Pharmacy program, or permission of instructor, and a 3.30 overall GPA.

**PHP 332 Pharmacotherapy of Renal and Cardiovascular Disorders** (3 crs.) The appropriate use of medications in the treatment of human disease. Interpretation of clinical data to design, monitor, and modify drug therapy in renal and cardiovascular disease. (Lec. 3) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**PHP 340 IPPE I: A Health Care Service Learning Experience PRA** (1 cr.) Structured practical experiences in a healthcare setting or community outreach program. Develops social responsibility and professionalism while providing needed assistance to the community. (Practicum) Pre: successful completion of the 1st professional year, including PHP 317; a valid and updated HIPAA certificate and RI intern license. Service learning.

**PHP 360 Hospital Pharmacy** (3 crs.) Introduction to practice of pharmacy in hospitals, including both professional and administrative activities. Field trips to representative hospital pharmacies. (Lec. 3) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of the instructor.

**PHP 401 Pharmacy Resources for Practice** (3 crs.) Introduces pharmacy management skills to assist students in understanding the effective use of the human, technological, and fiscal resources to manage a positive work environment and maximize their patient interaction time. (Lec. 3) Pre: First year Doctor of Pharmacy student in good standing; or permission of the instructor.

**PHP 405 Epidemiology in Health Care** (4 crs.) Basic principles of epidemiology as they apply to health care delivery, research and activities; emphasizing the practical application of epidemiological knowledge to literature evaluation. (Lec. 4) Pre: STA 307, PSY 300 or PHP 305. Not for graduate credit.

**PHP 409 Foundations of Human Disease III: Infectious and Pulmonary Processes** (2 crs.) Cross-listed as (BPS), PHP 409. The etiology, pathogenesis, epidemiology, symptomatology, and diagnosis of infections and pulmonary diseases. (Lec. 2) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor

**PHP 410 Foundations for Human Disease V: GI, Endocrine** (2 crs.) Cross-listed as (PHP), BPS 410. The etiology, pathogenesis, symptomatology, and diagnosis of endocrine, and gastrointestinal diseases. (Lec. 2) Pre: P3 standing in the Doctor of Pharmacy program.

**PHP 411 Biostatistics II** (3 crs.) Cross-listed as (STA), PHP, BPS 411. An overview of statistical methods used in performing research in pharmacotherapeutics and pharmacoepidemiology. Emphasis will be on understanding both common study designs and the output from statistical analysis of data obtained from these studies. (Lec. 3) Pre: an introductory statistics course (i.e., 307) or permission of instructor.

**PHP 412 Foundations of Human Diseases: CNS** (2 crs.) Cross-listed as (PHP), BPS 412. The etiology, pathogenesis, epidemiology, symptomatology, and diagnosis of diseases of the central nervous and musculoskeletal system. (Lec. 2) Pre: Doctor of Pharmacy student in good standing or permission of instructor. Not for graduate credit.

**PHP 413 Pharmacotherapy of Infectious Diseases and Pulmonary Disorders** (3 crs.) The appropriate use of medications in the treatment of human infectious and pulmonary disorders. Interpretation of patient data to design, monitor, and modify drug therapy in infectious and pulmonary diseases. (Lec. 3) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor.

**PHP 414 Pharmacotherapy of Gastrointestinal and Endocrine Diseases** (3 crs.) The appropriate use of medications in the treatment of human disease. Interpretation of clinical data to design, monitor, and modify drug therapy in endocrine and gastrointestinal disease. (Lec. 3) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor.

**PHP 418 Self-Care I** (3 crs.) An overview of alternative therapies and over the counter medicines with an emphasis on self-care and natural medicine. Basic information as well as case studies. (Lec. 3) Pre: second-year Doctor of Pharmacy student in good standing; or permission of the instructor.

**PHP 420 Biotechnology Products in Pharmacy** (2 crs.) Cross-listed as (BPS), PHP 420. Clinical, pharmaceutical, and economic impact of biotechnology products in pharmacy, including monoclonal antibodies, interleukins, human growth factors, antigens oligonucleotides, DNase, and interferons. (Lec. 2)

**PHP 424 Pharmacotherapy of CNS and Musculoskeletal Disease** (2 crs.) The appropriate use of medications in the treatment of human disease. Interpretation of data to design, monitor, and modify drug therapy in psychiatric, neurologic, and musculoskeletal diseases. (Lec. 2) Pre: Doctor of Pharmacy student in good standing or permission of the instructor. Not for graduate credit.

**PHP 430 Public Health Consequences of Infectious Diseases** (3 crs.) Through a variety of learning techniques, students will learn about current and emerging public health challenges, focusing on team-based identification, prevention, and control of transmissible infectious diseases. (Lec. 3)

Pre: PHP 413, second- or third-year Doctor of Pharmacy professional student in good standing or permission of the instructor. Not for graduate credit.

**PHP 440 Advanced Pediatric Pharmacotherapy** (3 crs.) Pharmacotherapeutic needs of infants, children, and adolescents with a focus on pharmacokinetic, pharmacodynamic, and other developmental-associated physiological changes. (Lec.3) Pre: second- or third-year Doctor of Pharmacy professional student in good standing or permission of the instructor.

**PHP 450 Introductory Pharmacy Practice Experience I PRA** (0 crs.) Structured practical experience in institutional and community pharmacy settings. (Practicum) Pre: first year Doctor of Pharmacy professional student or permission of the instructor. Not for graduate credit.

**PHP 451 Introductory Pharmacy Practice Experience II PRA** (0 crs.) Structured practical experience in institutional and community pharmacy settings. (Practicum) Pre: second-year Doctor of Pharmacy professional student in good standing or permission of instructor. Not for graduate credit.

**PHP 460 Palliative Care** (3 crs.) Principles of palliative care including control of pain and other symptoms, and psychological, social, and spiritual issues. (Lec.3) Pre: second- or third-year Doctor of Pharmacy professional student in good standing or permission of the instructor. Not for graduate credit.

**PHP 497 Special Problems** (1-3 crs.) Methods of carrying out a specific research project. Literature search, planning, laboratory work, writing an acceptable report. (Independent Study) Pre: permission of chairperson.

**PHP 498 Special Problems** (1-3 crs.) Methods of carrying out a specific research project. Literature search, planning, laboratory work, writing an acceptable report. (Independent Study) Pre: permission of chairperson.

**PHP 503 Health Systems I** (2 crs.) Introduction to the U.S. public health system, and roles of pharmacists in promoting patient wellness, and safe and effective medication use. This course provides the didactic component of immunization training. (Lec. 2) Pre: third-year Doctor of Pharmacy professional student in good standing or permission of the instructor.

**PHP 504 Health Systems II** (3 crs.) Analysis and interpretation of the U.S. health care system, including care delivery, and economic, finance, payment and policy perspectives, with emphasis on the role of the pharmacist. (Lec. 2, Rec. 1) Pre: third-year Doctor of Pharmacy professional student in good standing or permission of the instructor.

**PHP 505 Advanced Pharmacotherapy in Geriatrics** (3 crs.) Broad issues in pharmacotherapy for older persons including age-related physiologic changes, pharmacokinetics

and pharmacodynamics, assessment, and the importance of interdisciplinary teams in the management of complex drug therapy. (Lec. 3) Pre: Doctor of Pharmacy professional student in good standing or permission of instructor.

**PHP 513 Pharmacotherapy of Oncology and Toxicology-Therapeutics IV** (2 crs.) The appropriate use of medications in the treatment of human disease. Interpretation of clinical data to design, monitor, and modify drug therapy in cancer, blood disorders, and overdose conditions. (Lec. 2) Pre: third-year Doctor of Pharmacy student in good standing; or permission of the instructor.

**PHP 519 Self-Care II** (3 crs.) Cross-listed as (PHP), BPS 519. Expansion of nonprescription and complementary medicine therapeutics. Explore the implementation of pharmaceutical care programs in community pharmacy practice. (Lec. 3) Pre: PHP 418 (or BPS 418); third-year Doctor of Pharmacy professional student.

**PHP 520 Advanced Gastrointestinal and Endocrine Pharmacotherapy** (3 crs.) Provides students with an expanded knowledge base in the area of GI and endocrine pharmacotherapy, emphasizing active learning, literature evaluation, data interpretation. (Lec. 3) Pre: third-year Doctor of Pharmacy professional student in good standing or permission of instructor. Not for graduate credit.

**PHP 526 Foundations of Human Disease VI: Hematology-Oncology** (2 crs.) The etiology, pathogenesis, symptomatology, and diagnosis of hematology and oncology diseases in people. Introduction to pharmacogenomics, gene-drug interactions, and genetic therapy in human disease. (Lec. 2) Pre: third-year Doctor of Pharmacy professional student standing. Taken concurrently with BPS 521 and PHP 513. Not for graduate credit.

**PHP 540 Principles, Methods, and Applications of Epidemiology** (3 crs.) An introduction to epidemiology, the study of health and disease in populations. Epidemiologic methods and research design for conducting and interpreting health research. (Lec. 3) Pre: STA 307; second- or third-year Doctor of Pharmacy professional student in good standing; or permission of the instructor.

**PHP 542 Evaluation of Controversies in Drug Literature** (3 crs.) Through critical review of literature, controversies in drug therapy and drug-associated illness will be evaluated to improve students knowledge and analytical skills. (Lec. 3) Pre: second or third year Doctor of Pharmacy professional student in good standing; or permission of the instructor.

**PHP 550 Pharmacoepidemiology** (3 crs.) The application of epidemiologic principles to the study of drug effects in human populations. (Lec. 3) Pre: PHP 540, third year Doctor of Pharmacy student in good standing; or permission of the instructor.

**PHP 555 Advanced Neuropsychiatric Pharmacotherapy** (3 crs.) Comprehensive and advanced course on the pharmacotherapy of psychiatric and neurological diseases. Use of clinical case studies, evaluation of the primary literature, and other forms of interactive teaching will be emphasized. (Lec) Pre: PHP 324, 312 or BPS 312, BPS 322, second- or third-year Doctor of Pharmacy student in good standing or permission of the instructor.

**PHP 560 Advanced Cardiovascular and Renal Pharmacotherapy** (3 crs.) Advanced assessment and pharmacotherapeutic management of patients with cardiovascular and renal disease through the application of evidence-based medicine and critical evaluation of literature. (Lec. 3) Pre: second- or third-year Doctor of Pharmacy student in good standing or permission of the instructor. Not for graduate credit.

**PHP 580 Pharmacoeconomic Analysis** (3 crs.) Introduction to methodologic approaches utilized in economic evaluation of drug use and therapy in community and managed care settings, and clinical trials, including the FDA approval process and liability issues. (Lec. 3) Pre: STA 307 or equivalent, or permission of instructor. In alternate years.

**PHP 591 Advanced Pharmacy Practice Experience: Community PRA** (6 crs.) An advanced practice experience designed to integrate current pharmacy practice with innovative patient-oriented services in a community pharmacy. A variety of sites are used which include independent, chain, and outpatient pharmacies. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**PHP 592 Advanced Pharmacy Practice Experience: Inpatient PRA** (6 crs.) Through collaboration with other health care professionals including the medical team, and application of evidence-based medicine, students will develop clinical skills to provide pharmaceutical care for patients in the inpatient setting. (Practicum) Pre: Fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**PHP 593 Advanced Pharmacy Practice Experience: Elective PRA** (6 crs.) Experiential courses in a wide variety of settings in clinical, industry, and managed care sites. Students learn and practice the core concepts of pharmaceutical care through interaction with faculty, health care professionals, and patients. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**PHP 594 Advanced Pharmacy Practice Experience: Institutional PRA** (6 crs.) An advanced practice experience designed to integrate institutional pharmacy practice with innovative patient-oriented and distributive services in a variety of sites such as hospital

pharmacies and other institutions. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**PHP 595 Advanced Pharmacy Practice Experience: Ambulatory PRA** (6 crs.) In collaboration with health care professionals, students will provide pharmaceutical care to individuals in ambulatory care sites using patient-specific information to modify, create, and monitor pharmacotherapy regimens. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**PHP 640 Epidemiologic Methods for the Health Sciences** (3 crs.) A focus on quantitative methods used in epidemiologic and health-related research. Students will learn to analyze and interpret data from large-scale observational studies and will be exposed to problematic situations in research design and data analysis. (Lec. 3) Pre: PHP 540, STA 412, or permission of instructor.

**PHP 680 The Legal Environment in Health Administration** (3 crs.) Application of specialized statutory and regulatory provisions in federal and state law to the delivery of health care. (Lec. 3) Pre: graduate standing.

**PHP 685 Pharmacoeconomic Methods and Applications** (3 crs.) Methodologies for conducting pharmacoeconomic analyses in observational settings and clinical trials, and the application of pharmacoeconomic techniques to describe and evaluate cost-effectiveness of medication use. (Lec. 3) Pre: PHP 580, or graduate student standing with permission of instructor.

**PHP 697 Research in Pharmacy Administration** (1-3 crs.) Literature survey, laboratory work, and a detailed research report on one or more assigned topics in pharmacy. (Independent Study)

**PHP 698 Research In Pharmacy Administration** (1-3 crs.) Literature survey, laboratory work, and a detailed research report on one or more assigned topics in pharmacy. (Independent Study)

**PHP 900 Physical Assessment WRK** (0 crs.) Provides students with an introduction to core patient assessment skills. Further develops students' patient interviewing and documentation skills. (Workshop) Pre: fifth-year standing in the Doctor of Pharmacy Program. S/U only.

## PHT | Physical Therapy

**PHT 440 Advanced Head And Neck Anatomy** (3 crs.) Cross-listed as (PHT), CMD 440. Study of structure and function of human head and neck anatomy, supplemented by dissection laboratory. Emphasis on the musculoskeletal, visceral, nervous, and vascular systems related to dental hygiene and communicative disorders. (Lec. 2, Lab. 2) Pre: BIO 121 or equivalent.

**PHT 500 Human Anatomy and Histology** (5 crs.) Structure and function of human anatomy as related to physical therapy. Emphasis on musculoskeletal, visceral, nervous and vascular systems and tissue histology. Functional changes after injury will be emphasized. (Lec. 4, Lab. 2) Pre: first-year standing or permission of chairperson.

**PHT 501 Applied Human Anatomy Laboratory** (3 crs.) Surface anatomy, palpation, introduction to forces and torques, stretching and strengthening. (Lab. 6) Pre: PHT 500 and first-year standing in D.P.T., or permission of chairperson.

**PHT 505 Introduction to Physical Therapy** (2 crs.) Introduction to the profession of physical therapy including concepts related to disability, rehabilitation, evidence based practice, models of care and introduction to the Guide to Physical Therapist Practice. Characteristics and history of the profession and professional expectations for practitioners will be included. (Lec. 2) Pre: Admission to the D.P.T. program.

**PHT 508 Psychosocial Issues in Physical Therapy** (2 crs.) Behavioral and psychosocial issues relevant in physical therapy practice. Patient's perception of care and interactions in the health care environment. (Lec. 2) Pre: first-year standing or permission of chairperson.

**PHT 510 Biomechanics And Pathokinesiology** (5 crs.) Principles, theories, and recent investigations of the biomechanics of human motion and posture are presented to develop analytical skills for normal and abnormal movement evaluation. (Lec. 5) Pre: PHT 500 and first-year standing, or permission of chairperson.

**PHT 511 Human Neuroscience and Neurology** (5 crs.) Anatomy, physiology, dysfunction, and evaluation of the human nervous system as a basis of therapeutic intervention. Gross and microscopic structure of the nervous system and the neurological examination. (Lec. 4, Lab. 2) Pre: second year standing in D.P.T. or permission of chairperson.

**PHT 512 Physical Examination and Evaluation I** (3 crs.) Provides students with basic skills for physical examination and evaluation in the provision of physical therapy. Focus will be on strength testing, range of motion, and sensation (Lec. 3) Pre: PHT 500 and first-year standing in D.P.T. or permission of chairperson.

**PHT 513 Directed Study in Physical Therapy** (1-3 crs.) Subject matter arranged to meet the individual needs of graduate students in physical therapy under the supervision of staff. (Independent Study) Pre: permission of instructor.

**PHT 518 Communication and Education in Physical Therapy** (3 crs.) Topics include teaching in classroom and clinic, psychomotor skills and home exercise programs; increasing patient adherence; and commu-

nity health. Communication development focuses on verbal/non-verbal, conflict management, assertiveness. (Lec. 3) Pre: Second year standing in D.P.T. or permission of chairperson.

**PHT 519 Pathophysiology in Physical Therapy** (1 cr.) Physical therapy cases will be used to facilitate the application of pathophysiological concepts in the examination, evaluation, and interventions in physical therapy. Pre: first-year standing in D.P.T.

**PHT 520 Medical Management of Disease I** (2 crs.) Physiological systems, methods of diagnosis and rationale for physical therapists interventions. Topics include physiology of pain, inflammation, healing, impact of exercise and common conditions on the vascular, musculoskeletal, metabolic, and endocrine systems. (Lec. 2) Pre: PHT 500 and first-year standing in D.P.T. or permission of chairperson.

**PHT 521 Medical Management of Diseases II** (2 crs.) Pathophysiological mechanisms, methods of diagnosis, and rationale for interventions which entry-level physical therapists need to understand. Common conditions of the gastrointestinal, genitourinary, integumentary and nervous systems discussed. (Lec. 2) Pre: PHT 520 and second-year standing in D.P.T. or permission of chairperson.

**PHT 522 Physical Examination and Evaluation II** (4 crs.) A continuum of PHT 512, this course will cover posture, functional mobility, gait, balance, assistive devices, wheelchair fitting, and home evaluation. Practice of basic skills through course content using role modeling and patient cases. (Lec. 4) Pre: PHT 512 and first year standing in the D.P.T. program.

**PHT 528 Ethical, Legal, and Professional Issues in Clinical Practice** (3 crs.) Practice standards, interdisciplinary issues, ethical considerations, and legal implications of physical therapy practice. Professional development, expert practice, doctoring professions, informed consent, patient rights, standards of practice, advanced directives, malpractice, domestic violence, child and elder abuse. (Lec. 3) Pre: second-year standing or permission of chairperson.

**PHT 532 Physical Agents I** (2 crs.) Theory, practice, and current research regarding application of physical agents. Diagnostic methods, interventions, and personnel supervision and administration of mechanical, thermal, and hydrotherapeutic agents. (Lec. 2) Pre: first-year standing in D.P.T. or permission of chairperson.

**PHT 533 Physical Agents II** (2 crs.) Theory, practice and current research on physical agents in PT. Electrotherapeutic agents including ultraviolet, primary forms of electrical stimulation, laser and others. (Lec. 2) Pre: PHT 532 and first-year standing in D.P.T. or permission of chairperson.

**PHT 535 Advanced Pathophysiology** (3 crs.) Cross-listed as (NUR), PHT 535. An in-depth study of pathophysiological phenomena across the life span from the biological life processes perspective. Clinical decision making based on the synthesis of this knowledge and current research findings will be explored. (Lec. 3) Pre: for nursing students: admission to graduate program in nursing or permission of instructor; PHT 500 and 1st year standing in the D.P.T. program for physical therapy students.

**PHT 537 Management Theory in Physical Therapy** (2 crs.) An overview of health policy and management theory and its relationship to health care settings. Competent managers need to have a comprehensive understanding of how health care delivery is regulated. This topic will be covered in relationship to third party reimbursement, state regulations, health policy formulation roles of government and politics in health care. (Lec. 2) Pre: second-year standing in the D.P.T. program or permission of the chairperson.

**PHT 538 Management and Administration in Physical Therapy** (2 crs.) Practical managerial and supervisory techniques and theory in physical therapy settings with emphasis on application in a variety of settings are presented. Topics: strategic planning, consultation, performance improvement, professional development planning, resumes and interviews, management, and performance appraisal, the health care continuum, budgeting, productivity, outcomes and patient satisfaction. (Lec. 2) Pre: third-year standing in D.P.T. or permission of the chairperson.

**PHT 544 Health Promotion in Physical Therapy** (4 crs.) Presents physical therapists' role in wellness and health promotion across gender, systems, and the lifespan. (Lec. 4) Pre: third-year standing or permission of chairperson.

**PHT 550 Musculoskeletal Therapeutics I: The Extremities** (5 crs.) Physical therapy management of individuals with, and the prevention of: impaired joint mobility, motor function, muscle performance, range of motion, and reflex integrity associated with musculoskeletal dysfunction in the extremities. (Lec. 5) Pre: PHT 510 and second-year standing or permission of chairperson.

**PHT 552 Musculoskeletal Therapeutics II: The Spine** (5 crs.) Physical Therapy management of individuals with, and the prevention of, impaired joint mobility, motor function, muscle performance, range of motion, and reflex integrity associated with musculoskeletal dysfunction in the spine. (Lec. 5) Pre: PHT 550 and second-year standing or permission of chairperson.

**PHT 560 Neuromuscular Therapeutics** (5 crs.) Physical therapy management of individuals with, and the prevention of, impaired motor function and sensory integrity associated with neuromuscular dysfunction. (Lec.5) Pre: second-year standing in D.P.T. or permission of chairperson.

**PHT 570 Cardiopulmonary Physical Therapy** (4 crs.) Physiological basis, testing and evaluation, treatment, and administration of programs for cardiac and pulmonary-diseased patients requiring physical therapy. (Lec. 4) Pre: second-year standing in D.P.T. or permission of chairperson.

**PHT 574 Sports Physical Therapy** (2 crs.) Advanced knowledge and competency in sports injury evaluation and treatment are developed. Additional coverage of sports injury prevention, athletic screening, medical intervention, interdisciplinary coordination, and patient or public education is provided. (Lec. 1, Lab. 3) Pre: PHT 550 or permission of instructor.

**PHT 575 Physical Therapy Internship I PRA** (4 or 5 crs.) Assignment to various clinical settings that provide supervised experiences with practicing physical therapists and support personnel. Specific setting and rotational time schedule are determined by the student, academic clinical coordinator, and clinical site. (Practicum) Pre: second-year standing in D.P.T. or permission of chairperson. S/U credit.

**PHT 576 Broadening Experiences in Physical Therapy** (2 crs.) Provision of physical therapy service in a non-traditional setting or with a unique population. Preparatory work and two-week hands-on experience. (Lec. 1, Practicum in approved setting) Pre: Enrolled in D.P.T. program. S/U credit.

**PHT 580 Pediatric Physical Therapy** (2 crs.) Physical therapy assessment, care planning, and treatment of the pediatric population in diverse practice settings. Some hands-on experience with infants and children with a variety of diagnoses. (Lec. 2) Pre: PHT 511 and third-year standing in D.P.T. or permission of chairperson.

**PHT 585 Physical Therapy Internship II PRA** (4 or 5 crs.) Assignment to various clinical settings that provide supervised experiences with practicing physical therapists and support personnel. Specific setting and rotational time schedule are determined by the student, academic clinical coordinator, and clinical site. (Practicum) Pre: permission of instructor. S/U credit.

**PHT 586 Physical Therapy in Geriatric Populations** (2 crs.) Geriatric and aging issues related to physical therapy practice. Evaluation and treatment strategies for disorders affecting adults, including biology, cognition, and motor function. Exposure to geriatric populations. (Lec. 2) Pre: second-year standing or permission of chairperson.

**PHT 592 Comprehensive Cases in Physical Therapy** (4 crs.) Cross-curricular integration of physical therapy evaluation, diagnosis, prognosis, intervention and outcome assessment applied to complex cases. Consideration of modifications necessary for different stages of development/age, different cultures, and across the continuum of care. (Lec. 4) Pre: third-year standing in D.P.T. program.

**PHT 595 Physical Therapy Internship III PRA** (4 or 5 crs.) Assignment to various clinical settings that provide supervised experiences with practicing physical therapists and support personnel. Selection of clinical specialty area of student's interest is considered in determination of the setting. (Practicum) Pre: permission of instructor. S/U credit.

**PHT 600 Foundations of Evidence-Based Practice** (3 crs.) Presentation and application of principles of evidence-based practice as related to current physical therapy practice, theory development, and scientific literature. Preparation of proposal through literature review. (Lec. 3) Pre: first-year standing or permission of chairperson.

**PHT 605 Special Topics and Professional Preparation in Physical Therapy** (2 crs.) Integration of the art and science of physical therapy with the delivery of services. Comprehensive review of systems, including evaluation and interventions as they relate to physical therapy. (Lec. 2) Pre: third-year standing or permission of chairperson.

**PHT 610 Evidence-Based Inquiry I PRA** (1 crs.) Introduces the student to the concept of evidence based inquiry and its importance in the physical therapy profession. Initial stages of an evidence-based inquiry project formulated with the guidance of a faculty advisor. (Practicum 1) Pre: PHT 600 or permission of chairperson. S/U credit.

**PHT 620 Evidence-Based Inquiry II PRA** (3 crs.) Guides the student through the refinement and focusing of a previously identified multiphase inquiry project in which evidence is the critical feature. Identification of target audience, delineation of scope of evidence to be gathered occurs along with initial evidence collection. (Practicum) Pre: PHT 610 and second-year standing or permission of chairperson. S/U credit.

**PHT 630 Evidence-Based Inquiry III PRA** (3 crs.) Final data gathering, analysis/synthesis, and documentation aspects of a multiphase inquiry project in which evidence is the critical feature. Statistical analysis and literature synthesis are potential techniques to be utilized. (Practicum) Pre: PHT 620 or permission of chairperson. S/U credit.

**PHT 640 Evidence-Based Inquiry IV PRA** (1 cr.) Formal dissemination of a multi-phase inquiry project in which evidence is the critical feature. The form this dissemination takes will be individual to the specific project, but may include a research poster, scholarly publication, newsletters or other professional scholarly sources. (Practicum) Pre: PHT 630 or permission of chairperson. S/U credit.

**PHT 655 Diagnostic Imaging** (2 crs.) Referral and interpretation of diagnostic images relevant in musculoskeletal assessment and management. Radiologic anatomy, normal variants, and pathological and traumatic conditions reviewed. CT scan, magnetic

resonance imaging, ultrasonography, angiography addressed. (Lec. 2) Pre: PHT 500 and first-year standing in D.P.T. or permission of chairperson.

**PHT 672 Pharmacology for Physical Therapists** (2 crs.) Pharmacological actions, interventions, and interactions that physical therapists encounter in their treatment of patients undergoing physical rehabilitation. Drug administration appropriate to physical therapy practice. (Lec. 2) Pre: second year-standing in D.P.T. or permission of chairperson.

## PHY | Physics

**PHY 109 Introduction to Physics** (3 crs.) Appreciation of the physical environment and an introduction to the principles and theories of contemporary physics. Recommended for elementary education majors. (Lec. 3) Pre: concurrent enrollment in PHY 110. Not open to students with credit in PHY 111 or PHY 112 or PHY 203 or PHY 204 or PHY 205. (N)

**PHY 110 Laboratory for Introduction to Physics** (1 cr.) Demonstrations and laboratory exercises related to PHY 109. (Lab. 2) Pre: concurrent enrollment in PHY 109.

**PHY 111 General Physics I** (3 crs.) Mechanics, heat, and sound. (Lec. 3) Pre: concurrent enrollment in PHY 185. (N)

**PHY 112 General Physics II** (3 crs.) Optics, electricity, magnetism, and modern physics. Non-calculus presentation of fundamental physics. (Lec. 3) Pre: concurrent enrollment in PHY 186. (N)

**PHY 185 Laboratory for General Physics I** (1 cr.) Selected laboratory exercises applicable to materials in PHY 111. (Lab. 2) Pre: concurrent enrollment in PHY 111. (N)

**PHY 186 Laboratory for General Physics II** (1 cr.) Selected laboratory exercises applicable to materials in PHY 112. (Lab. 2) Pre: concurrent enrollment PHY 112. (N)

**PHY 203 Elementary Physics I** (3 crs.) Introduction to Newtonian mechanics. Kinematics and dynamics of particles and systems of particles. Motion of rigid bodies and oscillatory motion. Conservation principles. (Lec. 3) Pre: credit or concurrent enrollment in MTH 141 and concurrent enrollment in PHY 273. Intended for science or engineering majors. (N)

**PHY 203H Honors Section of PHY 203: Elementary Physics I** (3 crs.) Honors Section of PHY 203: Elementary Physics I. (Lec. 3) Pre: must have a 3.30 overall GPA. Credit or concurrent enrollment in MTH 141 and concurrent enrollment in PHY 273. Intended for science or engineering majors. Not open to students with credit in PHY 213. (N)

**PHY 204 Elementary Physics II** (3 crs.) Introduction to electricity and magnetism, leading to Maxwell's equations. Electric fields and Gauss' law; magnetic fields and Ampere's

law. Capacitance and inductance, DC and AC circuits. Electromagnetic waves. (Lec. 3) Pre: PHY 203, credit or concurrent enrollment in MTH 142, and concurrent enrollment in PHY 274. Intended for science or engineering majors. (N)

**PHY 204H Honors Section of PHY 204: Elementary Physics II** (3 crs.) Honors Section of PHY 204: Elementary Physics II. (Lec. 3) Pre: must have a 3.30 overall GPA. PHY 203; credit or concurrent enrollment in MTH 142, and concurrent enrollment in PHY 274. Intended for science or engineering majors. Not open to students with credit in PHY 214. (N)

**PHY 205 Elementary Physics III** (3 crs.) Introduction to topics of thermodynamics, kinetic theory, wave motion, acoustics, and optics. (Lec. 3) Pre: PHY 203, credit or concurrent enrollment in MTH 243 or MTH 362, and concurrent enrollment in PHY 275. Intended for science or engineering majors. (N)

**PHY 205H Honors Section of PHY 205: Elementary Physics III** (3 crs.) Honors Section of PHY 205: Elementary Physics III. (Lec. 3) Pre: must have a 3.30 overall GPA. PHY 203; concurrent enrollment in MTH 243 or 362; concurrent enrollment in PHY 275. Intended for science or engineering majors. Not open to students with credit in PHY 213, 214. (N)

**PHY 210 Radiation Safety** (1 cr.) Radiation safety instruction sufficient to qualify students as radiation workers under state and federal regulations. (Lec. 1)

**PHY 273 Elementary Physics Laboratory I** (1 cr.) Laboratory exercises and recitation sessions related to topics in PHY 203. (Lab. 3, Rec.) Pre: concurrent enrollment in PHY 203. [Students must register for both a Lab & Recitation of PHY 273.] (N)

**PHY 273H Honors Section of PHY 273: Elementary Physics Laboratory I** (1 cr.) Honors Section of PHY 273: Elementary Physics Laboratory I (Lab. 3) Pre: Must have a 3.30 overall GPA. Concurrent enrollment in PHY 203. [Students must register for both a Lab & Recitation of PHY 273H.] (N)

**PHY 274 Elementary Physics Laboratory II** (1 cr.) Laboratory exercises and recitation sessions related to topics in PHY 204. (Lab. 3, Rec.) Pre: concurrent enrollment in PHY 204. [Students must register for Lab. & Recitation.] (N)

**PHY 274H Honors Section of PHY 274: Elementary Physics Laboratory II** (1 cr.) Honors Section of PHY 274: Elementary Physics Laboratory II (Lab. 3) Pre: must have a 3.30 overall GPA. Concurrent enrollment with PHY 204. (N)

**PHY 275 Elementary Physics Laboratory III** (1 cr.) Laboratory exercises and recitation sessions related to topics in PHY 205. (Lab. 3, Rec.) Pre: Concurrent enrollment in PHY 205. [Students must register for Lab & Recitation section.] (N)

**PHY 275H Honors Section of PHY 275: Elementary Physics Laboratory III** (1 cr.)

Honors Section of PHY 275: Elementary Physics Laboratory III. (Lab. 3) Pre: must have a 3.30 overall GPA. Concurrent enrollment in PHY 205. (N)

**PHY 306 Elementary Modern Physics** (3 crs.) Introduction to relativistic and quantum physics: special relativity theory, structure of atoms, molecules, nuclei, and solids including semiconductor devices; wave and particle properties (Lec. 3) Pre: PHY 204 and 205. Not open to students with credit in PHY 341.

**PHY 322 Mechanics** (3 crs.) Introduction to Newtonian statics and dynamics using vector analysis; particle motion, Lagrange's equations; rigid body motion. Application to various topics in physical mechanics. (Lec. 3) Pre: PHY 204 and MTH 244.

**PHY 331 Electricity and Magnetism** (3 crs.) Electrostatic fields and dielectric materials; magnetic fields, magnetic induction and magnetic materials; introduction to Maxwell's equations. (Lec. 3) Pre: PHY 204 and MTH 243.

**PHY 334 Optics** (3 crs.) Cross-listed as (PHY), AST 334. Geometrical and physical optics; thick lens optics, interference, diffraction, polarization. (Lec. 3) Pre: PHY 112 or 205. (N)

**PHY 381 Advanced Laboratory Physics** (3 crs.) Key experiments covering a wide range of disciplines including nuclear physics, properties of the electron, magnetism thermodynamics, and optics. Quantitative analysis is stressed, including statistics and curve fitting. Technical skills are developed. (Lab. 6) Pre: PHY 204 and 205.

**PHY 382 Advanced Laboratory Physics** (3 crs.) Key experiments covering a wide range of disciplines including nuclear physics, properties of the electron, magnetism thermodynamics, and optics. Quantitative analysis is stressed, including statistics and curve fitting. Technical skills are developed. (Lab. 6) Pre: PHY 205 or HPR 322.

**PHY 401 Seminar In Physics** (1 cr.) Preparation and presentation of papers on selected topics in physics. (Seminar)

**PHY 402 Seminar In Physics** (1 cr.) Preparation and presentation of papers on selected topics in physics. (Seminar)

**PHY 410 Computational Physics** (3 crs.) Development and application of computer techniques to classical and quantum physics problems. Emphasis will be on approximation techniques and numerical methods for solving matrix, integral, and differential equations arising in physics. (Lec. 2, Lab. 3) Pre: MTH 215 and CSC 200 or CSC 201 or CSC 211. Credit or concurrent enrollment in MTH 244 and PHY 306.

**PHY 420 Introduction to Thermodynamics and Statistical Mechanics** (3 crs.) Emphasis on laws of thermodynamics and properties of thermodynamic systems, kinetic theory of gases, molecular velocity distributions, transport phenomena, Max-

well-Boltzmann statistics. (Lec. 3) Pre: PHY 205 and MTH 243.

**PHY 430 Modern Biological Physics** (3 crs.) Quantitative representation of the structure and organization of biological molecules (DNA, RNA, proteins, membranes), the forces that stabilize biomolecules, cooperative transitions, protein folding, membrane physics, energy transduction in biological systems, molecular motors, and ratchet models. (Lec. 3) Pre: MTH 244. Not for graduate credit.

**PHY 451 Introduction to Quantum Mechanics** (3 crs.) Particle-wave duality, uncertainty principle; Schrodinger equation: eigenvalues, wave functions, time dependence; Dirac notation; Heisenberg representation: operators, matrices, eigenvectors; angular momentum: spin and polarization, Pauli matrices, hydrogen atom, application to quantum computation; symmetries: conservation laws, fermions and bosons. (Lec. 3) Pre: PHY 306 and 322, and MTH 215, and 244.

**PHY 452 Quantum Mechanics: Techniques and Applications** (3 crs.) Approximation techniques including time-dependent and time-independent perturbation theory, WKB, variational method, Born, Hartree, and computational techniques. Applications to atomic and molecular structure, model potentials, radiative transitions, and scattering. (Lec. 3) Pre: PHY 451 and MTH 461.

**PHY 455 Introduction to Solid-State Physics** (3 crs.) Crystal structure, thermal, electrical, and magnetic properties of solids. Electron gas theory of metals, band theory of solids. Semiconductors. (Lec. 3) Pre: PHY 451 and MTH 243.

**PHY 483 Laboratory And Research Problems In Physics** (3 crs.) Cross-listed as (PHY), AST, OCG 483. Research in current areas of physics. Students perform research projects with individual faculty members. Students in physics and physical oceanography may coordinate their research project with a faculty member of the Graduate School of Oceanography. (Lec. 1, Lab. 6) Pre: PHY 381 and 382.

**PHY 484 Laboratory And Research Problems In Physics** (3 crs.) Cross-listed as (PHY), AST, OCG 484. Research in current areas of physics. Students perform research projects with individual faculty members. Students in physics and physical oceanography may coordinate their research project with a faculty member of the Graduate School of Oceanography. (Lec. 1, Lab. 6) Pre: PHY 381 and 382.

**PHY 491 Special Problems** (1-6 crs.) Cross-listed as (PHY), AST 491. Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study)

**PHY 492 Special Problems** (1-6 crs.) Cross-listed as (PHY), AST 492. Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study)

**PHY 510 Mathematical Methods of Physics I** (3 crs.) Topics designed to include applications in physics. Vector and tensor analysis; linear algebra; coordinate systems. Determinants, matrices; introductory group theory. Infinite series, complex analysis, analytic properties, conformal mapping, calculus of residues. Fourier analysis and Laplace transforms. (Lec. 3) Pre: permission of chairperson.

**PHY 520 Classical Dynamics** (3 crs.) Newton's laws. Conservation theorems and symmetry properties. Lagrangian mechanics. Central force motion. Dynamics of rigid bodies. Hamiltonian mechanics. Canonical transformations. Action-angle coordinates. Hamilton-Jacobi theory. Deterministic chaos. Relativistic mechanics. (Lec. 3) Pre: credit or concurrent enrollment in PHY 510.

**PHY 525 Statistical Physics I** (3 crs.) Equilibrium thermodynamics. Thermodynamics of phase transitions. Elements of kinetic theory. Statistical ensembles and partition functions. Classical and quantum equilibrium statistical mechanics. (Lec. 3) Pre: PHY 420 or equivalent, PHY 510.

**PHY 530 Electromagnetism I** (3 crs.) Electrostatics, including boundary value problem. Multipoles, electrostatics of macroscopic media, dielectrics. Magnetostatics. Time-varying fields, Maxwell equations, conservation laws. Plane electromagnetic waves, wave propagation. Wave guides, resonant cavities. Magnetic materials. (Lec. 3) Pre: credit or concurrent enrollment in PHY 510 and 520.

**PHY 540 Modern Biological Physics** (3 crs.) Quantitative representation of biological molecules (DNA, RNA, proteins, membrane) structure and organization, forces stabilized biomolecules, cooperative transitions, protein folding, membrane physics, energy transduction in biological systems, molecular motors, ratchet models. Pre: MTH 244.

**PHY 545 Nanotechnology in Imaging and Therapy** (3 crs.) Nanomaterials: physical properties, application in drug delivery and diagnostics, nanodevices, nano-oncology. (Lec. 3) Pre: MTH 244.

**PHY 550 Introduction to Radiation Physics and Dosimetry** (3 crs.) Basic principles of radiation physics: radioactivity, the physics of ionizing radiation, radiation dosimetry, imaging equipment, radiation therapy equipment and radiation detectors. Pre: PHY 210 or permission of instructor.

**PHY 552 Radiobiology** (3 crs.) Basic principles of radiation biology: factors that modify radiation response; linear energy transfer; relative biological effectiveness; tissue radiosensitivity; time-dose and fractionation; radiobiological modeling. Pre: PHY 210 or permission of instructor.

**PHY 555 Radiation Oncology** (3 crs.) Practical aspects of radiation oncology medical physics: operation of radiotherapy equipment and dose measuring devices;

radiation beam measurement techniques; commissioning and quality assurance for clinical radiation equipment. (Lec. 3) Pre: PHY 550 and PHY 552.

**PHY 560 Experimental Methods In Condensed Matter Science** (3 crs.) Fundamental experiments on topics related to departmental research. Experimental methodology. (Lec. 2, Lab. 3) Pre: PHY 484 or equivalent.

**PHY 565 Photomedicine** (3 crs.) Interaction of light with matter, use of light in the diagnosis and treatment of diseases, physical principles of optical imaging with biomedical applications, photodynamic therapy. Pre: PHY 322 and PHY 331 or permission of instructor.

**PHY 570 Quantum Mechanics I** (3 crs.) Dirac notation. Matrix representations, observables, uncertainty relations. Time evolution; Schroedinger and Heisenberg pictures. Schroedinger equation applications. Propagators and Feynman path integrals. Aharonov-Bohm effect. Angular momentum; Wigner-Eckart theorem. (Lec. 3) Pre: credit or concurrent enrollment in PHY 510 and 520.

**PHY 578 Seminar In Sensors And Surface Technology** (1 cr.) Students, faculty, and invited outside speakers present and discuss selected topics related to research interests of the Sensors and Surface Technology Partnership. (Seminar) Pre: permission of instructor. May be repeated. S/U credit.

**PHY 580 Condensed Matter Physics I** (3 crs.) Drude and Sommerfeld theories. Crystal lattices and symmetries. Bragg scattering. Properties and calculation of electron spectra. Fermi surfaces of metals. Electrons in magnetic field. De Haas - van Alphen effect and Phonons. Electron-phonon interaction. Defects in solids. (Lec. 3) Pre: PHY 525, 570 or permission of chair.

**PHY 590 Faculty Project** (1-6 crs.) A special project directly related to the research program of an individual faculty member. (Independent Study). Pre: permission of chairperson. Not to exceed 6 credits.

**PHY 591 Special Problems** (1-6 crs.) Advanced study under the supervision of a faculty member arranged to suit the individual needs of the student. (Independent Study) Pre: permission of chairperson. Not to exceed 6 credits.

**PHY 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**PHY 610 Mathematical Methods of Physics II** (3 crs.) Topics designed to include applications in physics. Ordinary and partial differential equations; Sturm-Liouville theory. Numerical methods and computational techniques. Probability and statistics. Integral transforms. Integral equations; Green's functions. Special functions of mathematical physics. (Lec. 3) Pre: PHY 510.

**PHY 625 Statistical Physics II** (3 crs.) Equilibrium critical phenomena (critical exponents, scaling relations, multicritical phenomena). Exact solutions. Renormalization group theory and other approximate methods. Critical behavior of magnets, fluids, and surfaces. (Lec. 3) Pre: PHY 525 and 670.

**PHY 626 Statistical Physics III** (3 crs.) Stochastic processes. Markov condition. Master equation. Fokker-Planck equation. Brownian motion. Langevin equation. Transport phenomena. Onsager theory of irreversible processes near equilibrium. Boltzmann equation. Linear response theory, fluctuation dissipation theorem. (Lec. 3) Pre: PHY 525.

**PHY 630 Electromagnetism II** (3 crs.) Radiating systems, scattering, and diffraction. Special theory of relativity. Dynamics of relativistic particles and electromagnetic fields. Collisions between charged particles, energy loss and scattering. Radiation by moving charges. Multipole fields. (Lec. 3) Pre: PHY 530.

**PHY 670 Quantum Mechanics II** (3 crs.) Symmetry (parity, translation, time-reversal). Time-independent (dependent) perturbation theory, variational methods. Identical particles. Scattering theory (Lippman-Schwinger equation, Born series, partial waves, resonances, optical theorem, inelastic scattering). Applications. Relativistic quantum mechanics. (Lec. 3) Pre: PHY 570 or permission of chairperson.

**PHY 680 Condensed Matter Physics II** (3 crs.) Interacting systems. Green's functions. Diagrammatic methods. Applications to superconductivity. Fluctuations. Functional integration Generalized susceptibility and dielectric response. Fluctuation-dissipation theorem. Structure function. (Lec. 3) Pre: PHY 530 and 580 or permission of instructor.

**PHY 690 Topics In Physics** (3 crs.) Advanced topics in areas of research specializations: a) neutron physics; b) quantum fluids; c) magnetism; d) surface physics; e) nonlinear phenomena; f) advanced quantum physics; g) nuclear physics; h) low-temperature physics. (Lec. 3) Pre: permission of chairperson.

**PHY 691 Advanced Special Topics** (1-6 crs.) Special topics related to current developments by visiting or permanent faculty. (Lec. 1-6) Pre: permission of instructor.

**PHY 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**PHY 930 Workshop In Physics Topics For Teachers WRK** (0-3 crs.) Especially designed for teachers of physical sciences. Basic topics in physics from an advanced or pedagogical perspective. (Workshop) Pre: teacher certification.

## PLA | Prior Learning Assessment

**PLA 100 Prior Learning Assessment Portfolio Development** (1 cr.) Identification through self-assessment of student prior learning and appropriate methods for seeking credit. Analysis and application of the process for developing a prior learning portfolio. (Seminar) Pre: matriculated status and permission of the student's academic dean. Offered through the Alan Shawn Feinstein College of Continuing Education. S/U only.

## PLS | Plant Sciences

**PLS 143 Sustainable Solutions for Global Health Problems** (3 crs.) Cross-listed as (PHP), NUR, PLS 143. Teams of students will study a global health problem and research, write, and present a sustainable solution that integrates human innovation with existing technology. (Lec. 3) (N) (S) [D]

**PLS 150 Plants, People and the Planet** (3 crs.) Fundamentals of plant biology, emphasizing the structure, physiology, and ecology of vascular plants common to gardens and landscaped environments. (Lec. 3) (N)

**PLS 190 Issues in Biotechnology** (3 crs.) Cross-listed as (AFS), BCH, MIC, NRS, PLS 190. Introduction to modern biotechnology in medical, pharmaceutical, forensic, agricultural, marine, and environmental applications. Consideration of ethical, environmental, health, and social issues. (Lec. 3/Online) (N)

**PLS 200 Introduction to Plant Protection** (4 crs.) Basic study of weeds, insects, and disease agents, and the problems they cause. Recognition of important plant pests and application of integrated cultural, chemical, and biological pest management procedures. (Lec. 4) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 210 Plant Protection Practicum PRA** (2 crs.) Introduction to practical aspects of plant protection, concentrating on field diagnostic techniques and development of analytical and observation skills. Diagnostics are primarily an interactive field activity, supplemented by microscopy, report writing, and oral presentations. (Practicum) Pre: credit or concurrent enrollment in 200 or permission of instructor.

**PLS 215 Propagation Of Plant Materials** (4 crs.) Theory and practice of the propagation of ornamental plants by seed, cuttings, grafting and tissue culture. (Lec. 2 Lab 4) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 233 Floral Art** (3 crs.) Theory and practice in the art of flower and plant arrangement for the home, show, and special occasions. History, elements, and principles of design and color. (Lec. 1, Lab. 4) (A) (N)

**PLS 250 Plant Breeding and Genetics** (4 crs.) Introduction to the general principles

of plant breeding, with emphasis on the application of genetic principles in plant improvement strategies. (Lec. 3, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 255 Horticultural Plant Science** (3 crs.) Fundamental concepts underlying life functions in plants and their horticultural implications and relevancy. Emphasis on plant physiology, plant nutrition and plant reproduction and how they relate to horticultural plant production. Pre: BIO 102 or PLS 150 and CHM 103 or 124 or permission of instructor.

**PLS 301 Nursery Crop Production and Management** (4 crs.) Foundation of nursery management and woody plant production practices. History and organization of the nursery industry, land selection and management, plant culture, growing structures and equipment, and recent innovations. (Lec. 3, Lab. 3) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 306 Landscape Management and Arboriculture** (4 crs.) Culture of new and established trees, shrubs, and vines in the landscape. Practical exposure to planting, pruning, fertilization, and plant protection. Prepares the student for Arborist's Certification Examination. (Lec. 3, Lab. 3) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 311 Fruit Culture** (3 crs.) Principles of fruit production with emphasis on home gardens. Topics include propagation, planting, soils, fertilization, cultural practices, pruning and storage of tree and small fruits and dwarfs or semi-dwarf stocks. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 320 Landscape Design** (3 crs.) Examination of landscape design principles and practices including introduction to landscape graphics, preliminary design, and planting design. (Lec. 3) Not open to landscape architecture majors.

**PLS 322 Power Units** (3 crs.) Principles of operation, maintenance, and adjustment of power units including gasoline and diesel engines and electric motors. Emphasis on tractors and other power units important in farm, nursery, greenhouse, and grounds maintenance operations. (Lec. 2, Lab. 2)

**PLS 324 Vegetable Crops** (4 crs.) A study of vegetable crops including the botany and systematics of the vegetables commonly grown in the United States. Includes organic and conventional production techniques for home gardeners and market farmers. (Lec. 3, Lab. 2) Pre: PLS 150 or BIO 102 or permission of instructor.

**PLS 325 Vegetable Crops Production Techniques** (2 crs.) Hands-on instruction in vegetable production with emphasis on season extension techniques such as high and low tunnels, hydroponic greenhouse production, and production of transplants. (Lab. 2) Pre: PLS 324 or permission of instructor.

**PLS 331 Floriculture and Greenhouse Management** (4 crs.) The greenhouse environment and its relation to the culture of specific plants. Principles governing the production and culture of plants under controlled temperature, humidity, light, and modified atmospheres. Greenhouse construction and environmental control. (Lec. 3, Lab. 3) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 332 Plant Pathology: Introduction to Plant Diseases** (4 crs.) Cross-listed as (BIO), PLS 332. Nature, cause, and control of plant diseases. Use of basic techniques for identification of major types of plant diseases and their causal agents. (Lec. 4) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 341 Introduction To Turf Management** (3 crs.) Fundamental aspects of turfgrass science including identification, propagation, fertilization, pest control, and other soil-plant relationships. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 350 Herbaceous Garden Plants** (3 crs.) Identification and use of annual and perennial herbaceous ornamental plants in the landscape. Emphasis on sustainable landscaping and the use of native plants. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 353 Landscape Plants I** (3 crs.) Cross-listed as (LAR), PLS 353. Identification and description under fall conditions; classification and adaptation of the important trees and shrubs including broadleaf evergreens and their value in ornamental plantings. (Lec. 1, Lab. 4) Pre: BIO 102 or PLS 150.

**PLS 354 Landscape Plants II** (3 crs.) Cross-listed as (LAR), PLS 354. Identification and description under winter and spring conditions; classification and adaptation of the coniferous evergreens, vines, and groundcovers and their value in ornamental plantings. (Lec. 2, Lab. 2) Pre: LAR 353 or PLS 353.

**PLS 361 Weed Science** (3 crs.) Ecological and cultural aspects of weed problems, physiology of herbicide action, selected problem areas in weed control and plant identification. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

**PLS 390 Irrigation Technology** (3 crs.) A study of the science and technology of obtaining, applying, and managing water as it relates to the culture of field, forage, vegetable, turf, and ornamental crops. (Lec. 2, Lab. 2) Service learning. Pre: MTH 107 or MTH 108 or MTH 111 or permission of instructor.

**PLS 399 Plant Sciences Internship PRA** (1-6 crs.) Directed work experience programs at nurseries, turf farms, greenhouses, plant breeding farms, arboreta, research farms, or laboratories. (Practicum) Pre: BIO 102 or PLS 150 or permission of instructor. May be repeated for a maximum of 6 credits. S/U credit.

**PLS 401 Plant Sciences Seminar Presentations and discussions of current topics of concern to producers and consumers of plants and plant products, including plant protection.** (Seminar)

**PLS 402 Plant Sciences Seminar** (1 cr.) Presentations and discussions of current topics of concern to producers and consumers of plants and plant products, including plant protection. (Seminar)

**PLS 415 Plant Plagues: Causes and Consequences** (2 crs.) Events and decisions leading to major plant epidemics, historical and current. Emphasizes causative organisms and their characteristic biology, with subsequent consideration from diverse social-political-economic viewpoints. Extensive student preparation/participation required. (Lec. 2) Pre: PLS 200 or BIO 102 or permission of instructor.

**PLS 440 Diseases of Turf and Ornamentals** (3 crs.) Diagnosis, epidemiology, and control measures of common turf and ornamental plant diseases found in the Northeast United States. (Lec. 3) Pre: PLS 200 or 332. Not for graduate credit.

**PLS 442 Advanced Turf Management** (3 crs.) Establishment and maintenance practices for specialty turfgrass areas (golf courses, athletic fields, and parks) including design and construction specifications and budget management. (Lec. 3) Pre: PLS 341 and 440 or permission of instructor. Not for graduate credit.

**PLS 471 Plant Improvement** (4 crs.) Traditional breeding, techniques and methods used for germplasm development and enhancement. Plant cell and tissue culture methodologies as they relate to the improvement of plant varieties through biotechnology. (Lec. 3, Lab. 2) Pre: PLS 215 and PLS 250 or permission of instructor. Not for graduate credit.

**PLS 491 Special Projects and Independent Study** (1-3 crs.) Special work to meet individual needs of students in various fields of plant nutrition, propagation, growth and development, garden design, site planning, plant pathology, entomology, and related subjects. (Independent Study) Pre: permission of instructor.

**PLS 492 Special Projects and Independent Study** (1-3 crs.) Special work to meet individual needs of students in various fields of plant nutrition, propagation, growth and development, garden design, site planning, plant pathology, entomology, and related subjects. (Independent Study) Pre: permission of instructor.

**PLS 501 Graduate Seminar In Plant Sciences** Presentation of technical reports and discussion of current research papers in crop science, landscape ecology, growth and development of economic plants, and production, protection, and management of economic crops. (Seminar)

**PLS 502 Graduate Seminar In Plant Sciences** Presentation of technical reports and discussion of current research papers in crop science, landscape ecology, growth and development of economic plants, and production, protection, and management of economic crops. (Seminar)

**PLS 508 Seminar in Biological Literature** (1 cr.) Cross-listed as (BIO), MIC, AFS, AVS, PLS, NRS, LIB, BCH 508. Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Sem. 1) Pre: graduate standing or permission of the instructor.

**PLS 540 Diseases of Turf and Ornamentals** Disease diagnosis, epidemiology and control measures of common turf and ornamental diseases found in the Northeast United States. (Lec. 3) Pre: PLS 200 or PLS 332.

**PLS 542 Advanced Turf Management** (3 crs.) Establishment and maintenance practices for specialty turfgrass areas (golf course, athletic fields and parks) including design and construction specifications and budget management. (Lec. 3) Pre: PLS 341, PLS 440.

**PLS 571 Plant Improvement** (4 crs.) Traditional breeding, techniques and methods used for germplasm development and enhancement. Plant cell and tissue culture methodologies as they relate to the improvement of plant varieties through biotechnology. (Lec. 3, Lab. 1) Pre: PLS 250 and PLS 215 or permission of instructor. Offered in alternate years.

**PLS 591 Nonthesis Research in Plant Sciences** (1-3 crs.) Advanced work under the supervision of researchers to expand research experience into areas other than those related to thesis research. Arranged to suit individual requirements. (Independent Study) Pre: permission of instructor.

**PLS 592 Nonthesis Research in Plant Sciences** (1-3 crs.) Advanced work under the supervision of researchers to expand research experience into areas other than those related to thesis research. Arranged to suit individual requirements. (Independent Study) Pre: permission of instructor.

## POR | Portuguese

**POR 101 Beginning Portuguese I** (3 crs.) Fundamentals of modern European Portuguese. Emphasis on standard pronunciation, development of familiarity with most common grammar structures, and acquisition of working vocabulary. (Lec. 3) Pre: no prior Portuguese is required. Will not count toward the language requirement if the student has studied Portuguese for more than one year within the last six years. (FC) [D]

**POR 102 Beginning Portuguese II** (3 crs.) Continuation of POR 101. Students enrolling in this course should have taken POR 101 or equivalent. (Lec. 3) (FC) [D]



**POR 103 Intermediate Portuguese I** (3 crs.) Intensive and extensive reading of moderately difficult Portuguese prose, review of grammar structures, idiomatic expressions, conversation practice based on readings. Students enrolling in this course should have taken POR 102 or equivalent. (Lec. 3) (FC) [D]

**POR 104 Intermediate Portuguese II** (3 crs.) Continuation of POR 103. Readings of more difficult texts. Class discussion and reports on supplementary readings. Students enrolling in this course should have taken POR 103 or equivalent. (Lec. 3) (FC) [D]

**POR 205 Portuguese Language and Style I** (3 crs.) Continuation of POR 104. Comprehensive upper-intermediate level course focusing on POR language and communication skills. (Lec. 3) Pre: POR104, or permission of instructor. (FC) [D]

**POR 206 Portuguese Language and Style II** (3 crs.) Continuation of POR 205. Comprehensive upper-intermediate level course focusing on POR language and communication skills. (Lec. 3) Pre: POR 205 or equivalent, or permission of instructor. (FC) [D]

**POR 335 Topics in the Literature of the Portuguese-Speaking World** (3 crs.) Selected topics in the literatures of continental Portugal and the adjacent islands, Brazil, Cape Verde, Angola, Mozambique. (Lec. 3) Pre: POR 206 or equivalent or permission of instructor. POR 205 or 206 may be taken concurrently with permission of instructor. May be repeated for credit as often as topic changes.

**POR 497 Directed Study** (3 crs.) For the advanced student. Individual study and reports on problems of special interest. (Independent Study) Pre: one 300-level course in Portuguese, acceptance of project by faculty member, and approval of chair. Not for graduate credit.

## PRS | Public Relations

**PRS 100 Introduction to Public Relations** (3 crs.) Examine and explore public relations principles, concepts and emerging trends associated with the role of the PR practitioner. Explore career paths, such as investor relations, community relations, public affairs, and event management. (Lec. 3) For freshmen and sophomores only.

**PRS 200 Introduction to Event Management** (3 crs.) Explore principles, concepts and emerging trends pertinent to event management, a significant aspect of public relations. Gain an understanding of the synergy that develops between public relations and marketing. (Lec. 3) Pre: sophomore standing or above and public relations major/minor or planning to major/minor in public relations.

**PRS 300 Social Media Strategies for the PR Prof** (4 crs.) Students will explore principles, concepts and emerging trends relative to the pervasiveness of social media. Will focus on effectively branding and messaging to

niche markets. (Lec. 3, Practicum) Pre: junior/senior (Comm. Studies and PR students)

**PRS 320 Strategic Media Relations** (3 crs.) Explore media relations strategies/tactics (crafting releases, pitching to the media, use of social/traditional media, e.g. twitter) to inform/persuade publics about issues. (Lec. 3) Pre: Students admitted to PR Major.

**PRS 340 Public Relations** (3 crs.) Cross-listed as (PRS), JOR 340. Principles and procedures in public relations: emphasis on role of the public relations practitioner as a specialist in communication; analysis of publications produced as a part of public relations. (Lec. 3) Pre: junior standing and JOR 220 with a grade of C or better.

**PRS 441 Public Relations Practices PRA** (3 crs.) Cross-listed as (PRS), JOR 441. Practical application of traditional PR methods in solving problems in a variety of markets. Explores fundamental agency operations, client-agency relationships. Combines practical experience with individual projects, programs, and campaigns. (Practicum) Pre: PRS 340. Not for graduate credit.

**PRS 442 Strategic Media Communication** (3 crs.) Cross-listed as (PRS), WRT, COM 442, JOR 443. Introduces strategic media relation tactics when responding to the media, specifically crisis communication situations. Students gain practical experience in various writing and speaking opportunities to effectively work with the media. (Lec. 3) Pre: PRS 340. Open only to majors in Communication Studies, Public Relations, Journalism, and Writing. Not for graduate credit.

**PRS 491 Public Relations Internship PRA** (3 or 6 crs.) Supervised experience in public relations. Requires a minimum of 120 hours (3 credits) or 240 hours (6 credits). Weekly class meeting. May be repeated; maximum of 6 credits allowed toward graduation. Pre: public relations majors only; PRS 340, 441, COM 381 and JOR 341. Permission of instructor and application required. Not for graduate credit.

## PSC | Political Science

**PSC 113 Introduction to American Politics** (4 crs.) Basic principles of the government of the United States: constitutionalism, separation of powers, federalism, civil liberties; politics; legislative, executive, and judicial organization; functions of government. (Lec. 3, Rec. 1) (S) [D]

**PSC 116 Introduction to International Politics** (4 crs.) Nature of the state system, foundations of national power, means of exercising power. Cooperative interactions between states. Current international problems. (Lec. 3, Rec. 1) (S) [D]

**PSC 201 Introduction to Comparative Politics** (4 crs.) An examination of different governmental systems and political institutions. Illustrations and comparisons from the Americas, Europe, and the developing nations. (Lec. 4) Pre: PSC 116 or 211. (S) [D]

**PSC 210 American Politics: Theories and Applications** (4 crs.) The core course for political science majors pursuing the American Politics Track. Students identify, apply and criticize the major theories used to interpret American Politics. (Lec. 4)

**PSC 211 World Politics: Theories and Applications** (4 crs.) The core course for political science majors pursuing the World Politics Track. Students identify, apply, and criticize the major theories used in World Politics. (Lec. 4)

**PSC 240 Major Political Ideologies** Introduction to and analysis of fascism, communism, socialism, and capitalism. An examination of the contemporary meaning of liberalism, radicalism, and conservatism. (Lec. 3)

**PSC 274 Criminal Justice System** (3 crs.) Cross-listed as (SOC), PSC 274. The American system of criminal justice, general processing of cases, principal actors, study of theories of criminal law, and pretrial detention and sentencing. (Lec. 3/Online)

**PSC 300 Challenge of Nuclear Arms** (4 crs.) Nuclear weapons addressed from a range of perspectives. Emphasis on the strategic, political, social, and moral issues and controversies raised by the potential for nuclear war. (Lec. 4/Online) Pre: 3 credits in the social sciences recommended or permission of instructor.

**PSC 303 The Politics of the Vietnam War** (4 crs.) The politics of the Vietnam War addressed from a range of perspectives. Emphasis on the political, social, strategic, legal, and moral issues raised by the Vietnam War and its aftermath. (Lec. 3, Practicum 2) Pre: PSC 113 or 210 or PSC 116 or 211 or permission of instructor.

**PSC 305 Politics In Rhode Island** (4 crs.) An exploration of the political process in Rhode Island in an age of New Federalism. Examination of the political development of the state and the character of contemporary politics and policymaking. (Lec. 3, Practicum 2) Pre: PSC 113 or 210.

**PSC 306 Education Policy and Public Service Internship-MTI@URI PRA** (4 crs.) Cross-listed as (PSC), EDC 306. Internship in a Rhode Island public school accompanied by an introduction to the problems and politics of education policy viewed from an interdisciplinary approach. (Rec. 1, Prac. 1, Online 2)

**PSC 310** (212) Introduction to Political Science Research (4 crs.) The core scope and methodology course for all political science majors. Topics covered include: history of political science, evaluation of its current character, and the extent to which politics can be studied scientifically. (Lec. 3, Rec. 1)

**PSC 312 Topics in Political Science** (3-4 crs.) Critical study of selected topics. Subject will vary according to the expertise and availability of instructors. (Lec.3) Pre: PSC 113 or 116 or permission of instructor. May be repeated for a total of 9 credits.

**PSC 320 Comparative European Politics** (4 crs.) Introduces students to the major political, economic and social systems of Europe through a detailed examination of the United Kingdom, France, Germany, Italy, and Russia. (Lec. 3, Online 1)

**PSC 321 Politics and Problems of Israel** (4 crs.) Analysis of the evolution of political institutions and the dynamics of public policy in Israel. Emphasis on contemporary political problems. (Lec. 3/Practicum 1) Pre: PSC 116 or 210 or 211 or permission of instructor.

**PSC 330** (221) State and Local Government (4 crs.) Examination of the politics, institutions and policy processes of state and local governments. (Lec. 3, Pract. 2) Pre: PSC 113 or 210.

**PSC 333 Economics and the Law** (4 crs.) Cross-listed as (ECN), PSC 333. Explores the different approaches of the economic analysis of law, and the history of how economics came to influence on the field of law. (Lec. 4) Pre: ECN 201.

**PSC 341 Political Theory: Plato to Machiavelli** (4 crs.) Major political philosophies from Plato to Machiavelli and their influence on such key concepts as justice, equality, and political obligation. (Lec. 3, Practicum 2) (L)

**PSC 341H Honors Section of PSC 341: Political Theory: Plato to Machiavelli.** (4 crs.) Honors Section of PSC 341: Political Theory: Plato to Machiavelli. (Lec. 3, Practicum 2) Pre: must have a 3.30 overall GPA. (L)

**PSC 342 Political Theory: Modern and Contemporary** (4 crs.) Continuation of PSC 341. Rousseau to the present. (Lec. 3, Practicum 2) Pre: PSC 113 or 210 and PSC 116 or 211. (L)

**PSC 342H Honors Section of PSC 342: Political Theory: Modern and Contemporary** (3 crs.) Honors Section of PSC 342: Political Theory: Modern and Contemporary (Lec. 3) Pre: must have a 3.30 overall GPA and PSC 113 or 210, and PSC 116 or 211. (L)

**PSC 344 Political Economy of Global Finance** (3 crs.) Cross-listed as (ECN), PSC 344. History, theory, and politics of the global financial system. Topics include the foreign exchange market, international banking, macroeconomic problems of open economies, and global financial crises. (Lec. 3) Pre: ECN 100 or 202 or permission of instructor.

**PSC 350 From Cold War to Cold Peace** (4 crs.) Provides essential political and historical background to understanding the evolution of U.S. and Soviet/Russian relations over the past 60 years. (Lec. 3, Practicum 2) Pre: PSC 116 or 211.

**PSC 367 American Political Campaigns and Elections** (4 crs.) Examines the most recent political science research on American political campaigns and elections. Emphasis also on experiencing real world electoral politics. (Lec. 3, Practicum 2) Pre: PSC 113 or 210.

**PSC 368 Public Opinion** (4 crs.) Examination of public opinion and formative influences upon it. Role and implications of public opinion in governmental process. Focus on the practical analysis of public opinion data. (Lec. 3, Online 1) Pre: PSC 113 or 210.

**PSC 369 Legislative Process and Public Policy** (4 crs.) Analysis of American legislative bodies, particularly Congress, some attention to comparative legislatures. Structure, organization, functions of Congress analyzed in relation to its role in determining public policy. (Lec. 3, Online 1) Pre: PSC 113 or 210.

**PSC 370 Politics and Media** (4 crs.) Analysis of the relationship between the mass media in the United States and the political process. Emphasis on the impact of the media on both domestic and foreign policy processes. (Lec. 3, Practicum 2) Pre: PSC 113 or 210 or PSC 116 or 211, or permission of instructor.

**PSC 371 The Constitution and the Supreme Court** (4 crs.) The historical role of the Constitution and the Supreme Court in American democracy. Analysis of leading constitutional decisions regarding governmental powers and civil rights and liberties. (Lec. 3, Online 1)

**PSC 375 Field Experience In Practical Politics PRA** (1-3 crs.) Supervised experience in local, state, and national units of government, political organizations, private and public community agencies. Students must have placement description, faculty supervisor, and outline of academic component of experience prior to registration. (Practicum) Pre: 12 credits in the social sciences including 6 credits in political science and permission of instructor. May be repeated for a maximum of 6 credits. S/U credit.

**PSC 376 Field Experience In Practical Politics PRA** (1-3 crs.) Supervised experience in local, state, and national units of government, political organizations, private and public community agencies. Students must have placement description, faculty supervisor, and outline of academic component of experience prior to registration. (Practicum) Pre: 12 credits in the social sciences including 6 credits in political science and permission of instructor. May be repeated for a maximum of 6 credits. S/U credit.

**PSC 377 Politics of China** (4 crs.) Institutions of the Chinese system including the Communist Party, the state system, the bureaucracy, and the army. Emphasis on China's economic and social progress and relations with other nations. (Lec. 3, Practicum 2) Pre: PSC 116 or 211 or equivalent.

**PSC 380 Civil Rights Movement** (3 crs.) Cross-listed as (AAF), PSC 380. Major transformations in American life brought about by the civil rights movement in law, in social relations, in the role of government. Focus on the period between 1954 and 1968 in an effort to identify and evaluate the changes in government and civil society that occurred during this period. (Lec. 3)

**PSC 388** (288) The American Legal System (4 crs.) Political and social analysis of the American legal system, particularly at trial court and street levels, and roles of participants in that system with court observation. (Lec. 3, Ind. Study 1/Online) Pre: PSC 113 or PSC 210 or PSC 310 or PSC 274 or permission of instructor.

**PSC 402 Environmental Policy and Politics** (4 crs.) Seminar in the politics and public policy associated with environmental pollution. (Lec. 3, Project 3) Pre: PSC 113 or 210 and junior or senior standing. Not for graduate credit.

**PSC 403 Global Ecopolitics** (4 crs.) Seminar focuses on the international politics of global pollution, marine pollution, atmospheric pollution, tropical deforestation, and conservation. (Lec. 3, Project 3) Pre: PSC 212 or 310. Not for graduate credit.

**PSC 408 African Governments and Politics** (4 crs.) Cross-listed as (PSC), AAF 408. Political developments in the nations of Africa. Main stress is thematic: challenges to democracy, ethnicity, and identity politics, African political thought, civil conflict, resources, and common developmental problems. (Lec. 4, Practicum) Pre: PSC 113 or 210, and PSC 116 or 211.

**PSC 408H Honors Section of PSC/AAF 408 - African Governments and Politics** (4 crs.) Cross-listed as (PSC), AAF 408. Honors Section of PSC/AAF 408 - African Government and Politics. (Lec. 4, Practicum) Pre: PSC 113 or 210, and PSC 116 or 211, and 3.30 or better overall GPA.

**PSC 410 Issues in African Development** (3 crs.) Cross-listed as (AAF), PSC 410. A seminar focusing on the dynamics of African development, including political and social change, economic development, education, urbanization, rural development, environmental management, labor and business, industrialization, and technology transfer. (Seminar) Pre: APG 313 or PSC 201 or HIS 388 or permission of instructor.

**PSC 415 Dynamics of Social Change in the Caribbean** (3 crs.) Cross-listed as (AAF), PSC 415. Exploration of the slave trade and the origins of Africans and people of African descent in the Caribbean. Emphasis on political and economic relations with the U.S. and the impact of modernization. (Lec. 3) Not for graduate credit.

**PSC 416 Russian Politics and Society** (4 crs.) An upper-level introduction to the politics and society of Russia and the Commonwealth of Independent States. (Lec. 3, Project 3) Pre: sophomore standing or permission of instructor. Not for graduate credit. Offered in alternate years.

**PSC 417 Russian Foreign Policy** (4 crs.) An upper-level introduction to the issues of Russian foreign policy, including relations with newly formed states of the CIS. (Lec. 3, Project 3) Pre: Sophomore standing or permission of instructor. Not for graduate credit. Offered in alternate years.

**PSC 422 International Political Economy** (4 crs.) Examines the impact of political and economic influences on interactions between and within states. (Lec. 3, Project 3) Pre: PSC 212 or 310 or permission of the instructor. Not for graduate credit.

**PSC 422H Honors Section of PSC 422-International Political Economy** (4 crs.) Honors Section of PSC 422: International Political Economy. (Lec. 3, Project 3). Pre: overall GPA 3.30 or better. Not for graduate credit.

**PSC 431 International Relations** (4 crs.) Analysis of the various theories of international relations and study of the major factors influencing the politics of international conflict, trade, organizations, and other interactions between international actors. (Lec. 3, Project 3) Pre: PSC 212 or 310 or permission of instructor. Not for graduate credit.

**PSC 434 American Foreign Policy** (4 crs.) Analysis of the institutions, techniques, and instruments of policy making and the execution of foreign policy. (Lec. 3, Project 3) Pre: PSC 212 or 310 or permission of instructor. Not for graduate credit.

**PSC 435 Theories of International Conflict** (4 crs.) Analysis of the various theories of international conflict. Topics include interstate war, international disputes, interstate rivalry, and democratic peace theory. (Lec. 3, Project 3) Pre: PSC 212 or 310 or permission of the instructor. Not for graduate credit.

**PSC 440 The Politics of Being Mortal** (4 crs.) Seminar on how attitudes toward death affect political values and priorities, especially in regard to capitalism and the threat of nuclear war. (Seminar 3, Project 3) Pre: PSC 341, 342, or permission of instructor. Not for graduate credit.

**PSC 441 Women and Politics** (4 crs.) Cross-listed as (PSC), GWS 441. Explores the role of women in the American political system, as voters, campaign activists, and office holders, and as members of organized groups in the policy making process. (Seminar 3, Project 1) Pre: PSC 113 or PSC 210 or PSC 310 or permission of instructor.

**PSC 443 Twenty-first Century Political Theory** (4 crs.) Important political theorists of this century, particularly as they interpret the basis of political obligation and weigh the question of violent political change. (Lec. 3, Project 3) Pre: PSC 240 or 341 or 342 or any 300-level philosophy course or permission of instructor. Not for graduate credit. Offered every third year.

**PSC 455 Directed Study or Research** (3 crs.) Special work arranged to meet the needs of individual students who desire advanced work in political science. (Independent Study) Pre: permission of chairperson.

**PSC 456 Directed Study or Research** (3 crs.) Special work arranged to meet the needs of individual students who desire advanced work in political science. (Independent Study) Pre: permission of chairperson.

**PSC 461 The American Presidency** (4 crs.) Presidential leadership and decision making, with emphasis on growth in power and prestige of the presidency, exercise of presidential influence in conduct of government, and presidential initiative in formulating and developing national policies and priorities. (Lec. 3, Project 3) Pre: PSC 113 or 210 and 212 or 310 or permission of instructor. Not for graduate credit.

**PSC 465 (365) Political Parties in the United States** (4 crs.) Analysis of the American political party process. History, organization, functions, methods, problems, and prospects for reform. Focus on the two party system and limits of third parties in the United States. (Lec. 3, Portfolio 1) Pre: PSC 113 or 210. Not for graduate credit.

**PSC 466 Urban Problems** (3 crs.) Cross-listed as (PSC), AAF 466. Contemporary and emerging problems of urban affairs. Discussion, reading, and assignments on the interaction among urban change, development of social institutions, and formation of public policy. (Lec. 3/Online) Pre: PSC 113 or 210.

**PSC 466H Honors Section of AAF/PSC 466: Urban Problems** (3 crs.) Cross-listed as (PSC), AAF 466H. Honors Section of AAF/PSC 466: Urban Problems. (Lec. 3) Pre: PSC 113 or 210, and 3.30 overall GPA.

**PSC 472 Civil Liberties** (4 crs.) The problem of human freedom examined in the context of the fundamental rights guaranteed to individuals by the American Constitution. Emphasis on religious liberty, freedom of expression, racial equality, fair criminal procedures, and the protection of personality and privacy. (Lec. 3, Project 3) Pre: PSC 371 or permission of instructor. Not for graduate credit.

**PSC 476 Policy Issues In Criminal Justice** (3 crs.) Cross-listed as (SOC), PSC 476. Examination of current and proposed criminal justice policies in light of social science theory and research, including capital punishment, community policing, gun control, intermediate sanctions, legalization of drugs, mandatory sentencing, privatization of prisons, restorative justice. (Seminar) Pre: SOC 274 (or PSC 274) and SOC 301, and permission of instructor.

**PSC 481 Political Science Seminar** (3 crs.) Intensive studies in various important fields in political science. Class discussion of assigned readings and student reports. Emphasis on independent research. (Seminar) Pre: PSC 210 or PSC 211 or PSC 310.

**PSC 482 Political Science Seminar** (4 crs.) Intensive studies in various important fields in political science. Class discussion of assigned readings and student reports. Emphasis on independent research. (Seminar) Pre: PSC 210 or PSC 211 or PSC 310.

**PSC 491 Principles of Public Administration** (3 crs.) Principles of public administration, structure and organization, financial

management, administrative responsibility, and the relation between the administration and other branches of government. (Lec. 3) Pre: PSC 113 or 210.

**PSC 501 Administrative Theory** (3 crs.) Theoretical constructs and models in fields of public administration; theories of Weber, Riggs, Dorsey, Simon, Presthus. Lower-level models in subfields of organization, communications, and decision making. Task-oriented subject matter such as personnel, budget, and program administration related to theoretical formulations that seek to explain them. (Lec. 3) Pre: PSC 491 or permission of instructor.

**PSC 503 Problems In Public Personnel Administration** (3 crs.) Cross-listed as (PSC), LRS 503. Development of personnel administration, including problems of recruitment, examination, promotion, and staffing within public service. Emphasis on evaluation of employee performance and collective bargaining in public service. (Lec. 3) Pre: graduate standing or permission of instructor.

**PSC 504 Ethics In Public Administration** (3 crs.) This course explores through case studies, class discussion, films, and readings how ethical deliberation in the public sector is an essential commitment and skill for public administrators. (Seminar) Pre: graduate standing or permission of instructor.

**PSC 505 Public Program Evaluation** (3 crs.) Cross-listed as (PSC), SOC 505. Research design and methodologies associated with the evaluation of governmental programs and activities. (Lec. 3) Pre: STA 308 or equivalent or permission of instructor.

**PSC 506 Seminar In Budgetary Politics** (3 crs.) Examination of federal, state, and local fiscal and budgetary processes, focusing on the politics of the budgetary process and models of budgeting, with emphasis on contemporary issues. (Seminar)

**PSC 507 Government Financial Administration** (3 crs.) Political, administrative, and technical elements of government financial management in public policy settings are examined. Special emphasis is placed on local and state governments and public authorities. (Seminar) Pre: graduate standing or permission of instructor.

**PSC 521 Comparative Labor Relations Systems** (3 crs.) Cross-listed as (LRS), PSC 521. Comparative labor and industrial relations systems, including union, management, and government functions and roles; also the functions of international organizations in labor relations. (Lec. 3) Pre: permission of instructor.

**PSC 524 Seminar In Public Policy Problems** (3 crs.) In-depth exploration of selected problems of policy formulation: intergovernmental relations, regionalization, citizen participation and control, priority setting for public sector programs. (Seminar) Pre: PSC 491, 501, or permission of instructor.

**PSC 544 Democracy and Its Critics** (3 crs.) Seminar examining the roots of modern democracy in the social contract theories and analyzing the quality and limits of self-determination in these theories in the light of contemporary politics. (Lec. 3) Pre: PSC 341, 342, or permission of instructor.

**PSC 546 Peace And World Order Studies** (3 crs.) This seminar explores various approaches globally to peacebuilding, world order, and community. Emphasizes conflict resolution, from local to transnational levels, and the search for social justice and human unity. (Seminar) Pre: graduate standing.

**PSC 553 Scope And Methods Of Political Science** (3 crs.) Study of political science as a discipline, its development in relation to other social sciences, and survey of political theories, concepts, and analytic models. (Seminar) Pre: graduate standing.

**PSC 555 Directed Study or Research** (3 crs.) Special work arranged to meet the individual needs of graduate students in political science. (Independent Study) Pre: permission of chairperson.

**PSC 556 Directed Study or Research** (3 crs.) Special work arranged to meet the individual needs of graduate students in political science. (Independent Study) Pre: permission of chairperson.

**PSC 573 Administrative Law** (3 crs.) Legal aspects of interaction among government agencies, individuals, and public interest groups. Systematic analysis of leading cases, evaluating the courts as an instrument for protecting the individual's rights in administrative action. (Lec. 3) Pre: PSC 113.

**PSC 577 International Ocean Law** (3 crs.) Cross-listed as (MAF), PSC 577. Principles of international law as they relate to ocean management problems. Jurisdiction in zones, such as territorial seas, exclusive economic zones, and the high seas will be examined, as well as the problems posed by zonal approaches to ocean-use management.

**PSC 580 Seminar In International Relations Theory** (3 crs.) A critical treatment of major international relations theories beginning with an analysis of core theoretical concepts. (Seminar) Pre: honors seniors with permission of instructor or graduate standing.

**PSC 581 Special Topics Seminar** (3 crs.) Master's-level seminar on special topics in political science not regularly covered in other courses. (Seminar) Pre: graduate or senior standing in political science or permission of instructor. May be repeated up to five times for a total of 15 credits with different topic.

**PSC 582 Special Topics Seminar** (3 crs.) Master's-level seminar on special topics in political science not regularly covered in other courses. (Seminar) Pre: graduate or senior standing in political science or permission of instructor. May be repeated up to five times for a total of 15 credits with different topic.

**PSC 583 Seminar In American Politics** (3 crs.) Critical consideration of central issues in American political institutions, behavior, and policy making. (Seminar) Pre: honors seniors with permission of instructor or graduate standing.

**PSC 584 Seminar in Advanced Comparative Theory** (3 crs.) A critical treatment of the major methodological approaches used in comparative politics beginning with an analysis of core theoretical concepts. (Seminar) Pre: graduate standing; undergraduates only with permission of instructor.

**PSC 590 Internship In Public Administration PRA** (3-6 crs.) Participation at an administrative agency under supervision of agency head and a faculty member. Planning, personnel management, research organization, budgeting, interdepartmental relations, informal liaisons that are the hallmark of effective administration. (Practicum) Pre: permission of M.P.A. director. May be taken as one 6-credit unit or two 3-credit units.

**PSC 595 Environment and Development Economics** (3 crs.) Cross-listed as (EEC), MAF, PSC, SOC 595. Application of economic principles and research methods to understand the economics of environmental and natural resource management and poverty alleviation. (Lec. 3) Pre: EEC 528 or permission of instructor.

**PSC 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## PSY | Psychology

**PSY 103 Towards Self-Understanding** (3 crs.) Individual and social problems of normal persons. Personality development, social behavior, and adjustment reactions with emphasis on increasing awareness of personal and interpersonal functioning. (Lec. 3/Online) (S) [D]

**PSY 113 General Psychology** (3 crs.) Introductory survey course of the major facts and principles of human behavior. Prerequisite for students interested in professional work in psychology or academic fields in which an extended knowledge of psychology is basic. (Lec. 2, Rec. 1) (S) [D]

**PSY 113H Honors Section of PSY 113: General Psychology** (3 crs.) Honors Section of PSY 113: General Psychology. (Lec. 2, Rec. 1) Pre: 3.30 overall GPA. (S) [D]

**PSY 130 The Problem of Hunger in the U.S.** (3 crs.) Cross-listed as (HSS), PSY 130. Survey of the problem of hunger in the United States, the causes, effects on individuals and society, and the policies and programs intended to help hungry people. (Lec. 2, Seminar 1) (S) [D]

**PSY 200** (300) Quantitative Methods in Psychology (4 crs.) Basic concepts and

techniques of quantification in psychology. Emphasis on application of certain descriptive and inferential statistical tools in the analysis of psychological measurement of behavior. Practical applications using computer programs may be undertaken and/or other lab exercises. (Lec. 3, Lab. 2) Pre: PSY 113, at least one college-level mathematics course, and sophomore standing.

**PSY 200H Honors Section of PSY 200** (300): Quantitative Methods in Psychology (4 crs.) Honors Section of PSY 200: Quantitative Methods in Psychology. (Lec. 3) Pre: PSY 113, at least one college-level mathematics course, sophomore standing, and 3.30 overall GPA.

**PSY 232 Developmental Psychology** (3 crs.) Comprehensive understanding of human development and growth from birth to senescence. (Lec. 3) Pre: PSY 113. (S) [D]

**PSY 235 Theories of Personality** (3 crs.) Critical survey of the major theories of personality. Emphasis will be placed on the normal personality. (Lec. 3) Pre: PSY 113. (S) [D]

**PSY 254 Behavior Problems and Personality Disorders** (3 crs.) Evaluation of the more serious behavioral disorders as found in the major forms of character disorders, psychoneuroses, and psychoses. Theories of causation, development and effects of anxiety and defense mechanisms, and interpretation of symptoms and methods of treatment. (Lec. 3) Pre: PSY 113. (S) [D]

**PSY 254H Honors Section of PSY 254: Behavior Problems and Personality Disorders** (3 crs.) Honors Section of PSY 254: Behavior Problems and Personality Disorders. (Lec. 3) Pre: PSY 113 and 3.30 or better overall GPA. (S) [D]

**PSY 255 Health Psychology** (3 crs.) Investigates the relationship between behavior and health; emphasizes the theory and science of health behavior change; explores specific behaviors and behavior change strategies from an individual and public health perspective. (Lec. 3/Online) (S) [D]

**PSY 261 The Alcohol-Troubled Person: Introductory Concepts** (3 crs.) Introductory and basic concepts in alcohol trouble: prevention, identification, early intervention, treatment, education. (Lec. 3)

**PSY 275 Alcohol Use and Misuse** (3 crs.) Examination of biological, psychological, and social determinants of alcohol use and misuse. Prevention, early intervention, and treatment approaches also covered. (Lec. 3) Pre: PSY 113.

**PSY 301 Introduction To Experimental Psychology** (3 crs.) Lectures, demonstrations, and laboratory experiments introduce the student to basic methodological principles and experimental techniques applied in psychological research. (Lec.3, Lab. 2) Pre: PSY 200 or 200H.

**PSY 302 Applied Methods in Psychological Research** (3 crs.) This course will provide a structured training experience addressing data management, statistical analysis, how to handle methodological problems, and interpretation of results for applied psychology research topics. (Lec. 2, Lab. 2) Pre: Grades of C or higher in PSY 200 (previously PSY 300) and PSY 301, or permission of the instructor.

**PSY 305 Field Experience In Psychology PRA** (3 crs.) Direct contact with settings and populations served by psychologists. Emphasis on understanding models and theories in relation to practical problems. Topical sections may include: a) pre-clinical, b) community, c) laboratory, and d) organizational applications. (Practicum) Pre: PSY 113 and permission of instructor. May be repeated for a maximum of 6 credits.

**PSY 310 History and Systems of Psychology** (3 crs.) Origins of psychological inquiry and theories of psychology. Transformations of theories and methods of inquiry through the history of our culture including contemporary systems and models of psychological functioning. (Lec. 3/Online) Pre: PSY 113. (L)

**PSY 334 Introduction to Clinical Psychology** (3 crs.) Emphasis on scope of the field, functions of the clinical psychologist, methods used, and problems encountered, both scientific and professional. (Lec. 3) Pre: PSY 254.

**PSY 335 The Psychology of Social Behavior** (3 crs.) Conceptual and empirical analyses of individual behavior in social contexts; attention to social motivation, attitude development and change, liking, conformity, aggression, altruism. (Lec. 3) Pre: PSY 113 and junior standing or permission of instructor.

**PSY 361 Learning** (3 crs.) Learning process in humans and non-humans, focusing on principles and methods. This course features operant-learning and behavior-modification principles and examples from real life. (Lec. 3/Online) Pre: PSY 301 or permission of instructor.

**PSY 371 Laboratory in Learning** (1 cr.) Laboratory experiments in learning (primarily animal) designed to parallel course materials in 361. (Lab. 2) Pre: 301, credit or concurrent enrollment in 361, or permission of instructor.

**PSY 381 Physiological Psychology** (3 crs.) Physiological mechanisms operative in human behavior. Sensory, neural, endocrine, and response systems as related to sensation, perception, attention, emotions, motivations, and learning. (Lec. 3) Pre: junior standing.

**PSY 382 Research Methods in Physiological Psychology** (3 crs.) An introduction to the principles and techniques of experimentation in physiological psychology, such as brain stimulation and lesions, electrophysiology, neuropsychological testing, and pharmacology. (Lab. 6) Pre: 381 and permission of instructor.

**PSY 384 Cognitive Psychology** (3 crs.) An examination of contemporary research and theories on mental activities. Topics will include perception, pattern recognition, attention, memory, problem solving, language, consciousness, and artificial intelligence. (Lec. 3) Pre: PSY 113 and 301 or equivalent. In alternate years.

**PSY 385 Perception** (3 crs.) Sensory function, development of perception, perception of space, color, sound, and complex events. (Lec. 3) Pre: PSY 113 and 200, or equivalent. In alternate years.

**PSY 385H Honors Section of PSY 385: Perception** (3 crs.) Sensory function, development of perception, perception of space, color, sound, and complex events. (Lec. 3) Pre: PSY 113 and 200 or equivalent, and overall GPA of 3.30 or better. In alternate years.

**PSY 388 Psych Of Language** (3 crs.) Study of language processes in light of contemporary theories and research. Topics include speech production, perception, memory, comprehension, language and the brain, language acquisition, reading, language, and thought. (Lec. 3) Pre: junior standing. In alternate years.

**PSY 399 Introduction to Multicultural Psychology** (3 crs.) Cross-listed as (PSY), AAF 399. Introductory course focusing on multiculturalism as a major paradigm. Emphasizes the meaning of multiculturalism and associated principles, concepts, and sociocultural factors as related to assessment, intervention, and research. (Lec. 3/Online) Pre: PSY 113 or 103.

**PSY 405 Psychological Anthropology** (3 crs.) Cross-listed as (APG), PSY 405. Study of human behavior in different cultures employing psychological concepts and theories. (Lec. 3) Pre: APG 203 or permission of instructor.

**PSY 425 Peace Psychology** (3 crs.) Cross-listed as (PSY), NVP 425. Peace psychology combines aspects of cognitive, social, clinical and cross-cultural psychology that bear on the prevention of violence and the promotion of constructive nonviolent behavior. (Lec. 3/Online) Pre: Prior coursework in psychology, or permission of instructor. Prior coursework in another social science is recommended.

**PSY 430 Intimate Relationships** (3 crs.) Cross-listed as (SOC), PSY 430. Examination of the effects of cultural, social, and psychological processes on the development, maintenance, and dissolution of intimate relationships. Emphasis on friendship patterns, dating and marital relationships, intimacy in nontraditional relationships. Emphasis on research. (Lec. 3) Pre: any 100- or 200-level course in sociology or PSY 113 or permission of instructor. Not for graduate credit.

**PSY 432 Advanced Developmental Psychology** (3 crs.) Major issues in developmental psychology. Emphasis on research in Piaget, Erikson, Bruner, Kagan, and Moss.

Includes effects of infant care, sex typing, parental discipline, and developmental aspects of intellectual and perceptual growth. (Lec. 3) Pre: PSY 232.

**PSY 434 Psychological Testing** (3 crs.) Measurement procedures employed in the measurement of intelligence, aptitudes, abilities, attitudes, interests, and personality. Focus on psychometric principles associated with the various tests. (Lec. 3) Pre: PSY 200 or equivalent.

**PSY 436 Psychotropic Drugs and Therapy** (3 crs.) Cross-listed as (BPS), PSY 436. Interaction of drug and non-drug therapy and of physiological and psychological origins of psychopathology. Intended for advanced undergraduate and graduate students interested in clinical psychology. (Lec. 3) Pre: any one of the following—BIO 101, 104B, 113, 121, PSY 381, or permission of instructor. Not for graduate credit.

**PSY 442 Psychology of Exceptionality** (3 crs.) Survey of the major issues underlying the classification, institutionalization, and treatment of persons with mental, physical, psychological, and educational disabilities. Specific topics include social attitudes toward exceptionalities, past and current legislation, special education services, and transitions into community life and the workplace. (Lec. 3) Pre: junior or senior standing.

**PSY 460 The Substance-Troubled Person** (3 crs.) Presents theoretical and applied material on alcohol and other mood-altering substances of abuse. Relevant for alcohol and substance abuse counselors, personnel administrators, and other social service workers. (Lec. 3) Offered through the Alan Shawn Feinstein College of Continuing Education.

**PSY 464 Humanistic Psychology** (3 crs.) Discussion of humanistic approaches to the understanding and direction of behavior. Emphasis on contemporary writers such as Rogers, Maslow, May, Moustakas. Discussions of phenomenology and existentialism. (Lec. 3) Pre: PSY 235 and junior standing. In alternate years.

**PSY 465 Introduction to Crisis Intervention** (3 crs.) Interventions for various types of emergencies including substance abuse and functional or organic disorders. (Lec. 3) Pre: PSY 254 and permission of instructor.

**PSY 466 Child Sexual Abuse** (3 crs.) Current theorizing regarding the causes of sexual abuse of children will be presented, as well as the short- and long-term effects of such abuse. Management of problems will be followed, from disclosure through current state-of-the-art practices in treatment. Issues in prevention, court cases, and investigation will be reviewed. (Lec. 3) Pre: senior status and permission of instructor. Not for graduate credit.

**PSY 470 Topics In Social Psychology** (3 crs.) Empirical and conceptual approaches to a major topic in contemporary social psychology. Topics will vary from semester to semester. (Seminar) Pre: PSY 113 and 335.

**PSY 471 Applied Behavioral Analysis and Remediation** (3 crs.) Study and application of behavioral approaches used to analyze and remediate behavioral problems of children and adults in educational and human service settings and everyday life. (Lec. 3/Online) Pre: PSY 361 or permission of instructor. Offered through the Alan Shawn Feinstein College of Continuing Education only.

**PSY 473 Practicum In Behavioral Psychology PRA** (3 crs.) Supervised, on-site field experience in applications of behavioral approaches in an educational or human service setting. (Practicum) Pre: PSY 471 or permission of instructor.

**PSY 477 Preparation for Careers in Psychology** (1 cr.) Designed to assist students as they explore career options in the field of psychology. Students will prepare materials for job/graduate school applications, and practice interview skills. (Lec. 1) Pre: sophomore standing or above. Not for graduate credit.

**PSY 478 Applications of Psychology** (1-3 crs.) Applications of psychological research and theory to contemporary problems, with an emphasis on scholarly bases. (Seminar/Online) Some topics may be offered online. May be repeated for a maximum of 12 credits.

**PSY 479 Topics in Psychology** (1-3 crs.) Central issues in the field of psychology, allowing in-depth study of contemporary or historical topics. (Seminar/Online) Some topics may be offered online. Pre: PSY 113 or permission of instructor. May be repeated with a change in topic for a maximum of 12 credits.

**PSY 479H Honors Section of PSY 479: Topics in Psychology** (1-3 crs.) Honors Section of PSY 479: Topics in Psychology. (Seminar) Pre: PSY 113 or permission of instructor and 3.30 GPA. May be repeated with a change in topic for a maximum of 12 credits.

**PSY 480 Psychology of Women** (3 crs.) Discussion of psychological research and theories on the psychology of girls and women from a multicultural perspective. Topics include personality theories, gender similarities and differences, biological aspects of sex and gender, cultural images of women, sexuality, relationships, motherhood, work and achievement, physical and mental health. (Lec. 3/Online) Pre: PSY 113 and at least one 200-level psychology course.

**PSY 487 Seminar for Psychology Teaching Assistants** (1 cr.) Students will learn pedagogies and engage in activities designed to enhance teaching skills. (Seminar) Pre: junior or senior standing. Not for graduate credit.

**PSY 488 Undergraduate Teaching Experience in Psychology PRA** (1-3 crs.) Students will acquire experience in psychology working under the supervision of course instructors and/or faculty members. (Practicum) Pre:

permission of instructor. May be repeated for a total of 3 credits. Not for graduate credit.

**PSY 489 Problems in Psychology** (3 crs.) Advanced work in psychology. Course will be conducted as seminar or as supervised individual project. (Independent Study) Pre: permission of instructor. May be repeated once.

**PSY 499 Psychology Practicum PRA** (1-6 crs.) Individual and group projects applying psychology in clinical or laboratory settings. (Practicum) Pre: permission of instructor. May be repeated for a maximum of 12 credits. No more than 6 credits may be taken in one semester. Not for major credit in psychology. S/U only.

**PSY 500 Theory and Research on Non-violence and Peace** (3 crs.) Cross-listed as (NVP), PSY 500. Surveys selected issues in the interdisciplinary field of Nonviolence and Peace Studies. It focuses on human problem solving in potentially violent situations, and the creation of conditions for peace. (Online)

**PSY 505 Community Psychology** (3 crs.) Introduction to community psychology; study and change of individual's interaction with community systems; theoretical and empirical models, intervention strategies, and research methods relevant to community psychology. (Lec. 3)

**PSY 517 Small N Designs** (3 crs.) Cross-listed as (PSY), STA 517. A survey of Small N experimental methodology appropriate for repeated observations on a single unit or individual. Methods include quasi-experimental designs, interrupted time series, and multivariate time series. Applications in applied research, particularly behavioral intervention. (Seminar) Pre: PSY 532 and 533. In alternate years.

**PSY 527 Language Study for Teachers of Reading** (3 crs.) Cross-listed as (EDC), PSY 527. Focuses on the structure of language at the sound, syllable, and word level. Applies concepts to reading and spelling development, teaching phoneme awareness, interpreting student errors, and planning instruction. (Seminar)

**PSY 532 Experimental Design** (3 crs.) Cross-listed as (STA), PSY, AFS 532. Application of statistical methods to biological and psychological research and experimentation. Experimental situations for which various ANOVA and ANCOVA designs are most suitable. (Lec. 3) Pre: STA 409 or equivalent.

**PSY 533 Advanced Quantitative Methods In Psychology** (3 crs.) Advanced quantitative methods applied to psychology. Survey of methods such as multiple regression, multivariate analysis of variance, discriminant analysis, canonical correlation, principal component analysis, and factor analysis. Applications involve practice with computer programs. (Lec. 2, Lab. 2) Pre: PSY 532.

**PSY 540 Learning Disabilities: Assessment and Intervention** (3 crs.) Cross-listed as (PSY), EDC 540. Applications of early

screening batteries; remedial programs for various disabilities, including behavioral programs and methods for older children and adolescents. Emphasis on pragmatic application of skills for detection and treatment. (Lec. 3) Pre: permission of instructor. May be repeated for a maximum of 6 credits.

**PSY 544 Reading Acquisition and Reading Disability: Research and Implications for Practice** (3 crs.) Cross-listed as (PSY), EDC 544. Examination of research on the language, cognitive, and reading characteristics of children who successfully learn to read and of those who encounter difficulty. Additional focus on the implications and use of the research for assessment and instruction. (Lec. 3) Pre: graduate standing or permission of instructor.

**PSY 550 Behavior Analysis and Change** (3 crs.) Introduction to the principles of operant conditioning with emphasis on the use of these principles in the analysis and change of behavior in real-life settings such as schools and families. (Lec. 3)

**PSY 554 Alternative Therapies** (3 crs.) Theory and practice of a variety of individual and group techniques that can be integrated into one's present style of helping. (Lec. 2, Lab. 2) Pre: professional and/or graduate standing.

**PSY 581 Psychological Aspects of a Healthy Lifestyle** (3 crs.) Cross-listed as (KIN), PSY 581. Considers the psychological processes and behaviors related to exercise participation and the adoption of a healthy lifestyle. Analysis of models and theories used in exercise psychology, associated research, and the implications for practitioners. (Lec. 3) Pre: graduate standing, PSY 113 and 232, or permission of instructor.

**PSY 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**PSY 600 Multicultural Issues in Psychology: Theory, Research, and Practice** (3 crs.) Focus is on general issues and concepts relevant to a psychology that is concerned with multicultural populations as sources of enrichment for theory, research, and practice. Counts as a core course for graduate study in psychology and includes an historical perspective. (Seminar) Pre: graduate standing.

**PSY 601 Physiological Psychology** (3 crs.) An advanced consideration of physiological research on neural, endocrine, and response systems as they relate to attention, motivation, emotion, memory, and psychological disorders. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 2, Lab. 2)

**PSY 602 Learning and Motivation** (3 crs.) Empirical and theoretical analysis of the basic principles of acquisition and loss of habits. Topically organized to deal with respondent and operant conditioning, and their rela-

tionship to reinforcement and motivation. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3) Pre: undergraduate learning course.

**PSY 603 Development** (3 crs.) Theoretical, methodological, and applied issues in life span development, including cognitive, perceptual, psychomotor, affective, and social development. Topically organized. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3)

**PSY 604 Cognitive Psychology** (3 crs.) A survey of the theoretical and methodological issues in human cognition. Topics include pattern recognition, attention, memory, language, problem solving. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3)

**PSY 605 Personality** (3 crs.) Reading of primary source materials from major personality theorists relevant to a particular topical emphasis. Application and comparative evaluation of the theories studied. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3)

**PSY 606 Social Psychology** (3 crs.) Intensive exploration of the methods, theory, and database of contemporary social psychology focusing on salient issues that clarify significant topics in this area. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3)

**PSY 607 Advanced Psychopathology** (3 crs.) A review of the multicultural, theoretical, clinical, and empirical literature related to the development, classification, and diagnosis of psychopathology. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3)

**PSY 608 Theories and Systems** (3 crs.) An in-depth analysis of the origin and logical structure of major systematic approaches to psychology. Emphasis on significant recurrent controversies. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3) Pre: graduate standing.

**PSY 609 Perception** (3 crs.) A survey of topics in the psychology of perception, including sensory function; psychophysical models, measurement, and scaling; visual perception; and methods for analyzing perceptually guided behavior. Counts as a core course for graduate study in psychology and includes an historical perspective. (Lec. 3)

**PSY 610 Parsimony Methods** (3 crs.) Cross-listed as (PSY), STA 610. Multivariate procedures designed to reduce the dimensionality and help in the interpretation of complex data sets. Methods include principal components analysis, common factor analysis, and image analysis. Related methods: cluster analysis and multidimensional scaling. Applications involve the use of existing

computer programs. (Lec. 3) Pre: PSY 533 or STA 541 or equivalent. In alternate years.

**PSY 611 Methods of Psychological Research and Experimental Design** (3 crs.) Provides the student of psychology with a knowledge of research methodology and the techniques of experimental designs. It prepares for the development of thesis problems of graduate students in psychology and related disciplines. (Lec. 3) Pre: PSY 532 and 533.

**PSY 612 Structural Modeling** (3 crs.) Cross-listed as (PSY), STA 612. Theory and methodology of path analysis with latent variables. Discussion of causation and correlation, Confirmatory Factor Analysis, Measurement and Structural Equation models. Practical applications using current computer programs (e.g. EQS). (Lec. 3) Pre: PSY 533 or 610.

**PSY 613 Qualitative Research and Analysis in Psychology** (3 crs.) Introduction to qualitative methods and analyses with a focus on interviews, focus groups and visual data methods. Counts as a core methodology course for graduate study in psychology and includes historical and contemporary perspectives in psychology. (Lec. 2, Lab 2) In alternate years. Pre: graduate standing

**PSY 614 Evaluation Research Seminar** (3 crs.) Introduction to application of research and consultation methods to program and policy evaluation; emphasizes quantitative methods and utilization focus. Assumes background in social science research methods. (Seminar) Pre: graduate standing.

**PSY 615 Collaborative Research in Psychology** (1-3 crs.) Collaborative approaches to methods of psychological inquiry. Special emphasis on topics that can involve students at varying levels of research skill. Format includes weekly seminars and colloquia. (Seminar) May be repeated for a maximum of 24 credits. S/U credit.

**PSY 625 Seminar: Social Psychology** (3 crs.) Emphasis on a major area in contemporary social psychology. Empirical studies analyzed for their relevance to theoretical and applied issues; students will design an original investigation. (Seminar) Pre: graduate standing or permission of instructor. May be repeated for a maximum of 12 credits with different topic.

**PSY 626 Psychology of Sex and Gender** (3 crs.) Examines theory and research relevant to sex and gender from social psychological, multicultural and interdisciplinary perspectives. Focuses on topics relevant to men, women, transgendered people, transsexuals and intersexuals. In alternate years. (Lec. 3)

**PSY 635 Transtheoretical Model Applied to Health Psychology** (3 crs.) The transtheoretical model is an influential comprehensive model of behavior change that has been extensively employed in health psychology. Applications include smoking cessation, ex-

ercise, diet, dress, and medication adherence. (Seminar 3) Pre: Graduate standing

**PSY 641 Introduction to Psychotherapy** (3 crs.) An analysis of the major systems of psychotherapy. Developing an integrative, eclectic model through identifying the processes of change that are the core of effective therapy. (Lec. 3)

**PSY 643 Multicultural Mental Health** (3 crs.) This course aims to familiarize students with interdisciplinary perspectives on multicultural psychology and mental health in order to facilitate the development of cultural competence in clinical practice. Pre: PSY 672.

**PSY 644 Family Therapy** (3 crs.) Introduction to theories and techniques of family assessment and family therapy. Seminar format with videotape illustrations, case presentation and discussion, lecture, and selected experiential exercises. (Lec. 3) Pre: permission of instructor. Not offered every year.

**PSY 647 Child Therapy** (3 crs.) Seminar discusses issues, techniques, and research related to behavior changes in children and their families. Aspects of therapy, the role of behavioral approaches, and the participation of parents will be explored. Direct, supervised experience is included in this course. (Lec. 3) Pre: participation in the Psychological Consultation Center.

**PSY 660 Clinical Assessment and Decision Making** (3 crs.) Covers basic principles and methods for decreasing error and increasing accuracy in applied clinical work, such as clinical versus actuarial judgment and use of base rates. (Lec. 3) Pre: course in psychological testing.

**PSY 661 Psychological Services I: Administration and Interpretation of Cognitive Tests** (3 crs.) Instruction and practice in administration and interpretation of contemporary cognitive tests; individual intelligence tests of both general and specific abilities. Rationale, research evidence, clinical applications. (Lec. 3) Pre: PSY 660.

**PSY 662 Psychological Services II: Administration and Interpretation of Personality Tests** (3 crs.) Instruction and practice in the administration and interpretation of instruments used in the assessment of personality. Emphasis on tests such as the MMPI, Rorschach, TAT. Rationale, research evidence, and clinical application. (Lec. 2, Lab. 2) Pre: PSY 661.

**PSY 663 Child and Adolescent Personality Assessment and Intervention** (3 crs.) Psychological assessment and intervention with children and adolescents, focused on personality functioning, behavioral, social, and emotional problems. Emphasis on assessment theory and methods as linked to empirically supported intervention approaches. (Lec. 2, Lab. 2) Pre: graduate standing in psychology and PSY 665 and 661 or permission of instructor.

**PSY 665 Developmental Psychopathology** (3 crs.) Child and adolescent psychological disorders are conceptualized through a developmental perspective, and contemporary research on etiology, diagnosis, course, prognosis, and treatment/management is examined. (Lec. 3) Pre: PSY 603 or equivalent.

**PSY 666 Seminar: Ethical and Legal Issues in Psychology** (3 crs.) Ethical, legal, and professional issues as they relate to the provision of psychological services and psychological research. Emphasis is on the study of ethical issues and the examination of the development of professional standards as they relate to the areas of clinical psychology practice, school psychology practice, and applied research practice. (Seminar)

**PSY 668 School Psychological Consultation** (3 crs.) Historical and contemporary perspectives on consultation are reviewed. Theory, research, and practice are discussed from various consultation models including mental-health, behavioral, and organizational. The focus is on content and process of consultation in various clinical and educational settings. (Lec. 3) Pre: PSY 661 and 663 or equivalent.

**PSY 670 Field Experience In Psychological Services PRA** (1-12 crs.) Practicum placements and internships are available in a variety of agencies clinical and school settings under supervision. (Practicum) S/U credit.

**PSY 672 Individual Clinical Practicum PRA** (3-9 crs.) Introductory experience in dealing with clinical problems in a variety of clinical settings under supervision. (Practicum) Pre: PSY 661, 662. May be repeated for a maximum of 9 credits. S/U credit.

**PSY 681 Ethical, Historical, Legal, and Professional Issues in School Psychology** (3-9 crs.) Introduction to school psychology with focus on ethical, historical, legal, and professional issues. Roles and functions of school psychologists in schools and other settings will be explored. (Seminar) May be repeated for a maximum of 9 credits.

**PSY 683 Psychology of the Exceptional Child** (3 crs.) Cross-listed as (PSY), EDC 683. Social, psychological, and educational factors that constitute the matrix of concerns with the exceptional individual in the school and community. Recent innovations in public and private education and rehabilitation. Research issues and legislation discussed evolve into student studies. (Lec. 3)

**PSY 687 Seminar: Topics in the Psychology of the Exceptional Individual** (3 crs.) Cross-listed as (PSY), EDC 687. Survey of topics and current issues in the treatment, needs, and understanding of the psychology of specific exceptionalities. (Seminar) May be repeated for a maximum of 9 credits with different topics.

**PSY 690 Seminar: Contemporary Issues In Psychology** (3-12 crs.) Recent developments and current issues. Rigorous explora-

tion of experimental, applied, and theoretical literature. (Seminar) May be repeated for a maximum of 12 credits.

**PSY 692 Directed Readings and Research Problems** (3-12 crs.) Directed readings and advanced research work under the supervision of a faculty member arranged to suit the individual requirements of the students. (Independent Study)

**PSY 693 Directed Readings and Research Problems** (3-12 crs.) Directed readings and advanced research work under the supervision of a faculty member arranged to suit the individual requirements of the students. (Independent Study)

**PSY 695 Seminar: Teaching Psychology** (3 crs.) Primarily a seminar in the teaching of psychology at the undergraduate level. Includes a consideration of general issues in college teaching, preparation of a course proposal, and sample presentation. (Seminar)

**PSY 696 Practicum: Teaching Psychology PRA** (1-3 crs.) Practicum for students teaching a college-level psychology course. Supervision of course preparation, presentation, and evaluation. (Practicum) S/U credit. Pre: PSY 695 or permission of the Department. May be repeated for a total of 6 credits with permission of the Department.

**PSY 699 Doctoral Dissertation Research** (1-12 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## RDE | Resource Development Education

**RDE 486 Internship in Agricultural and Extension Education PRA** (1-6 crs.) Provides experiential learning opportunities related to agricultural education and/or Cooperative Extension education. (Practicum) May be repeated for a maximum of 6 credits. Not for graduate credit.

## RIC | Joint PhD Program

**RIC 0 Joint PhD Program with Rhode Island College PRA** Joint PhD Program with Rhode Island College. Students should consult with their advisor and register for the number of credits that coincide with Rhode Island College registered credits for the semester.

## RLS | Religious Studies

**RLS 111 Judaism, Christianity, and Islam** (3 crs.) Comparative study of the teachings, the histories, and the practices of the three religions of Abraham; emphasis on their teachings. (Lec. 3) (L) [D]

**RLS 125 Biblical Thought** (3 crs.) Selected portions of the Old and New Testaments with

emphasis on their positive contribution to the philosophy of the Jewish and Christian religions. (Lec. 3) (L)

**RLS 126 The Development of Christian Thought** (3 crs.) History of religious and philosophical ideas, development of the teachings of Christianity. Emphasis to meet needs and interests of students. Historical nature of material suitable for liberal education without regard to student's religious affiliation. (Lec. 3) (L)

**RLS 131 Introduction to Asian Philosophies and Religions** (3 crs.) Introductory study of the main philosophical and religious ideas in Asia, with emphasis on Hinduism, Buddhism, Confucianism, and Taoism. (FC) (L) [D]

## RUS | Russian

**RUS 101 Beginning Russian I** (3 crs.) Introduction to fundamentals of grammar; exercises in speaking, reading, and writing. Emphasis on pronunciation, intonation, and aural comprehension of contemporary spoken Russian. Language laboratory required. (Lec. 3) Pre: no prior Russian is required. Will not count toward the language requirement if the student has studied Russian for more than one year within the last six years. (FC) [D]

**RUS 102 Beginning Russian II** (3 crs.) Continuation of RUS 101. Students enrolling in this course should have taken RUS 101 or equivalent. (Lec. 3) (FC) [D]

**RUS 103 Intermediate Russian I** (3 crs.) Completion of fundamentals of grammar; exercises in speaking and writing, reading of contemporary texts; emphasis on distinction between spoken and written language. Language laboratory required. Students enrolling in this course should have taken RUS 102 or equivalent. (Lec. 3) (FC) [D]

**RUS 104 Intermediate Russian II** (3 crs.) Continuation of RUS 103. Students enrolling in this course should have taken RUS 103 or equivalent. (Lec. 3) (FC) [D]

**RUS 391 Masterpieces of Russian Literature** (3 crs.) Prose, poetry, and drama from late 18th through 20th centuries in translation. Emphasis on literary movements through textual analysis. Authors range from Pushkin to Pasternak, including Dostoevsky and Tolstoy. (Lec. 3) (A) [D]

**RUS 392 Masterpieces of Russian Literature** (3 crs.) Prose, poetry, and drama from late 18th through 20th centuries in translation. Emphasis on literary movements through textual analysis. Authors range from Pushkin to Pasternak, including Dostoevsky and Tolstoy. (Lec. 3) (A) [D]



## SCM | School of Communications and Media

**SCM 312 Introduction to Video Games: Design and Development** (4 crs.) Cross-listed as (SCM), ART, COM, FLM 312. Introduces video game development through the perspective of artistic design and production. Projects include pitches, storyboards and mock-ups, narratives and scripts, and prototypes. Entails substantial collaborative work. (Lec. 3, Studio 2) Pre: sophomore standing.

**SCM 313 Introduction to Video Games: Users and Contexts** (4 crs.) Cross-listed as (SCM), ART, COM, FLM, WRT 313. Introduces video game development through the perspective of different users' experiences and contexts. Projects include critical analyses, observations, multi-media pitch presentations. Requires substantial game playing outside of class. (Sem. 3, Prac. 2) Pre: sophomore standing.

## SOC | Sociology

**SOC 100 General Sociology** (3 crs.) Introductory description and analysis of the structure and dynamics of human society. Social norms, groups, intergroup relations, social change, stratification, and institutions. (Lec. 3) (S) [D]

**SOC 204 Social Psychology** (3 crs.) Examination of the social basis of self and behavior; emphasis on identity, motivation, attitude, social role, and the symbolic in social life. (Lec. 3)

**SOC 212 Families in Society** (3 crs.) Examines the role of families in maintaining and changing society. Emphasis on demographic and historical changes in family life, the diversity of family structures and connections between the family and the political economy. (Lec. 3/Online) (S) [D]

**SOC 214 Urban Sociology** (3 crs.) Introduction to major theories of urbanization; examination of the social, political, and cultural aspects of urbanization and contemporary urban problems such as the population explosion, pollution, class inequality and alienation; emphasis on a global and comparative cross-national perspective. (Lec. 3)

**SOC 216 Deviant Behavior** (3 crs.) Examination and analysis of major theories of deviant behavior. Application of these theories to particular types of deviant behavior. (Lec. 3)

**SOC 224 Health, Illness, and Medical Care** (3 crs.) Introduction to social factors in the occurrence, distribution, and treatment of illness in society; critical analysis of the social organization of medicine in contemporary American society. (Lec. 3)

**SOC 230 Crime and Delinquency** (3 crs.) Survey of the extent, distribution, trends and costs of delinquency and crime in the United States; examination of selected types of crime and delinquency; policy implications.

(Lec. 3/Online) (S) [D]

**SOC 240 Race and Ethnic Relations** (3 crs.) Cross-listed as (SOC), AAF 240. Relations among the various ethnic, religious, racial, and political minorities and majorities, with special reference to the United States. (Lec. 3) Professor Cunnigen's section is writing intensive [WI]. (S) [D]

**SOC 242 Sex and Gender** (3 crs.) Current research exploring issues of sex and gender. Socialization, gender role playing, and personal relationships. Institutional costs of sexism. Prospects for human liberation. (Lec. 3/Online) (S) [D]

**SOC 274 Criminal Justice System** (3 crs.) Cross-listed as (SOC), PSC 274. The American system of criminal justice, general processing of cases, principal actors, study of theories of criminal law, and pretrial detention and sentencing. (Lec. 3/Online)

**SOC 300 Topics In Sociology** (3 crs.) Critical study of selected topics. Subject will vary according to the expertise and availability of instructors. (Lec. 3) Pre: one 100- or 200-level sociology course. May be repeated for credit with different topic.

**SOC 301 Sociological Research Methods** (3 crs.) Scientific method in sociological research; emphasis on the development of the ability to construct and evaluate data-based arguments; topics include the nature of evidence, research design, principles and techniques of sampling, data collection and interpretation. (Lec. 3) Pre: 9 credits in SOC. Open only to sociology majors.

**SOC 318 Social Movements and Social Change** (3 crs.) Analysis of theoretical perspectives, directions, patterns, and consequences of social change in relationship to social movements. Case studies of social movements with special emphasis on the civil rights movement. (Lec. 3) Pre: 6 credits in sociology.

**SOC 320 Organizations** (3 crs.) Explores both formal and informal aspects of organizations from a sociological perspective. Topics include bureaucracy and its consequences; post-bureaucratic and postmodern forms of organization; modern and contemporary theories of organizing and organizations. (Lec. 3) Pre: one 100- or 200-level sociology course. Offered in the spring of even-numbered years.

**SOC 322 The Arts and Social Order** (3 crs.) Consideration of the relationship between the arts and socially established meanings, social structure, and societal myths, with special attention to consonant and dissonant functions of the arts for social cohesion. (Lec. 3) Pre: 6 credits in sociology or permission of instructor.

**SOC 326 Madness And Society** (3 crs.) Phenomenon of mental disorder considered in light of recent research findings and developments in sociological theory. Mental disorder discussed as an outgrowth of societal processes. (Lec. 3) Pre: 6 credits in sociology or permission of instructor.

**SOC 329 Contemporary Mexican Society** (3 crs.) Cross-listed as (SOC), APG 329. Examines the social, political, economic, and cultural dimensions of contemporary Mexico. Demographic composition, economic and political development, civil society and women's political participation, indigenous issues and rights, U.S.-Mexico relations and bilateral issues, and human rights. (Lec. 3) Pre: SOC course at the 200-level or APG 203.

**SOC 330 Police in Democratic Societies** (3 crs.) Examines the development of policing, its structures and functions, police discretion and accountability, and current innovations. Focus on the United States with comparisons to other countries. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

**SOC 331 Punishment and Corrections** (3 crs.) An overview and analysis of societal reactions to crime with emphasis on American society. Purposes of criminal sanctions, probation and parole, jails and prisons, capital punishment and its effect. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

**SOC 332 Juvenile Justice** (3 crs.) A comprehensive look at the juvenile justice system in the United States. Topics include police work, pretrial procedures, court and correctional systems, treatment programs, and issues of inequality. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

**SOC 336 Social Inequality** (3 crs.) Cross-listed as (SOC), AAF 336. Dimensions and dynamics of inequality in society; concepts of class and status; processes of social mobility. (Lec. 3) Pre: one 100- or 200-level sociology course. Professor Cunnigen's section is writing intensive [WI]

**SOC 350 Work and Family Life** (3 crs.) Linkages between economic and family institutions. Effects of work on family and of family on work. Historical development of the linkages. Contemporary effects due to men's decreasing and women's increasing labor force participation. (Lec. 3) Pre: SOC 100 or 212 or HDF 230.

**SOC 370 Theories of Crime and Delinquency** (3 crs.) Historical development of criminological theory; examination of the major sociological and social psychological theories of crime, criminality and delinquency; evaluation of competing theories. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

**SOC 401 History of Sociological Thought** (3 crs.) Examination of the basic questions and issues that have been the focus of sociological thought; critical analysis of theoretical sociology with an emphasis on the contributions of sociological theory to understanding the structures and problems of modern society. (Lec. 3) Pre: SOC 100 and 6 credits in sociology. Open only to sociology majors.

**SOC 403 Gender, Crime, and Justice** (3 crs.) Gender differences in the extent and nature of crime and delinquency; sociological explanations of the gender differences in crime and delinquency; gender differences in formal and informal social control. (Seminar) Pre: SOC 370. Not for graduate credit.

**SOC 408 Individual Life and Social Order** (3 crs.) Sociology of the individual as a creative participant in social order. Emphasis on cultural symbolism in the development of personal idiom, social structure, and social change. (Lec. 3) Pre: 9 credits in sociology or permission of instructor.

**SOC 410 Race, Crime, and Criminal Justice** (3 crs.) Examination of the involvement of selected racial and ethnic groups in crime, both as victims and offenders; disparity and discrimination in the criminal justice system. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

**SOC 413 Gender Inequality** (3 crs.) Development of gender inequality. Critique of various theories explaining inequality. Sociological interpretation of theories of gender. (Seminar) Pre: SOC 242 or permission of instructor.

**SOC 415 Migration in the Americas** (3 crs.) Cross-listed as (APG), SOC 415. Contemporary trends in migration in the Americas with a focus on migratory flows from Latin America to the United States. Migration theories, unauthorized migration, anti-immigration discourses, inter-migration in Latin America, gender dynamics, transnationalism, refugees and the internally displaced, and immigration policies in the Americas. (Lec. 3) Pre: open only to juniors, seniors, and graduate students.

**SOC 420 Family Violence** (3 crs.) Surveys the extent, distribution, trends, and costs of physical, emotional, and economic forms of family violence at individual, dyadic, and cultural levels. (Seminar) Pre: SOC major, junior or senior standing or permission of instructor. Approved for graduate credit.

**SOC 428 Institutional Racism** (3 crs.) Cross-listed as (SOC), AAF 428. Consideration of varying models of race and ethnic relations; examination of recent research on issues such as residential segregation, school desegregation, affirmative action, and racial disorders; comparisons of United States with other societies. (Seminar) Pre: one 300-level sociology course or permission of instructor. In alternate years.

**SOC 430 Intimate Relationships** (3 crs.) Cross-listed as (SOC), PSY 430. Examination of the effects of cultural, social, and psychological processes on the development, maintenance, and dissolution of intimate relationships. Emphasis on friendship patterns, dating and marital relationships, intimacy in nontraditional relationships. Emphasis on research. (Lec. 3) Pre: any 100- or 200-level course in sociology or PSY 113 or permission of instructor. Not for graduate credit.

**SOC 432 Work, Employment, and Society** (3 crs.) Cross-listed as (SOC), LRS 432. Explores the workplace and employment relations from a sociological perspective. Topics include work systems, worker alienation and organization, occupational identity, and the impacts of immigration, feminization, and globalization on the workplace. (Lec. 3) Pre: SOC 100 or permission of instructor.

**SOC 437 Law and Families in the United States** (3 crs.) Cross-listed as (HDF), SOC 437. Seminar to investigate family roles, relationships, rights, and responsibilities as defined by the law. Emphasis on explicit and implicit family policy revealed in the various branches of law. (Seminar) Pre: HDF 200 and 230 or SOC 212.

**SOC 438 Aging In Society** (3 crs.) Analysis of the use of age in assigning roles, age changes over the life course, and the implications of demographic changes for societies. Emphasis upon theories of aging, the status and power of the aged, and relations between age groups. (Lec. 3) Pre: one 300-level course in sociology or permission of instructor.

**SOC 444 The Sociology Of Religion** (3 crs.) Sociological theory and research in the analysis of interrelationships among religious culture, secular culture, the social structure of religious groups, and general social structure. (Lec. 3) Pre: one 100- or 200-level sociology course.

**SOC 452 Class and Power** (3 crs.) Class structures and patterns of power in advanced societies; comparisons of inequality in capitalist and socialist societies; theories of the relation between class and power; class consciousness, conflict, and accommodation. (Lec. 3) Pre: 6 credits in SOC. In alternate years.

**SOC 476 Policy Issues In Criminal Justice** (3 crs.) Cross-listed as (SOC), PSC 476. Examination of current and proposed criminal justice policies in light of social science theory and research, including capital punishment, community policing, gun control, intermediate sanctions, legalization of drugs, mandatory sentencing, privatization of prisons, restorative justice. (Seminar) Pre: SOC 274 (or PSC 274) and SOC 301, and permission of instructor.

**SOC 495 Senior Seminar In Sociology** (3 crs.) Critical examination of selected topics in sociology. Particular topics for examination will be selected by the course instructor. Required for students in the B.A. program in sociology. (Seminar) Pre: senior standing; open only to sociology majors. Not for graduate credit.

**SOC 497 Field Experience In Sociology PRA** (3 crs.) Field experience in an approved government agency or non-profit organization; practice in applying sociological concepts and methods to the analysis of problems faced by the agency and/or its clients, exploration of career opportunities. (Practicum) Service Learning. Pre: junior or

senior standing and 6 credits in SOC beyond 100. May be repeated for a maximum of 6 credits. Not for graduate credit. Open only to Sociology majors or permission of instructor.

**SOC 498 Independent Study** (3 crs.) Areas of special research not covered in other courses. May be taken as honors courses. (Independent Study) Pre: one 300-level sociology course and permission of instructor.

**SOC 499 Independent Study** (3 crs.) Areas of special research not covered in other courses. May be taken as honors courses. (Independent Study) Pre: one 300-level sociology course and permission of instructor.

**SOC 505 Public Program Evaluation** (3 crs.) Cross-listed as (PSC), SOC 505. Research design and methodologies associated with the evaluation of governmental programs and activities. (Lec. 3) Pre: STA 308 or equivalent or permission of instructor.

**SOC 595 Environment and Development Economics** (3 crs.) Cross-listed as (EEC), MAF, PSC, SOC 595. Application of economic principles and research methods to understand the economics of environmental and natural resource management and poverty alleviation. (Lec. 3) Pre: EEC 528 or permission of instructor.

**SOC 610 Parsimony Methods** (3 crs.) Cross-listed as (PSY), STA 610. Multivariate procedures designed to reduce the dimensionality and help in the interpretation of complex data sets. Methods include principal components analysis, common factor analysis, and image analysis. Related methods: cluster analysis and multidimensional scaling. Applications involve the use of existing computer programs. (Lec. 3) Pre: PSY 533 or STA 541 or equivalent. In alternate years.

## SPA | Spanish

**SPA 101 Beginning Spanish I** (3 crs.) Introduction to Spanish for beginners. (Lec. 3) Pre: no prior Spanish is required. Will not count toward the language requirement if the student has studied Spanish for more than one year within the last six years. (FC) [D]

**SPA 102 Beginning Spanish II** (3 crs.) Continuation of SPA 101. Students enrolling in this course should have taken SPA 101 or equivalent. (Lec. 3) (FC) [D]

**SPA 103 Intermediate Spanish I** (3 crs.) Reading and discussion of representative authors, grammar review, and continued practice in language skills to broaden understanding of Hispanic culture. Students enrolling in this course should have taken SPA 102 or equivalent. (Lec. 3) (FC) [D]

**SPA 104 Intermediate Spanish II** (3 crs.) Continuation of SPA 103. Students enrolling in this course should have taken SPA 103 or equivalent. (Lec. 3) (FC) [D]

**SPA 111 Accelerated Elementary Spanish** (6 crs.) Accelerated elementary Spanish

equivalent to 101 and 102. Develops basic communication skills in Spanish. Explores the products, practices and perspectives of Hispanic culture. (Lec. 6) (FC) [D]

**SPA 113 Accelerated Intermediate Spanish** (6 crs.) Accelerated intermediate Spanish equivalent to 103 and 104. Develops intermediate communication skills in Spanish. Explores the products, practices and perspectives of Hispanic culture. (Lec. 6) Pre: SPA 102 or 111 or permission of instructor. (FC) [D]

**SPA 205 Spanish Language and Style I** (3 crs.) Advanced-intermediate course for non-heritage speakers of Spanish. Development and refinement of all Spanish language skills, with emphasis on writing, through structured practice using Hispanic cultural and literary material. Students enrolling in this course should have taken SPA 104 or equivalent. (Lec. 3/Online) Note: Not open to heritage speakers of Spanish. (FC) [D]

**SPA 206 Spanish Language and Style II** (3 crs.) Continuation of SPA 205. Students enrolling in this course should have taken SPA 205 or equivalent. (Lec. 3) (FC) [D]

**SPA 207 Oral Expression in Spanish** (3 crs.) Development of oral skills in Spanish through discussion, interpretation, and reports on topics of personal, practical, and cultural interest. Students enrolling in this course should have taken SPA 205 or equivalent. (Lec. 3) May be taken concurrently with SPA 206. Note: Not open to native speakers of Spanish. (FC) [D]

**SPA 210 Spanish for Heritage Speakers** (3 crs.) Fundamentals of Spanish grammar, spelling, and writing designed to address the specific needs of heritage speakers with academic background in Spanish. Note: Not open to non-native students. (Lec. 3) (FC) [D]

**SPA 305 Early Spanish-American Literature and Culture** (3 crs.) Study of the early development of Spanish-American culture through its literature, from Conquest to Independence. (Lec. 3) Pre: SPA 206 or permission of instructor. (A) [D]

**SPA 306 Modern Spanish-American Literature and Culture** (3 crs.) Significant figures and developments in literature, the arts, and society, from Independence to the present. (Lec. 3) Pre: SPA 206 or permission of instructor. (A) [D]

**SPA 307 Hispanic Culture Through the 17th Century** (3 crs.) Significant contributions in literature and the arts, from the unique period of coexistence of Christians, Jews, and Muslims through the Golden Age of the 16th and 17th centuries. (Lec. 3) Pre: SPA 206. (A) [D]

**SPA 308 Literature and Culture of Modern Spain** (3 crs.) Major figures and developments in Spanish literature, the arts, and society from the 18th century to the present. (Lec. 3) Pre: SPA 206 or permission of instructor. (A) [D]

**SPA 310 Field Workshop WRK** (1-6 crs.) Cultural visit to Spain or Hispanic America. Significant monuments and places of interest to the student of literature and civilization will be studied. Lectures supplemented by assigned readings. (Workshop) Pre: SPA 104 or permission of instructor.

**SPA 312 Advanced Spanish** (3 crs.) Problematic aspects of Spanish grammar; proper syntax and word usage in speaking, translation, and writing at sophisticated levels; correct reproduction of sounds and intonation patterns. (Lec. 3) Pre: SPA 206 or permission of instructor.

**SPA 313 Introduction to Spanish Linguistics** (3 crs.) Introduction to Spanish linguistics with focus on what human languages are and how they are used. Analysis of Spanish phonetics, phonology, morphology, and syntax, along with issues of language variation and bilingualism in Spanish speaking communities. (Lec. 3) Pre: SPA 312.

**SPA 316 Spanish Internship Abroad** (3-6 crs.) Supervised work experience in Spanish-speaking country for advanced language students. (Independent Study) Pre: SPA 321. For credit for the B.A. in Spanish only for students also completing a B.S. in engineering.

**SPA 317 Spanish Internship Abroad** (3-6 crs.) Supervised work experience in Spanish-speaking country for advanced language students. (Independent Study) Pre: SPA 321. For credit for the B.A. in Spanish only for students also completing a B.S. in engineering.

**SPA 320 Critical Studies in Spanish Cinema** (3 crs.) Study of major Spanish film genres and of prominent Spanish film directors. Emphasis will vary. Course taught in English. Students counting the course for a major or minor in Spanish are required to do all written work in Spanish and must have credit for SPA 206. (Lec. 3) FLM 101 or equivalent recommended. May be repeated with different topics for a total of 6 credits. (A) (FC) [D]

**SPA 321 Spanish for Business and Technology** (3 crs.) Study of the concepts and terminology of the Spanish language common to the realm of international business and engineering. (Lec. 3). SPA degree credit only for B.S. Business or B.S. Engineering students also completing B.A. in Spanish. Pre: SPA 206 or equivalent.

**SPA 325 Introduction to Literary Genres** (3 crs.) Presentation of the novel, poetry, drama, and essay as literary genres. Textual commentary and methods of criticism. (Lec. 3) Pre: SPA 206 or permission of instructor. Required for Spanish majors.

**SPA 401 Oral and Dramatic Presentation of Hispanic Literature** (3 crs.) Practice in effective oral communication in Spanish and appreciation of Hispanic literature through analysis and class presentation of drama, poetry, and prose. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 412 Advanced Technical Spanish** (3 crs.) Cross-listed as (EGR), SPA 412. Seminar on advanced scientific and engineering topics in an international context. All reading, writing and discussion will be conducted in Spanish. (Seminar) Pre: any 400-level course in Spanish and senior standing in an approved engineering program. Not for graduate credit.

**SPA 413 Spanish Sociolinguistics and Pragmatics** (3 crs.) Study of Spanish sociolinguistics and pragmatics. Analysis of speech variants or dialects and the factors that determine them. Examination of the use of language in context and the ways in which speakers interpret discourse. (Lec. 3) Pre: any 300-level SPA course or permission of the instructor.

**SPA 421 Business Spanish** (3 crs.) Study of concepts and terminology in the Spanish-speaking business world. (Lec.3) Not for graduate credit in Spanish. SPA degree credit only for B.S. Business or B.S. Engineering students also completing B.A. in Spanish. Pre: credit or concurrent enrollment in a 300-level Spanish course.

**SPA 430 Castilian Prose of the 16th and 17th Centuries** (3 crs.) Literary significance of the Renaissance and Baroque periods and an analysis and critical examination of the prose works of the principal writers of this Golden Age of Castilian Literature. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 431 Drama and Poetry of the 16th and 17th Centuries** (3 crs.) Spanish poetry and drama from the early Renaissance through the Baroque. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 471 Topics in Latin American Literature and Culture** (3 crs.) Latin American topics or author not emphasized in other courses. (Seminar) Pre: SPA 325 or permission of instructor. May be repeated with a change in topic for a maximum of 6 credits.

**SPA 472 Topics in Hispanic Linguistics** (3 crs.) Topics in Hispanic linguistics not emphasized in other courses. (Seminar) Pre: SPA 325 or permission of instructor. May be repeated with a change in topic for a maximum of 6 credits.

**SPA 473 Topics in Spanish Literature and Culture** (3 crs.) Spanish topics or authors not emphasized in other courses. (Seminar) Pre: SPA 325 or permission of instructor. May be repeated with a change in topic for a maximum of 6 credits.

**SPA 481 Don Quijote** (3 crs.) Life and times of Miguel de Cervantes Saavedra and the reading and critical interpretation of his work. *El ingenioso hidalgo Don Quijote de la Mancha*. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 485 Modern Spanish Narrative** (3 crs.) Representative narrative works by Spain's major authors from the Generation of 1898 to the present. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 486 Modern Spanish Poetry and Drama** (3 crs.) Selected poetry and plays from the 19th century through the present. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 488 Spanish-American Poetry and Drama** (3 crs.) Traces the development of poetic expression and drama from the 17th century to modern times as a reflection of the evolution of Spanish-American identity. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 489 The Spanish-American Narrative** (3 crs.) Traces the development of fictional prose in Spanish America from the colonial period to modern times as a reflection of cultural and societal changes. (Lec. 3) Pre: SPA 325 or permission of instructor.

**SPA 497 Directed Study** (1-3 crs.) For the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: SPA 325, acceptance of project by faculty member, and approval of section head.

**SPA 498 Directed Study** (1-3 crs.) For the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: SPA 325, acceptance of project by faculty member, and approval of section head.

**SPA 510 Contemporary Spanish Workshop WRK** (3-6 crs.) New developments in all areas of Hispanic studies including pedagogical matters and classroom techniques. (Workshop) Pre: graduate standing or permission of instructor.

**SPA 511 The Spanish of the Americas** (3 crs.) Examines linguistic dialect variation within Spanish and the factors that determine it. Individual and social bilingualism and its educational implications are also discussed. (Seminar) Pre: graduate standing or permission of instructor.

**SPA 513 Bilingualism in Spanish-speaking Communities** (3 crs.) Study of bilingualism from perspective of psycholinguistics. Study of different bilingual educational models and programs in the Spanish-speaking world and in the U.S.

**SPA 561 Seminar In Medieval Poetry And Prose** (3 crs.) Examination and analysis of the epic, lyrical, and narrative medieval literature of Spain and its impact on subsequent literature. (Seminar) Pre: graduate standing or permission of instructor.

**SPA 570 Topics In Hispanic Literature And Culture** (3 crs.) Special topics or authors not emphasized in other courses. (Seminar) Pre: graduate standing or permission of instructor.

**SPA 572 Evolution of Spanish-American Culture and Thought** (3 crs.) Development of Spanish-American thought and cultural trends, as portrayed in major works of artists and thinkers. (Lec. 3) Pre: graduate standing or permission of instructor.

**SPA 574 Interpretations Of Modern Spanish-american Thought** (3 crs.) Topics of interest in the development of modern Spanish-American thought as represented in the essay from the period of independence to the present. (Seminar) Pre: graduate standing or permission of instructor.

**SPA 580 Seminar in 19th-Century Spanish Literature** (3 crs.) Selected authors and topics from the Spanish Romantic movement through realism and naturalism. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic and permission of instructor.

**SPA 584 Interpretations of Modern Spain** (3 crs.) Development of Spanish thought particularly with respect to sociological and cultural problems from the 18th century to the contemporary period as seen through the writings of significant essayists. (Lec. 3) Pre: graduate standing or permission of instructor. In alternate years.

**SPA 585 Seminar in 20th and 21st Century Spanish Literature** (3 crs.) Topics of aesthetic, cultural, and linguistic concern in 20th century and 21st century peninsular literature. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic and permission of instructor.

**SPA 587 Seminar In Renaissance And Baroque Literature** (3 crs.) Aesthetic analysis of works representative of the period and their influence on subsequent literatures. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic and permission of instructor.

**SPA 588 Seminar in Colonial Spanish-American Literature** (3 crs.) Topics of interest dealing with the development of Spanish-American cultural identity and literature from the period of discovery and colonization to independence. (Seminar) Pre: graduate standing or permission of the instructor. May be repeated with different topic and permission of instructor.

**SPA 589 Seminar in Modern Spanish-American Literature and Culture** (3 crs.) Topics of interest dealing with the development of Spanish-American literature and culture from the period of independence to the present. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic.

**SPA 590 The Hispanic Presence in the United States** (3 crs.) A study of the establishment of the Hispanic presence and its heritage in the art, folklore, and language of the United States, and an analysis of the literature of the Spanish-speaking peoples. (Lec. 3) Pre: graduate standing or permission of instructor. In alternate years.

**SPA 597 Directed Study** (3 crs.) Individual research and reports on problems of special interest. (Independent Study) Pre: graduate standing and approval of the director of graduate studies. May be repeated with different topic.

**SPA 598 Directed Study** (3 crs.) Individual research and reports on problems of special interest. (Independent Study) Pre: graduate standing and approval of the director of graduate studies. May be repeated with different topic.

**SPA 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## STA | Statistics

**STA 220 Statistics In Modern Society** (3 crs.) Elementary concepts in sampling, polls, surveys, random samples. Foundations of statistical inference; estimation, comparison prediction. Statistics for the consumer, quality of data, credibility of statistical evidence. Environmental measurements and experiments. (Lec. 2, Rec. 1) (MQ)

**STA 307 Introductory Biostatistics** (4 crs.) Statistical methods applicable to health sciences. Data presentation. Vital statistics and life tables. Fitting models to health data. Testing, estimation, analysis of cross-classifications, regression, correlation. (Lec. 3, Rec. 1) Pre: MTH 107 or 108 or 131 or 141 or permission. Not open to students with credit in 308 or 409.

**STA 308 Introductory Statistics** (4 crs.) Descriptive statistics, presentation of data, averages, measures of variation. Elementary probability, binomial and normal distributions. Sampling distributions. Statistical inference, estimation, confidence intervals, testing hypotheses, linear regression, and correlation. (Lec. 3, Rec. 1) Pre: MTH 107 or 110 or 111 or 131 or 141 or BUS 111 or permission of instructor. Not open to students with credit in STA 307 or 409.

**STA 409 Statistical Methods in Research I** (3 crs.) Same as STA 308, but is for students who have better mathematical preparation. (Lec. 3) Pre: MTH 131 or 141. Not open to students with credit in STA 307 or 308.

**STA 411 Biostatistics II** (3 crs.) Cross-listed as (STA), PHP, BPS 411. An overview of statistical methods used in performing research in pharmacotherapeutics and pharmacoepidemiology. Emphasis will be on understanding both common study designs and the output from statistical analysis of data obtained from these studies. (Lec. 3) Pre: an introductory statistics course (i.e., 307) or permission of instructor.

**STA 412 Statistical Methods in Research II** (3 crs.) Multiple linear regression and correlation analysis, curvilinear regression. Analysis of variance and covariance. Analysis of enumerative data. Some nonparametric methods. (Lec. 3) Pre: STA 307 or 308 or 409.

**STA 491 Directed Study in Statistics** (1-3 crs.) Advanced work in statistics. Conducted as supervised individual projects. (Independent Study) Pre: permission of chairperson.

S/U credit.

**STA 492 Special Topics in Statistics** (3 crs.) Advanced topics of current interest in statistics. (Lec. 3) Pre: permission of chairperson.

**STA 501 Analysis of Variance and Variance Components** (3 crs.) Analysis of variance and covariance, experimental design models, factorial experiments, random and mixed models, estimation of variance components, unbalanced data. (Lec. 3) Pre: STA 412.

**STA 502 Applied Regression Analysis** (3 crs.) Topics in regression analysis including subset selection, biased estimation, ridge regression, and nonlinear estimation. (Lec. 3) Pre: STA 412.

**STA 513 Quality Systems** (3 crs.) Cross-listed as (ISE), STA 513. Topics in statistical quality control systems. Single, multiple, and sequential sampling. Design and analysis of a wide variety of statistical control systems used in conjunction with discrete and continuous data, for several kinds of data emission. (Lec. 3) Pre: ISE 411 or equivalent.

**STA 515 Spatial Data Analysis** (3 crs.) Analysis of point patterns: visualizing, exploring, and modeling, space time clustering, correcting for spatial variation, clustering around a specific point source. Analysis of spatially continuous data: variogram analysis and Kriging methods. (Lec. 3) Pre: STA 412 or permission of instructor.

**STA 517 Small N Designs** (3 crs.) Cross-listed as (PSY), STA 517. A survey of Small N experimental methodology appropriate for repeated observations on a single unit or individual. Methods include quasi-experimental designs, interrupted time series, and multivariate time series. Applications in applied research, particularly behavioral intervention. (Seminar) Pre: PSY 532 and 533. In alternate years.

**STA 520 Fundamentals of Sampling and Applications** (3 crs.) Simple random sampling; properties of estimates, confidence limits. Sample size. Stratified random sampling; optimum allocation, effects of errors, and quota sampling. Regression and ratio estimates; systematic and multistage sampling. (Lec. 3) Pre: STA 308 or 409.

**STA 522 Bioinformatics I** (3-4 crs.) Cross-listed as (CSC), STA, MIC, BCH, CSC 522, BPS 542. Integrates computing, statistical, and biological sciences, algorithms, and data analysis/management. Multidisciplinary student research teams. Modeling dynamic biological processes. Extra project work for 4 credits. (Lec. 3, Project 3) Pre: major in a computing, statistical, or biological science or permission of instructor.

**STA 532 Experimental Design** (3 crs.) Cross-listed as (STA), PSY, AFS 532. Application of statistical methods to biological and psychological research and experimentation. Experimental situations for which various ANOVA and ANCOVA designs are most suit-

able. (Lec. 3) Pre: STA 409 or equivalent.

**STA 535 Statistical Methodology in Clinical Trials** (3 crs.) Bioavailability, dose response models, crossover and parallel designs, group sequential designs, survival analysis, meta analysis. (Lec. 3) Pre: STA 409, 411, or 412 or permission of instructor.

**STA 536 Applied Longitudinal Analysis** (3 crs.) Longitudinal Data, Linear Mixed Effects Models, Repeated Measures ANOVA, Generalized Linear Models for Correlated Data. (Lec. 3) Pre: STA 411 or STA 412 or permission of instructor.

**STA 541 Multivariate Statistical Methods** (3 crs.) Review of matrix analysis. Multivariate normal distribution. Tests of hypotheses on means, Hotelling's T<sup>2</sup>, discriminate functions. Multivariate regression analysis. Canonical correlations. Principal components. Factor analysis. (Lec. 3) Pre: STA 412.

**STA 542 Categorical Data Analysis Methods** (3 crs.) Analysis of multidimensional categorical data by use of log-linear and logit models. Discussion of methods to estimate and select models followed by examples from several areas. (Lec. 3) Pre: STA 412.

**STA 545 Bayesian Statistics** (3 crs.) Introduces Bayesian methods for a variety of statistical problems. Topics include Bayesian inference, model selection, Bayesian computation, hierarchical models and Gibbs sampling. Open-source software will be utilized for Bayesian data analyses. (Lec. 3) Pre: STA 411 or STA 412 or permission of instructor.

**STA 550 Ecological Statistics** (3 crs.) Application of statistical methodology to the following topics: population growth, interactions of populations, sampling and modeling of ecological populations, spatial patterns, species abundance relations, and ecological diversity and measurement. (Lec. 3) Pre: STA 409 or permission of instructor.

**STA 576 Econometrics** (4 crs.) Cross-listed as (EEC), ECN, STA 576. Application of statistics and mathematics to economic analysis. Implication of assumption required by statistical methods for testing economic hypotheses. Current econometric methods examined and discussed. (Lec. 3, Lab. 2) Pre: ECN 575 or equivalent, STA 308 or equivalent, or permission of instructor.

**STA 584 Pattern Recognition** (3 crs.) Cross-listed as (ELE), STA 584. Random variables, vectors, transformations, hypothesis testing, and errors. Classifier design: linear, nonparametric, approximation procedures. Feature selection and extraction: dimensionality reduction, linear and nonlinear mappings, clustering, and unsupervised classification. (Lec. 3) Pre: ELE 509 or introductory probability and statistics, and knowledge of computer programming.

**STA 591 Directed Study in Statistics** (1-3 crs.) Advanced work in experimental statistics conducted as supervised individual projects. (Independent Study) Pre: permission of chair-

person. S/U credit.

**STA 592 Special Topics in Statistics** (3 crs.) Advanced topics of current interest in statistics. (Lec. 3) Pre: permission of chairperson. May be taken more than once.

**STA 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**STA 612 Structural Modeling** (3 crs.) Cross-listed as (PSY), STA 612. Theory and methodology of path analysis with latent variables. Discussion of causation and correlation, Confirmatory Factor Analysis, Measurement and Structural Equation models. Practical applications using current computer programs (e.g. EQS). (Lec. 3) Pre: PSY 533 or 610.

## SUS | Sustainability

**SUS 108 Spaceship Earth: An Introduction to Systems** (4 crs.) Cross-listed as (COM), ECN, SUS 108. Through in-depth study of films, readings and web sites, students will explore the economic and ecological principles of sustainability and the rhetorical strands linking scientific evidence, public policies and individual behavior. (Lec. 3, Rec. 1) (EC) (S)

**SUS 315 Environmental Dimensions of Communication** (3 crs.) Cross-listed as (COM), SUS 315. Investigation of individual and mediated environmental messages, analysis and experimentation with the ways communication can affect environmental knowledge, attitudes and behavior, design of communication campaigns to affect resource use and ecological responsibility. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

## THE | Theatre

**THE 100 Introduction To Theatre** (3 crs.) Designed to provide students with a theoretical and practical understanding of the theatrical process as well as to develop critical standards and increase the enjoyment of theatre as an art. (Lec. 2, Lab. 4) Not open to theatre majors. (A)

**THE 111 Introduction To Acting** (3 crs.) Designed to initiate students to theatre as a collaborative art through systematic exposure to the principles and techniques of acting. (Studio 6)

**THE 112 Introduction to Acting II** (3 crs.) To expand the work of THE 111 (exercise for relaxation, concentration, imagination) with character work on a monologue and scene complemented by intense work on voice, text and movement, (Lec. 2, Lab. 2) Pre: THE 111.

**THE 161 Introduction to Stagecraft** Stage carpentry, rigging, properties, scene painting,

and lighting mechanics with practical experience working on productions. (Lec. 2, Lab. 2)

**THE 181 Script Analysis** (3 crs.) Analysis of plays from varying perspectives of the actor, director, and designer. Course emphasizes theatre terminology and develops a working vocabulary. (Lec. 3) (A)

**THE 182 Script Analysis for Film Media** (3 crs.) Understanding scripts through analysis of structure, character, language, genre and style and their evolution from page to film. Scripts, videos and DVD's will be studied. (Lec. 3)

**THE 211 Basic Acting I** (3 crs.) Introduction to the theory and basic techniques of acting. Includes moment-to-moment improvisation, the reality of doing, fantasy work, and voice and movement. (Studio 6) Pre: THE 111, 117, or permission of instructor; concurrent enrollment in THE 213.

**THE 212 Basic Acting II** (3 crs.) Continuation of 211. Introduction to the theory and basic techniques of acting. Includes moment-to-moment improvisation, the reality of doing, fantasy work, and voice and movement. (Studio 6) Pre: THE 211 and permission of instructor; concurrent enrollment in THE 214.

**THE 213 Acting Workshop** (1 cr.) A voice-movement workshop to be taken concurrently with THE 211. (Studio 2) Pre: concurrent enrollment in THE 211.

**THE 214 Acting Workshop** (1 cr.) A voice-movement workshop to be taken concurrently with THE 212. (Studio 2) Pre: concurrent enrollment in THE 212.

**THE 217 The Role Of Music In Theatre** (3 crs.) Perspectives on music and its relationship and application to the theatre for theatre students. Musical vocabulary, performance techniques, and conventions related to the theatre. Emphasis on relationship of music and musical performance to all aspects of theatrical production. (Studio 6) Pre: permission of instructor. May be repeated for a maximum of 6 credits with permission of instructor.

**THE 221 Stage Management** (3 crs.) Theoretical and practical study of the basic methods and procedures of the production with emphasis on the director-stage manager relationship and the role of each. Participation in productions required. (Lec. 2, Lab. 2)

**THE 227 Dance For Musical Theatre** (3 crs.) Orientation and instruction in beginning dance for the musical stage. Dance vocabulary in jazz, ballet, tap; performance techniques and conventions related to the American musical. (Studio 6) Pre: theatre major or permission of instructor. May be repeated once with permission of instructor.

**THE 237 Stage Combat** (3 crs.) Fundamental principles of safety, form, choreographic conception and execution. Unarmed combat included. Eventual application in a performance environment geared to beginning

and advanced students. (Studio) Pre: permission of instructor.

**THE 250 Costume Laboratory** (3 crs.) Practical experience in the principles of costuming including construction and finishing techniques, and experience working on a theatrical production. (Lec. 1, Lab. 4)

**THE 261 Introduction To Theatre Design** (3 crs.) Introduction to theatre production design with emphasis on development of capabilities for expression in conceptual and graphic terms. Projects in stage scenery, costumes, and lighting. (Lec. 2, Lab. 2)

**THE 291 Production Laboratory** (1 cr.) Orientation and instruction in theatre through tutored participation in crews and production assignments or projects for departmental productions. (Independent Study) May be repeated for credit.

**THE 300 Individual Problems in Theatre Studies** (1-3 crs.) Individual theatre work on an approved project under supervision of a faculty member. (Independent Study) Pre: permission of staff. May be repeated for a maximum of 6 credits.

**THE 301 Special Group Studies** (1-3 crs.) Group theatre work in approved production projects under supervision of a faculty member. (Independent Study) Pre: permission of staff. May be repeated for a maximum of 6 credits.

**THE 307 Creative Dramatics** (3 crs.) Explores purposes, techniques and benefits of drama in the K-12 classroom. Theory and practice of creative dramatics, methodologies and activities. Teaching practicum in and out of the class to develop utilization of creative drama to teach a variety of skills. (Lec. 2, Lab. 2)

**THE 311 Intermediate Acting I** (3 crs.) Continuation of Basic Acting with emphasis on approaches to characterization through improvisation and through the analysis and performance of assigned scenes. (Studio 6) Pre: THE 212; concurrent enrollment in THE 313.

**THE 312 Intermediate Acting II** (3 crs.) Continuation of THE 311. Continuation of Basic Acting with emphasis on approaches to characterization through improvisation and through the analysis and performance of assigned scenes. (Studio 6) Pre: THE 311 and concurrent enrollment in THE 314.

**THE 313 Acting Workshop** (1 cr.) A voice-movement workshop to be taken concurrently with THE 311. (Studio 2) Pre: concurrent enrollment in THE 311.

**THE 314 Acting Workshop** (1 cr.) A voice-movement workshop to be taken concurrently with THE 312. (Studio 2) Pre: concurrent enrollment in THE 312.

**THE 321 Orientation To Play Direction** (3 crs.) Director's role in the process of theatre production. Emphasis on development of production concepts and rehearsal techniques. (Lec. 2, Lab. 2)

**THE 322 Play Direction PRA** (3 crs.) Practical course in play direction. Class functions as a production unit and mounts a season of one-act plays. (Practicum: minimum of 6 hours per week) Pre: THE 321 and permission of instructor.

**THE 331 Playwriting** (3 crs.) Analysis and evaluation of written material supplemented by play readings and workshop tryouts of students' plays. (Lec. 2, Lab. 2)

**THE 341 Theatre Management** (3 crs.) Principles, terminology, and practical technique of theatre administration. Assignments will be made to departmental productions. (Lec. 2, Lab. 2)

**THE 350 Makeup** (1 cr.) Principles and techniques of stage makeup. Practical experience in application through a number of projects in developing character makeups with prosthetics, wigs, and facial hair. (Studio 2) Open to senior theatre majors only. Others by permission of instructor.

**THE 351 Principles and Theories of Theatrical Costuming I** (3 crs.) Analytical study of fashions, modes, and manners in Western civilization as required for modern theatrical production; Greek through the Renaissance. (Lec. 3) (A) [D]

**THE 352 Principles and Theories of Theatrical Costuming II** (3 crs.) Analytical study of fashions, modes, and manners in Western civilization as required for modern theatrical production; the Renaissance to the present. (Lec. 3) (A) [D]

**THE 355 Stage Costume Design** (3 crs.) Costume design theories and techniques for modern and period plays in a wide variety of styles. (Studio 6) Pre: THE 261 and 351 or 352 or permission of instructor.

**THE 362 Scene Painting** (3 crs.) Problems in scene painting, including use of color, basic techniques in scenic art such as texturing, trompe l'oeil, work from design elevations, carving, and some work in plastics. (Studio 3)

**THE 365 Scene Design** (3 crs.) Theories and techniques of scenic design, emphasizing conceptualization and development of stage setting through project designs for various stage forms, production styles, and periods. (Studio 6) Pre: THE 261 or permission of instructor.

**THE 371 Stage Lighting** (3 crs.) Theories and techniques of lighting for the stage. A series of design projects and lab work introduces students to script analysis and conceptualization for lighting, instrumentation, and the use of color in stage lighting. (Lec. 2, Lab. 2)

**THE 381 History of Theatre to 1642** (3 crs.) General history of the theatre from its origins through the Renaissance. Introduction to non-Western drama of the period. Course focuses on the actor, staging, and the audience as they have influenced the development of the theatre and dramatic literature. (Lec. 3) (A)

**THE 382 History of Theatre: Neoclassical Through the 19th Century** (3 crs.) Course includes non-Western drama of China, Japan, and Korea. Continuation of THE 381. (Lec. 3) (A)

**THE 383 History of the Modern Theatre** (3 crs.) Modern theatre and drama from 1880 to the present. Course includes new European stagecraft and its influence on the development of modernist and post-modernist drama, and contemporary non-Western drama. (Lec. 3) (A)

**THE 384 American Theatre History** (3 crs.) Origins and development of American theatre from the wilderness to the contemporary Broadway and off-Broadway stage, including the evolution of the musical play. Analysis of special contributions made by the grassroots movement, the university theatres, the Federal Theatre Project, and the regional theatre movement. (Lec. 3)

**THE 391 Advanced Production Laboratory** (1-2 crs.) Advanced instruction in theatre through tutored participation in crews and production assignments or projects for departmental productions. (Independent Study) May be repeated for credit.

**THE 400 Advanced Individual Problems in Theatre Studies** (1-3 crs.) Advanced individual theatre work on an approved project under supervision of a faculty member. (Independent Study) Pre: permission of staff. May be repeated for a maximum of 6 credits. Not for graduate credit.

**THE 401 Advanced Special Group Studies** (1-3 crs.) Advanced group theatre work in approved production projects under supervision of a faculty member. (Independent Study) Pre: permission of staff. May be repeated for a maximum of 6 credits. Not for graduate credit.

**THE 411 Scene Study** (3 crs.) Emphasis on the analysis and interpretation of assigned scenes representative of the major theatrical genres and styles. (Studio 6) Pre: for THE 411, 311, 312, and permission of instructor and concurrent enrollment in THE 417. Not for graduate credit.

**THE 412 Scene Study** (3 crs.) Emphasis on the analysis and interpretation of assigned scenes representative of the major theatrical genres and styles. (Studio 6) Pre: THE 411 and permission of instructor and concurrent enrollment in THE 418. Not for graduate credit.

**THE 413 Special Workshop In Acting** (3 crs.) Techniques related to a specific aspect or style of performance; e.g., masks, puppetry, verse-speaking, and improvisation. The study is normally related to a departmental production or special project. (Studio 6) Pre: permission of instructor. May be repeated for a maximum of 6 credits. Not for graduate credit.

**THE 415 Professional Internship PRA** (6-12 crs.) Designed for junior and first-semester senior theatre majors who desire a professional experience. This program provides

instruction and practical experience in cooperation with a faculty advisor and a professional theatre. (Practicum) Pre: permission of chairperson. Not for graduate credit.

**THE 417 Acting Workshop** (1 cr.) A voice-movement workshop to be taken concurrently with THE 411. (Studio 2) Pre: concurrent enrollment in THE 411. Not for graduate credit.

**THE 418 Acting Workshop** (1 cr.) A voice-movement workshop to be taken concurrently with THE 412. (Studio 2) Pre: concurrent enrollment in THE 412. Not for graduate credit.

**THE 420 Advanced Directing Practice** (1-3 crs.) Special projects for the advanced directing student. Student directors will assume production responsibilities for all aspects of their projects, including a critical analysis upon completion. Weekly tutorial required. (Independent Study) Pre: THE 321, 322, or equivalent and permission of instructor. Not for graduate credit.

**THE 441 Advanced Theatre Management PRA** (3 crs.) Individual projects of theatre management in a major departmental production or project. (Practicum) Pre: THE 341. Not for graduate credit.

**THE 451 Stage Costume Technology** (3-6 crs.) Construction methods and techniques appropriate to stage costuming with emphasis on major theatrical periods and productions. (Studio 6) Pre: THE 351 or 352 or permission of instructor. May be repeated for a maximum of 6 credits. Not for graduate credit.

**THE 455 Advanced Costuming** (1-3 crs.) Individual projects in costume design for studio or major productions. Styles and theory related to projects; costume sketches and construction. (Independent Study) Pre: THE 355 or permission of instructor. Not for graduate credit.

**THE 463 Special Workshop in Design and Technical Theatre** (3 crs.) Techniques related to a specific aspect or style of production; e.g., masks, puppetry, wig making, sound effects, projections, properties. Normally related to a departmental production or special project. (Lab. 6) May be repeated for a maximum of 6 credits. Not for graduate credit.

**THE 465 Advanced Scene Design** (1-3 crs.) Individual projects in designing scenery for studio and major productions. (Studio 2-6) Pre: THE 365 and permission of instructor. Not for graduate credit.

**THE 475 Advanced Stage Lighting** (1-3 crs.) Individual projects in lighting design and control for studio and major productions. (Studio 2-6) Pre: THE 371 and permission of instructor. Not for graduate credit.

**THE 481 Topics In Theatre** (3 crs.) Selected topics in theatre. (Seminar) May be repeated for credit with different topic.

**THE 484 Special Research Project** (3

crs.) An in-depth study of a single critical or historical aspect of theatre. The subject is normally related to a departmental production. (Independent Study) Pre: upper-division standing. May be repeated for a maximum of 6 credits. Not for graduate credit.

**THE 499 Senior Seminar** (1 cr.) A capstone seminar for the graduating Theatre major. Content will be developed to assist in the transition from the educational realm to the professional world with Portfolio development and assessment as integral experience. (Seminar) Pre: senior standing and major or minor in theater.

## THN | Thanatology

**THN 360 Impact of Death on Behavior** (3 crs.) Cross-listed as (NUR), THN 360. Seminar to explore the human experience of dying and the issue of quality of life. Group discussion focuses on the effect that individual and social values and medical and social structures have on one's grief response and bereavement process. (Lec. 3) (L) [D]

**THN 360H Honors Section of NUR/THN 360: Impact of Death on Behavior** (3 crs.) Cross-listed as (NUR), THN 360H. Honors Section of NUR/THN 360: Impact of Death on Behavior. (Lec. 3) Pre: must have a 3.30 overall GPA. (L) [D]

**THN 390 Directed Study** (1-3 crs.) Cross-listed as (NUR), THN 390. Research study or individual scholarly project relating to the nursing major. Faculty guidance in problem delineation and in development, implementation, and evaluation of the project. (Independent Study) Pre: admission to the College of Nursing and prior faculty approval. S/U credit.

**THN 421 Death, Dying, and Bereavement** (3 crs.) Cross-listed as (HDF), THN 421. Exploration of human death, dying and bereavement. Focus on biomedical, psychological, social and multicultural dimensions. Implications for social policy. (Lec. 3) Pre: junior standing or above.

**THN 424 Exploring Loss through Creative Arts Therapies** (3 crs.) Cross-listed as (THN), NUR 424. Exploration and assessment of the merits of incorporating creative arts processes (imagery, story, metaphor, music, and movement) with individuals who are experiencing loss, grief and dying. (Seminar 3) Pre: one prior thanatology course or permission of instructor.

**THN 425 Spirituality of Loss and Death** (3 crs.) Cross-listed as (THN), NUR 425. Examination of major belief systems and spirituality during loss, death and grief. Emphasis on spiritual issues and ethnic, cultural, gender, and age differences, as well as the role of professional helpers. (Seminar 3) Pre: one prior thanatology course or permission of instructor.

**THN 471 Responding to Grief** (3 crs.) Cross-listed as (HDF), THN 471. Examines con-

ceptual, psychosocial, somatic and pragmatic issues faced when grieving and how to cope or assist others accommodating imminent or realized loss due to death. (Lec. 3) Pre: HDF 421, or prior thanatology course, or permission of instructor.

**THN 471H Honors Section of HDF 471: Responding to Grief** (3 crs.) Cross-listed as (HDF), THN 471H. Honors Section of HDF 471: Responding to Grief. (Lec. 3) Pre: 3.30 overall GPA and HDF 421, or prior thanatology course, or permission of instructor.

**THN 506 Independent Study** (1-6 crs.) Cross-listed as (NUR), THN 506. Intensive study of a specific area of interest, a problem or issue in nursing under guidance of the faculty. (Independent Study) Pre: permission of graduate faculty or coordinator of thanatology.

**THN 523 Contemporary Thanatology** (3 crs.) Interdisciplinary approach to trends, problems, theories, and strategies in thanatology. Explores effects of professional's personal beliefs and attitudes on care provided to dying clients across the life span and their families. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**THN 524 Exploring Loss Through Creative Arts Therapy** (3 crs.) Cross-listed as (NUR), THN 524. Exploration and assessment of the merits of incorporating creative arts processes (imagery, story, metaphor, music, and movement) with individuals who are experiencing loss, grief and dying. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**THN 525 Spirituality of Loss and Death for the Helping Professions** (3 crs.) Examination of major belief systems and spirituality during loss, death and grief. Emphasis on spiritual issues and ethnicity, culture, gender and developmental stage. Role of professional dealing with spiritual concerns. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**THN 526 Loss Across the Life Span** (3 crs.) Content provides a basis both for personal development and professional growth. Personal experience, selected readings, and personal reflections will provide direction for examining the multidimensional aspects of loss. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**THN 529 Special Topics in Thanatology** (1-3 crs.) Selected areas of study pertinent to loss, dying and grief. Instruction may be offered in class seminar or clinical settings according to specific needs and purposes. May be repeated for credit with a change in topic. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

## TMD | Textiles, Fashion Merchandising, and Design

**TMD 103 Textile Products** Product knowledge in design, manufacturing, and merchandising within the textile complex. Emphasis on domestic and international issues. Survey of careers in business, industry, government and research. (Lec. 3)

**TMD 113 Color Science** (3 crs.) The science of color: light and its interaction with objects and color vision. Color explained, mixed, measured, described, and reproduced (paints, dyes, photography, TV). Color in the natural world. (Lec. 3) (N)

**TMD 113H Honors Section of TMD 113: Color Science** (3 crs.) Honors Section of TMD 113: Color Science. (Lec. 3) Pre: 3.30 overall gpa. (N)

**TMD 126 Introduction to Design** (3 crs.) Elements and principles of design as applied to textiles, apparel, and interiors. Overview of historical design movements. Design vocabulary. (Lec. 3)

**TMD 222 Apparel Production** (3 crs.) Analysis of apparel construction and production; current industrial and technological developments. Discussion of sizing and quality standards with emphasis on identification of fabrics, garment styles, findings, and trims. (Lec. 3/Online) Pre: TMD 103.

**TMD 224 Culture, Dress, and Appearance** (3 crs.) Analysis of social, psychological and cultural factors in the creation, maintenance and use of human appearance. Focus on dress and appearance as a communication system from cross-cultural and international perspectives. (Lec. 3) (FC) (S) [D]

**TMD 224H Honors Section of TMD 224: Culture, Dress, and Appearance** (3 crs.) Honors Section of TMD 224: Culture, Dress, and Appearance. (Lec. 3) Pre: overall GPA of 3.30 or above. (FC) (S) [D]

**TMD 225 Apparel I** (4 crs.) Principles of garment production as related to construction, fit, performance, quality, and cost. Construction techniques, sizing, material evaluation and assembly management. Quality analysis and introduction to computer-aided design. (Lec. 2, Lab. 4) Pre: TMD 103.

**TMD 226 Interior Design** (3 crs.) Fundamentals of interior design: color, lighting and design of residential and commercial spaces. (Lec. 3) Pre: ART 101 or 207 or ARH 120 or ARH 251 or ARH 252, TMD 103 and 126.

**TMD 232 Fashion Retailing** (3 crs.) A comprehensive study of fashion retailing as an operating system. Examination of the strategies and the organizational structure that support the fashion retail system. (Lec. 3/Online)

**TMD 240 Development of Contemporary Fashion** (3 crs.) History of contemporary fashion from the beginning of the 20th century to the present. Influence of designers, buyers, consumers, and technology on fashion

in the marketplace. (Lec. 3/Online) Pre: TMD 103, 126, and sophomore standing.

**TMD 303 Textile Science** (3 crs.) The primary textile industry: fiber to finished fabric. Textile fibers and their properties; yarns, fabric construction, dyeing, finishing, and printing. (Lec. 3) Pre: TM or TMD majors admitted to the College of Human Science and Services with junior standing and credit in CHM 105. TMD 313 must be taken concurrently.

**TMD 313 Textile Science Laboratory** (1 cr.) Laboratory exercises in fiber identification, fabric analysis and fabric performance testing, dyeing and finishing. (Lab.2) Pre: Students must be admitted to the degree-granting college of HSS as TM or TM majors, and concurrent enrollment in TMD 303.

**TMD 327 Apparel Design** (3 crs.) Design principles as applied to contemporary clothing with emphasis on various age groups and special populations. Laboratory experiences concentrate on the creative process and development of illustrative techniques. (Lec. 2, Lab. 2) Pre: ART 101 or ART 207 or ARH 120 or ARH 251 or ARH 252, and TMD 126, and TMD 222 or 225.

**TMD 332 Fashion Merchandise Buying** (3 crs.) The theory of fashion merchandising and its application to basic retailing procedures, the responsibility of the buyer, and procedures used to determine consumer demand, merchandise selection, and pricing. (Lec. 3) Pre: TMD 103, 224, and 232.

**TMD 335 Apparel II** (3 crs.) Application of flat pattern design. Special emphasis on sloper development and pattern drafting. Creative laboratory processes from design to finished product. (Lec. 2, Lab. 2) Pre: TMD 225 or permission of instructor.

**TMD 342 Fashion Study Tour PRA** (1 cr.) Students spend two weeks overseas during intersession studying the apparel and/or interior furnishings market in London and Paris. Lectures and tours by designers, manufacturers, and retailers. Travel costs are extra. (Practicum) Pre: TMD 126, junior standing and permission of the instructor.

**TMD 345 CAD Apparel Design** (3 crs.) Application of flat pattern design using computer-aided design techniques as related to sloper development, sizing, and pattern manipulation. Creative laboratory processes from design to finished product. (Lec. 2, Lab. 2) Pre: TMD 335 or permission of instructor.

**TMD 346 Computer-Aided Textile and Apparel Design** (3 crs.) Development and production of textile and apparel designs and patterns using selected computer software packages. Implications for use in the apparel industry. (Lec. 1, Lab 4/Online) Pre: Pre: TMD 126 or permission of instructor.

**TMD 355 Draping for Apparel** (3 crs.) Application of draping techniques for apparel pattern making and design. Includes sloper development and draping in fashion fabric. Creative laboratory processes from design



to finished product. (Lec. 3, Lab. 2) Pre: TMD 335 or permission of instructor.

**TMD 358 Weaving** (3 crs.) Introduction to hand weaving including on-loom and off-loom techniques. Designing, drafting, warping, and finishing of various types of weaves. Students complete samplers and projects. (Lec. 1, Lab. 4)

**TMD 361 Special Problems** (1-4 crs.) Open to qualified juniors and seniors who wish to do advanced work. (Independent Study) Pre: approval of application by instructor and chairperson. May be repeated for a maximum of 6 credits.

**TMD 362 Special Problems** (1-4 crs.) Open to qualified juniors and seniors who wish to do advanced work. (Independent Study) Pre: approval of application by instructor and chairperson. May be repeated for a maximum of 6 credits.

**TMD 402 Seminar in Textiles and Clothing** (1-2 crs.) Recent developments in manufacturing, marketing, and retailing of textile products. Discussion of fashion issues and impact on consumer. Lectures by speakers from business, industry, and government. (Lec. 1-2) Pre: TM or TMD majors admitted to the College of Human Science and Services with junior or senior standing, or permission of instructor. May be repeated once.

**TMD 403 Textile Performance** (3 crs.) Analysis of textiles using test methods and standards adopted by government, industry, and buyers to insure consumer satisfaction. Interpretation of test data in relation to consumer expectations and performance claims. (Lec. 2, Lab. 2) Pre: TMD 103 and 303 or permission of instructor.

**TMD 413 Dyeing And Finishing Of Textiles** (3 crs.) Study of chemical and physical interactions of dyes and finishes with textile fiber/fabric systems. Evaluation of application techniques. Detection and evaluation of problems resulting from dyeing and finishing. (Lec. 2, Lab. 2) Pre: TMD 303 or permission of instructor.

**TMD 424 Fashion Theory and Analysis** (3 crs.) Principles, theories, and recent investigations of the fashion process are presented to develop analytical skills for evaluating consumer behavior, as related to clothing and adornment. Application to contemporary trends. (Lec. 3) Pre: senior or graduate standing.

**TMD 426 Historic And Contemporary Furniture** (3 crs.) Review of major historical styles of furniture and their influence on contemporary furniture design. Materials, styles, and construction of contemporary furniture. In-depth study of upholstery fabrics. (Lec. 3) Pre: TMD 103, 226.

**TMD 427 Portfolios and Presentations** (3 crs.) Students create design portfolios using traditional media and digital techniques. Development of original ideas in sketches and technical flats. (Lec. 2, Lab. 2) Pre: TMD 327 or permission of instructor. Not for graduate credit.

**TMD 432 Fashion Retail Supply Chain Management** (3 crs.) Comprehensive understanding and analysis of fashion retail organization management including financial merchandising management, product development and supply chain management in the fashion industry. Emphasis on implications for retail organization management. (Lec. 3) Pre: TMD 232 and 332.

**TMD 433 Textile Markets** (3 crs.) Study of social, economic, and political issues that affect the development, production, and marketing of textile products. Study of the textile needs of the apparel, home furnishings, industrial, and medical industries. (Lec. 3/Online) Pre: TMD 303 and ECN 201 and 202.

**TMD 440 Historic Textiles** (3 crs.) Chronological study of textiles, emphasizing socio-economic, religious, and political influences. Contribution of designers, inventors, trade groups, and industrialists. (Lec. 3) Pre: TMD 303 and 313 or permission of instructor.

**TMD 441 History of Western Dress** (3 crs.) Study of western dress from earliest civilizations to early 20th century and factors that affect design, production and use; material culture analysis of a pre-20th century garment or accessory. (Lec. 3) Pre: TMD 303 and 313 or permission of instructor.

**TMD 442 Fashion Promotion** (3 crs.) Emphasis on understanding and applying the principles of fashion retailing communication. Evaluation and application of effective promotional activities such as visual merchandising and fashion shows to trade and retail levels of fashion merchandising. (Lec. 3) Pre: TMD 126, 232 and 332 or permission of instructor.

**TMD 452 Consumer Behavior In Fashion Retailing** (3 crs.) Use by fashion retailing management of explanatory and predictive models of consumer behavior relating to fashion merchandising in establishing retail policy and strategy. (Lec. 3) Pre: TMD 232 and 332 or permission of instructor.

**TMD 461 Internship PRA** (1-6 crs.) Structured internship in textiles, apparel, or interior design supervised by a faculty advisor. Juniors and seniors work in business, industry, or other agencies under supervision of qualified personnel. (Minimum of 45 hours per semester per credit) May be repeated for a maximum of 12 credits. Pre: completion of 60 credits, minimum GPA of 2.50, and permission of instructor and chairperson. Not for graduate credit.

**TMD 462 Internship PRA** (1-6 crs.) Structured internship in textiles, apparel, or interior design supervised by a faculty advisor. Juniors and seniors work in business, industry, or other agencies under supervision of qualified personnel. (Minimum of 45 hours per semester per credit) May be repeated for a maximum of 12 credits. Pre: completion of 60 credits, minimum GPA of 2.50, and permission of instructor and chairperson. Not for graduate credit.

**TMD 500 Ethnic Dress and Textiles** (3 crs.) Survey of regional styles of dress and textiles from all areas of the world, excluding fashionable dress. Influence of social, economic, technological, and aesthetic factors. (Lec. 3) Pre: TMD 224 or equivalent, TMD 440, or permission of instructor. In alternate years.

**TMD 510 Research Methods in Textiles** (3 crs.) Application of research methodology to the study of textiles and clothing. Approach is multidisciplinary in that experimental, social science, and historic methods are covered. (Lec. 3) Pre: graduate standing or permission of instructor.

**TMD 513 Detergency** (3 crs.) Study of composition and function of surfactants and additives in laundry detergents for home, industrial, and institutional applications; effect of fabric, water, and soil on cleaning; evaluation of laundry products. (Lec. 2, Lab. 2) Pre: graduate standing, TMD 303 or equivalent, or permission of instructor. In alternate years.

**TMD 518 Introduction To Textile Conservation** (3 crs.) Survey of methods used to analyze, clean, repair, store, and exhibit historic textiles and apparel. Laboratory experience in conservation practices. (Lec. 2, Lab. 2) Pre: a textile science course and historic textiles or costume course, or permission of instructor.

**TMD 524 Cultural Aspects of Dress** (3 crs.) Seminar in social, psychological, and cultural aspects of dress. Symbolic interaction and other dress-relevant theories concerning individual motivation and group interaction. (Seminar) Pre: TMD 224 or permission of instructor.

**TMD 528 Cleaning Historic Textiles** (1 cr.) Application of aqueous and solvent cleaning treatments used by textile conservators on historic and ethnographic textiles and apparel. (Lab. 2) Pre: TMD 518 and concurrent enrollment in 513, or permission of instructor. In alternate years

**TMD 530 Graduate Internship PRA** (2-4 crs.) Supervised internship designed to introduce students to the professional requirements of their intended field. Students work under supervision of qualified personnel. Minimum of sixty internship hours per credit. (Practicum) Pre: TMD graduate standing; completion of a minimum of twelve credits in 400 or 500 level courses; approval of advisor and graduate director.

**TMD 538 Repair and Stabilization** (3 crs.) Study of repair and stabilization practices used by textile conservators; evaluation of materials and techniques for treating damaged objects. (Lec. 2, Lab. 2) Pre: TMD 518, experience in textile conservation, or permission of instructor. In alternate years.

**TMD 540 Special Problems in Textiles and Clothing** (3 crs.) Supervised independent study in specific areas of textiles and clothing. (Independent Study) Pre: permission of chairperson. May be repeated once.

**TMD 548 Exhibition and Storage of Historic Textiles** (3 crs.) Study of how light, temperature, humidity, and stress affect textiles and apparel; review of exhibition and storage techniques and materials; preparation of an exhibition for the Textile Gallery. (Lec. 2, Lab. 2) Pre: TMD 518, experience in textile conservation and exhibition, or permission of instructor. In alternate years.

**TMD 568 Special Problems in Textile Conservation** (1-3 crs.) Supervised independent studies on specific textile conservation projects or research. (Independent Study) Pre: TMD 518 or experience in textile conservation, and permission of instructor. May be repeated for a maximum of 6 credits.

**TMD 570 Topics in Textiles and/or Dress** (3 crs.) Advanced study in a particular area of textile science, fashion merchandising, textile and apparel marketing, historic or cultural aspects of dress, or textile conservation. May be repeated with different topics. (Lec. 3) Pre: TMD graduate standing or permission of instructor

**TMD 599 Master's Thesis Research** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## URB | Urban Affairs

**URB 310 Urbanization** (3 crs.) Processes and outcomes of urbanization. Origin and growth of cities; urban systems, urban development and morphology, neighborhood change, segregation, public policy, and urban problems. Theoretical emphasis on advanced capitalist countries. (Lec. 3)

**URB 392 Field Experience in Urban Studies** (1-3 crs.) Individual or group experiential work requiring substantial urban studies knowledge and done with faculty supervision. May be repeated for a maximum of six credits. (Independent Study) Pre: permission of instructor.

**URB 494 Topics in Urban Studies** (3 crs.) Advanced study of topics of special interest in urban studies. This course is primarily for juniors, seniors, and graduate students. Some topics may be offered online. May be repeated with a different topic. (Seminar) Pre: one course in urban studies or related subject recognized by the Urban Studies program, or permission of the instructor.

## URI | University of Rhode Island Freshman Seminar

**URI 101 Planning for Academic Success** (1 cr.) Introductory seminar for incoming students, intended to assist in the transition to college, from academic planning to use of resources and programs for academic success. Required of all new freshmen and new transfer students with less than 24

credits. (Seminar) May not be repeated for credit.

**URI 101B Tradition and Transformations for BIS 100 Students** (1 cr.) Traditions and Transformations in Lifelong Learning for BIS 100 students. (Seminar/Online) Pre: concurrent enrollment in BIS 100.

## WRT | Writing

**WRT 100 Introduction to College Writing** (2 crs.) Practice in topic development, research techniques, documentation and attribution, and process-based writing. Focuses on thesis statements, topic sentences, paragraphing, coherence, and syntax. (Lec. 2) Pre: Admission to Talent Development's Prematriculation Program.

**WRT 104 Writing to Inform and Explain** (3 crs.) Writing emphasizing the sharing of information. Varieties and strategies of expository writing for differing audiences and situations. Genres may include reports, proposals, letters, reviews, websites, academic essays. (Lec. 3) Not open to students with credit in WRT 106. (ECw)

**WRT 104H Honors Section of WRT 104: Writing to Inform and Explain** (3 crs.) Honors Section of WRT 104: Writing to Inform and Explain. (Lec. 3) Pre: must have a 3.30 overall GPA. (ECw)

**WRT 106 Introduction to Research Writing** (3 crs.) Introduction to working with sources and the research process. Guided help in conducting interviews, observations and database searches. All assignments contribute to a major research report. (Lec. 3) Not open to students with credit in WRT 104. (ECw)

**WRT 106H Honors Section of WRT 106: Introduction to Research Writing** (3 crs.) Honors Section of WRT 106: Introduction to Research Writing. (Lec. 3) Pre: Overall GPA of 3.30 or better. Not open to students with credit in WRT 104. (ECw)

**WRT 201 Writing Argumentative and Persuasive Texts** (3 crs.) Concepts, methods, and ethics of argumentative and persuasive writing. Writing argumentatively to examine complex issue, define values, resist coercion and seek common ground among diverse publics. (Lec. 3) (ECw)

**WRT 227 Business Communications** (3 crs.) Basic business communications forms, group reports and presentations, effective use of electronic mail systems, and design of graphic aids for successful visual communication. (Lec. 3/Online) Pre: Open to Business majors with sophomore or higher standing. Open to a limited number of writing majors with sophomore or higher standing. (ECw)

**WRT 235 Writing in Electronic Environments** (4 crs.) Examine, investigate, and practice digital writing. May include web design, blogs, wikis, social networking technologies, presentation software, and

construction of a digital portfolio. Requires out-of-class technology practice. (Seminar 3, Practicum 2/Online) (ECw)

**WRT 270 Writing Our Selves: Writing in the Expressivist Tradition** (3 crs.) Focuses on the expressivist tradition of writing, including memoirs, medical narratives, nature meditations and informal essays. (Seminar)

**WRT 270H Honors Section of WRT 270: Writing Our Selves: Writing in the Expressivist Tradition** (3 crs.) Honors Section of WRT 270: Writing Our Selves: Writing in the Expressivist Tradition. Focuses on the expressivist tradition of writing, including memoirs, medical narratives, nature meditations and informal essays. (Seminar) Pre: 3.30 overall gpa.

**WRT 302 Writing Culture** (4 crs.) Experience with writings that sustain or reshape culture. May include profiles, reviews, food and fashion writing, liner and exhibition notes. Requires sustained fieldwork and out-of-class technology practice. (Seminar 3, Practicum 2/Online) (ECw)

**WRT 303 Public Writing** (4 crs.) Writing in the public sphere, emphasizing civic literacy, democratic discourse, and writing for change. May include letters, public documents, activist publications, and legislative texts. Requires sustained fieldwork. (Seminar 3, Practicum 2/Online) (ECw)

**WRT 304 Writing for Community Service** (4 crs.) Study and practice of writing in community service organizations. Requires community service outside class, research, writing, and design. May include grant proposals, brochures, websites, or reports. Requires sustained fieldwork. (Seminar 3, Practicum 2) (ECw) [D]

**WRT 305 Travel Writing** (4 crs.) Writing about places both new and familiar. Emphasizes descriptive techniques, the use of facts, and different cultural perspectives. May include travel essays, place journals, guidebooks, query letters. Requires sustained fieldwork. (Seminar 3, Practicum 2/Online) (ECw) [D]

**WRT 306 Writing Health and Disability** (3 crs.) Explores the ways we experience, label, and politicize health and disability in our culture. Writing may include narratives, cultural critiques, persuasive essays, and policy proposals. (Lec. 3/Online)

**WRT 313 Introduction to Video Games: Users and Contexts** (4 crs.) Cross-listed as (SCM), ART, COM, FLM, WRT 313. Introduces video game development through the perspective of different users' experiences and contexts. Projects include critical analyses, observations, multi-media pitch presentations. Requires substantial game playing outside of class. (Sem. 3, Prac. 2) Pre: sophomore standing.

**WRT 331 Writing Public Relations** (3 crs.) Introduces the audiences, situations, and processes typical of public relations writing. Includes practice with genres including news

releases, media kits, speeches, and letters. Emphasizes professional behavior and polished writing. (Lec. 3) Pre: any 200-level WRT course.

**WRT 333 Scientific and Technical Writing** (3 crs.) Practice in specific forms of writing in the scientific and technical fields. (Lec. 3) Competence in basic skills required. (ECw)

**WRT 353 Issues and Methods in Writing Consultancy** (4 crs.) Practice and theory of one-to-one instruction emphasizing varied situations and multiple learning styles. Covers approaches to collaboration, learning, writing and responding. Requires sustained fieldwork. (Seminar 3, Practicum 2) Pre: permission of instructor or B or better in two WRT courses.

**WRT 360 Composing Processes and the Canons of Rhetoric** (3 crs.) Examines historical and contemporary theories of composing and rhetorical canons: writing processes, style and arrangement, and relationships among writing, learning social contexts, technology and publication. Field research on professional writers. (Lec. 3) Pre: WRT 201 and another WRT course at the 200-level or above.

**WRT 383 Field Experience in Writing Consultancy FLD** (1-3 crs.) Supervised field experience, tutoring in the Writing Center or in the undergraduate peer consultants program. (Field Exp.) Pre: WRT 353 and permission of instructor. May be repeated for a maximum of 9 credits.

**WRT 385 Field Experience with Writing Rhode Island PRA** (1-4 crs.) Supervised field experience in the Writing Rhode Island Production Lab. Entails substantial field-based and/or qualitative research, collaborative drafting, document design, and client interaction. Requires final project and reflection. (Practicum) Pre: writing and rhetoric major with a minimum of 12 credits in WRT courses and permission of supervisor.

**WRT 391 Independent Study in Writing and Rhetoric** (1-3 crs.) Intensive study and practice of an approved topic in writing and rhetoric under the supervision of a faculty member. (Independent Study) Pre: permission of director.

**WRT 392 Independent Study in Writing and Rhetoric** (1-3 crs.) Intensive study and practice of an approved topic in writing and rhetoric under the supervision of a faculty member. (Independent Study) Pre: permission of director.

**WRT 415 Perspectives On Reporting** (3 crs.) Cross-listed as (JOR), WRT 415. Critical assessment of reporting through the reading and analysis of book-length works of journalism and magazine and newspaper series of articles. (Seminar) Pre: JOR 110 or 115 and junior standing. Not for graduate credit.

**WRT 435 The Teaching of Composition** (3 crs.) Cross-listed as (WRT), EDC 435. Philosophy, materials, and methods underlying the teaching of writing with emphasis on

current approaches including the application of linguistics. Offers practice in writing workshop techniques, marking, constructing assignment sequences, and individualized instruction. (Seminar) Pre: junior standing or permission of instructor.

**WRT 442 Strategic Media Communication** (3 crs.) Cross-listed as (PRS), WRT, COM 442, JOR 443. Introduces strategic media relation tactics when responding to the media, specifically crisis communication situations. Students gain practical experience in various writing and speaking opportunities to effectively work with the media. (Lec. 3) Pre: PRS 340. Open only to majors in Communication Studies, Public Relations, Journalism, and Writing. Not for graduate credit.

**WRT 484 Internship in Writing and Rhetoric PRA** (1-3 crs.) Practice and direct supervision in workplace writing. Placement options include community based, governmental, technological, health services, military, educational and non-profit organizations. (Practicum) Pre: 60 credits with a minimum of 12 in WRT, 2.50 GPA, and permission of faculty advisor. May be repeated for a maximum of 6 credits. S/U only.

**WRT 490 Writing and Rhetoric Study emphasizing audience, composing processes, and rhetorical theories, including issues relevant to writing professional.** (Lec. 3) Pre: WRT 360

**WRT 495 Composing Electronic Portfolios** (4 crs.) Capstone for WRT majors. Create a substantive and reflective digital collection of representative writings for academic and career-centered audiences. Requires a public showcase and out-of-class technology practice. (Seminar 3, Studio 2) Pre: Senior standing in the WRT major or permission of instructor. Not for graduate credit.

**WRT 512 Studies in Rhetorical Theory** (3 crs.) Emphasis on written discourse and the relationships among language, epistemology, and subjectivity. Readings will range from classical to contemporary and will reflect the expanding canon of rhetorical theory. (Lec. 3) Pre: graduate standing or permission of instructor.

**WRT 524 Histories And Theories Of Writing Instruction** (3 crs.) Traces the origins and influences on current writing instruction, beginning with composition treatises of the 19th century and concluding with an analysis of contemporary practices. May include archival research. (Lec. 3) Pre: graduate standing or permission of instructor.

**WRT 533 Seminar in Graduate Writing in the Life Sciences** (3 crs.) Seminar in graduate writing in life sciences; analyzing and writing journal articles, proposals, popular press; rhetorical analysis of scientific writing. (Seminar) Pre: WRT 104 or 106 or equivalent, or permission of instructor; graduate standing or senior status.

**WRT 599 Master's Thesis Research in Rhetoric** (1-6 crs.) Number of credits is de-

termined each semester in consultation with major professor or program committee. Pre: permission of graduate director in writing and rhetoric. S/U credit.

**WRT 645 Seminar In Rhetoric And Composition** (3 crs.) Critical and theoretical conceptions of rhetoric and rhetoricality with varying historical periods and/or connections to cultural studies, literature, and composition studies. (Seminar)

**WRT 646 Seminar in Writing Studies** (3 crs.) Advanced study in special topics related to writing pedagogy. May include histories and theories of contemporary composition studies, interrogations of widespread practices, and/or relevant current topics in the field. May be repeated for credit. (Seminar) Pre: Graduate standing or permission of the instructor.

**WRT 647 Seminar in Research Methods: Rhetoric and Composition Studies** (3 crs.) Advanced practice in the theory and design of research projects, emphasizing qualitative and quantitative studies. May include archival research, teacher-research, ethnographies, case studies, interviews, surveys, experiments, and discourse analyses. (Seminar) Pre: graduate standing or permission of instructor.

**WRT 691 Independent Study in Rhetoric** (1-3 crs.) Advanced study of an approved topic in Rhetoric and Writing Studies under the supervision of a graduate faculty member. Pre: permission of WRT graduate director. May be repeated for a maximum of six credits.

**WRT 699 Doctoral Dissertation Research in Rhetoric** (1-6 crs.) Number of credits is determined each semester in consultation with the major professor or program committee. Pre: permission of graduate director in writing and rhetoric. S/U credit.

**WRT 999 Methods of Teaching College Writing** (0 crs.) Materials and multiple methods of teaching writing on the college level. Required of teaching assistants who will teach in the Writing and Rhetoric Program unless waived by the director of English graduate studies, the supervisor of teaching assistants, and the director of the Writing and Rhetoric Program. (Seminar)

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- Lee, Chong, Professor, Nutrition & Food Science
- Lee, Ronald, Professor/Dept Chair, Music
- Leete, William, Professor Emeritus, Art
- Leinen, Margaret, Vice Provost Emerita, GSO Dean
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Swan, M Beverly, Provost and VPAA Emerita,  
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Taggart, Catherine, Assistant Dean Emerita,  
Undergraduate AdmissionsTaggart, David, Dean Emeritus, Undergradu-  
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Young, Betty Jean, Professor, School of  
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## Full-Time Faculty

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