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## » Course Descriptions

We are always looking for ways to make this online resource even better. Please fill out our [survey](#) or [e-mail us](#) with your feedback.

If you are a prospective student and need more information about the University, fees, programs, campus tours, etc., please visit the [Admissions website](#) or contact [UNH Admissions](#).

If you are a current student and have additional questions about requirements, programs, classes, etc., please contact the [UNH Advising and Career Center](#), or the specific academic department.

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#### « [Introduction](#)

What makes the University of New Hampshire (UNH) an outstanding institution? Every day, brilliant, dedicated, inventive, hard-working people come together to teach, learn, and discover, always with an entrepreneurial spirit that has made many of our academic and research programs world-class. Faculty and students alike are motivated by passion, by a spirit of inquiry, and by a desire to make a difference in the world.

What makes UNH the "best of both worlds" for undergraduate education? We offer students the living and learning environment of a classic New England liberal arts college with the breadth, spirit of discovery, and civic commitment of a major research university. This is rare among American institutions of higher education, and students and faculty will tell you it is our greatest asset.

#### [The University Today](#)

Founded in 1866 as one of the first land-grant colleges in the nation, the University of New Hampshire today remains true to its original land-grant mission as one of only eight universities in the U.S. to hold land-, sea-, and space-grant charters.

The University comprises the following academic units: the College of Engineering and Physical Sciences; the College of Health and Human Services; the College of Liberal Arts; the College of Life Sciences and Agriculture, which includes the Thompson School of Applied Science; the Whittemore School of Business and Economics; University of New Hampshire at Manchester; the Graduate School, and the University of New Hampshire School of Law in Concord. UNH serves more than 12,200 undergraduate and 2,300 graduate students in 100 undergraduate and 70 graduate programs of study.

A comprehensive research university, UNH received more than \$120 million in grants in fiscal year 2010. The University has a unique commitment to undergraduate research, and has an endowed undergraduate research program that provides students from all disciplines with faculty mentoring and financial support to pursue independent research and scholarship.

The University of New Hampshire is at the forefront of developing nationwide university best practices to address climate change. Through its *EcoLine* project, UNH became the first university in the U.S. to use renewable landfill gas as its primary energy source, significantly reducing greenhouse gas emissions. UNH also developed the first University greenhouse gas inventory tool, which is now used by more than 300 universities, and established the first endowed University-wide program to integrate sustainability principles into University curriculum, operation, research, and engagement.

### **A Powerful Linking of Teaching and Research**

Where the University of New Hampshire has linked teaching and research programs with the practical realities of life, it has set the international standard with centers and institutes whose names have become synonymous with excellence in such fields as sustainability, computer interoperability, ocean mapping, child study and development, and experiential education.

Such research power translates into exceptional educational opportunities for our talented students. The University prides itself on graduating students who have undertaken significant research. In recent years, hundreds of students from all disciplines have experienced the thrill of designing their own research projects, collaborating with faculty, and presenting their findings in a public forum. Robust undergraduate research programs enable students to conduct research year-round on campus and around the world.

The University's international research opportunities program is among the largest of its kind and serves as a model for others nationwide. Today the internationalization of the University is an accomplished fact. The study abroad program and international affairs major are strong and growing. Faculty are in demand as visiting professors at universities around the globe (many as Fulbright Fellows), and bring their experiences back to Durham.

### **Mission**

UNH offers a broad array of undergraduate, graduate, professional, and research programs. Nearly 90 percent of the full-time faculty hold doctoral or terminal degrees, and many have earned national and international reputations.

The University of New Hampshire has a threefold mission of teaching, research, and public service.

*Teaching.* All undergraduate programs of instruction at the University are built on a program of general education. The objectives of general education carry through the undergraduate subject major, as students refine and apply their skills and discover the relationships among fields of study. At every level, students enjoy close contact with individual faculty members who are dedicated to research and scholarship; this is an advantage for students, because active scholars and researchers teach by sharing their own learning.

*Research.* The activity of research embraces all the arts and sciences at the University: it is an integral part of both undergraduate and graduate programs. In doctoral study and in many master's programs, thesis research is a primary mode of learning. As a land-, sea-, and space-grant institution, the University of New Hampshire has a special obligation to conduct applied research in the areas of agriculture, marine sciences, and engineering, and to disseminate the findings to the state and nation.

*Public Service.* The University fulfills its special responsibility for the welfare of the state through UNH Cooperative Extension, and through research and consultation on particular needs of New Hampshire citizens. The University is dedicated to collaborative learning inside and outside the classroom.

### **The UNH Library**

The UNH Library consists of the main Dimond Library and four science libraries specializing in biological sciences, chemistry, physics and computer science, mathematics, and engineering. The Dimond Library offers three quiet study reading rooms, seating for 1,200, Zeke's café, and the Dimond Academic Commons (DAC), a "one-stop shop" for information needs, including reference assistance, IT help, and media equipment (including video and audio equipment to borrow). Collaborative work spaces, computer workstations, WiFi, and laptop ports are available throughout the building.

The Biological Sciences Library (Kendall Hall), the Chemistry Library (in recently renovated Parsons Hall), the Engineering/Mathematics/Computer Science Library (Kingsbury Hall), and the Physics Library (DeMeritt Hall) offer customized service for the UNH scientific and engineering communities. Each science library offers specialized reference assistance, reserve materials, reference and circulating collections, periodicals, and electronic resources specific to their fields. All science libraries provide WiFi and laptop ports, laptops and computer workstations, as well as other equipment. Parsons, DeMeritt and Kingsbury Libraries have group meeting rooms that students may reserve; all have collaborative as well as quiet areas.

In addition to more than 2 million volumes and 50,000 periodical subscriptions, the library has

an extensive government documents collection, maps, sound recordings, CDs, videos, DVDs, and a Special Collections and Archives section with rare books, manuscripts, and University publications and papers. The UNH Library offers extensive electronic resources including e-books, digital collections, indexes in many subject areas, statistical data sets and databases supplying full-text periodical and newspaper articles. Library faculty and staff provide expert service to people seeking information or research assistance in all five libraries.

As members of the elite Boston Library Consortium (BLC), UNH community members may visit any of the other 17 well-known research institutions (including MIT, Tufts, Williams, and Wellesley) or borrow from a combined collection totaling more than 34 million volumes. In addition, journal articles and books not available onsite or through the BLC can be delivered quickly through interlibrary loan.

For more information on Dimond and the science libraries, visit [www.library.unh.edu](http://www.library.unh.edu) [≤http://www.library.unh.edu/≥](http://www.library.unh.edu) .

### **The Campus**

The home of the main campus of the University is Durham—one of the oldest towns in northern New England—near the picturesque seacoast of New Hampshire. The 200-acre campus is surrounded by more than 2,400 acres of fields, farms, and woodlands owned by the University. College Woods, on the edge of campus, includes five miles of well-kept paths through 260 acres of forest.

Recent major building and renovation projects have revitalized the UNH campus while maintaining its traditions. In 2002, the University celebrated the completion of Mills Hall, its newest and very beautiful residence hall; 2003 saw completion of the new Holloway Dining Commons. Renovations of Murkland and Congreve Halls have also been completed. The recent Kingsbury Hall expansion gives science and engineering students new project space, a modern lab wing, and high-tech classrooms. In 2007, DeMeritt Hall was torn down and rebuilt in the same location, reusing approximately 95 percent of the original materials to create a state-of-the-art physics building. In 2010, a two-year renovation of James Hall was completed, resulting in an energy-efficient, green-restored building. This past year, a Flow Physics Facility was completed with a federal research grant. It is one of the largest wind turbine facilities of its kind in the world. New construction for the Paul College of Business and Economics began this past spring 2011 with a planned completion date of December 2012.

### **Accreditation**

The University of New Hampshire is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges in the six New England states. Accreditation by the association indicates that the institution has been carefully evaluated and found to meet standards agreed upon by qualified educators. Specialized programs of study are also accredited by various professional organizations.

Veterans and their eligible dependents may apply for educational benefits before the start of each semester. For information, contact [Lonn Sattler](#), e-mail [UNH.Veterans@unh.edu](mailto:UNH.Veterans@unh.edu), UNH veterans coordinator, or call (603) 862-1595.

The University supports the efforts of secondary school officials and governing bodies to have their schools achieve regional accredited status to provide reliable assurance of the quality of the educational preparation of its applicants for admission.

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#### « [Admission](#)

UNH welcomes campus visitors. Campus tours are led by student admissions representatives who provide a general overview of academic programs and campus life opportunities.

Professional staff members are available to provide information about the criteria used by the Admissions Committee in reviewing candidates and to address specific concerns. For further information or to schedule a campus and/or group information session, visit the Admissions Web site at <http://admissions.unh.edu/visit-campus>. Registration is required. Complete information and instructions regarding the application process to UNH are found at

<http://admissions.unh.edu/apply>

#### [Admission Criteria](#)

Admission to a bachelor's degree program is based upon successful completion of a strong secondary school program of college preparatory coursework. Primary consideration is given to the academic record, as demonstrated by the quality of the candidate's secondary school course selections and achievement, recommendation, and the results of the SAT and/or ACT exam. Consideration is also given to character, initiative, leadership, and special talents.

Candidates must, at a minimum, present at least four years of English, three years of mathematics (Algebra I, Geometry, and Algebra II), three years of laboratory science, three years of social science, and two years of study in a single foreign language. Three years of a single foreign language are preferred. Recommended mathematics preparation includes the equivalent of Algebra I, Geometry, Algebra II, and Trigonometry/Advanced Math.

Students who plan to specialize in engineering, biological/physical science, mathematics, or forestry should present at least four years of mathematics including trigonometry, as well as laboratory coursework in chemistry and/or physics. Students pursuing business-related studies also should have completed four years of mathematics including trigonometry. For students planning to major in health-related disciplines, four years of math, as well as laboratory courses in biology and chemistry, are strongly recommended. Students interested in nursing must



complete high school chemistry.

Applicants may indicate a prospective major on the application for admission. An undecided applicant may apply for admission into a bachelor's program as an "undeclared" student to any one of the University's five college divisions in Durham or at UNH Manchester. For information concerning bachelor and associate degree programs offered through UNH Manchester, visit [www.unhm.unh.edu](http://www.unhm.unh.edu); for information concerning the associate degree programs at the Thompson School of Applied Science visit [www.thompsonschoo.unh.edu](http://www.thompsonschoo.unh.edu).

Many University students request a change in major during their undergraduate years, and most are approved. These changes are possible after a student has been at the University for at least one semester and has permission from the appropriate college dean and department chairperson. In recent years, however, the University has not always been able to honor all requests for a change of major, most notably into nursing .

### **Admission Test Requirements**

All candidates for admission to bachelor's degree programs are required to submit the results of the SAT or ACT exam (including writing). Scores must be submitted electronically to UNH by the testing agency. SAT subject tests are not required, but a foreign language subject test may satisfy the foreign language requirement of the bachelor of arts degree. UNH considers all three sections of the SAT score. Required scores vary by test.

International students whose primary language is not English must submit the results of a Test of English as a Foreign Language (TOEFL). The recommended minimum TOEFL score is 213 (computer version) or 550 (paper version) or 80 (Internet version). UNH also accepts the (IELTS) International English Language Testing System English Language proficiency examination in lieu of TOEFL; the minimum acceptable proficiency grade is 6.5.

### **Music Candidates**

Candidates applying for programs in the Department of Music must make arrangements with the department chairperson for an audition (603) 862-2404. Details regarding audition requirements may be obtained from the department, or may be found on the Department of Music website at [www.unh.edu/music](http://www.unh.edu/music).

### **Admission Deadlines**

The Admissions Office welcomes high school students who seek fall semester first-year admission to apply any time after the start of the senior year and before the February 1 regular decision deadline. Admission notifications are provided on a continuous basis through April 15.

Accepted candidates are required to confirm their intention to enroll with the payment of an enrollment fee by May 1. An additional deposit to reserve on-campus housing is also required by May 1.

The review of first-year candidates begins as soon as a complete application (including official grade reports through the first marking period of senior year and a confirmed course schedule, the results of the SAT or ACT, and a letter of recommendation) is on hand. To apply as an early action applicant, candidates must submit an admission application and supporting documents by November 15. In some cases, the Admission Committee will request senior mid-year grade reports in order to make a final admission decision. Students accepted to UNH through the early action program are not obligated to enroll at UNH since early action programs do not require a commitment from the student.

All offers of admission are considered conditional and are subject to the verification of satisfactory senior year achievement when final high school transcripts are reviewed by the Admission Committee.

### **Deferred Admission**

The University considers applicants for deferred admission, which enables students to reserve a space at the University while taking time off from school for work or travel. With few exceptions, UNH will not approve deferral requests in which the student will be taking college coursework elsewhere. Requests for deferrals must be put in writing and sent to the Admissions Office ([admissions@unh.edu](mailto:admissions@unh.edu)). The University may not be able to offer deferred admission in certain program areas.

### **Advanced Standing**

The University recognizes outstanding secondary school work by means of advanced placement and credit for those who have taken enriched or accelerated courses before entering college. Applicants qualify for such credit by successfully completing coursework for college credit and satisfactory achievement on University-approved placement examinations, including the College Board Advanced Placement (AP) Tests, International Baccalaureate (IB)

Higher Level Examination Test Results, or through the College Level Examination Program (CLEP). Students should have official results sent directly to the Office of Admissions.

The University accepts AP Tests in every subject area, with credit and course equivalency based on the score achieved. Visit <http://admissions.unh.edu/apply/first-year/ap-credit/> for further information.

The University awards 8 semester credits for each IB Higher Level Examination Test Result of 5, 6, or 7. The University recognizes up to 32 semester credits of CLEP General Examination tests which may be applied as elective credit only. Scores must be 500 or better in the humanities, natural sciences, and social sciences-history exams. The minimum score for mathematics is 500 and for the English exam with essay, 500. Subject exams, when applicable, may be used to satisfy either departmental or general education requirements. UNH does not accept all CLEP subject exams.

Maximum credit accepted toward a bachelor's degree for all credit by exam and advanced placement testing is 64 semester hours.

### **Associate Degree Candidacy**

The University accepts candidates who have demonstrated ability and motivation for learning through academic achievement, work experience, and/or military service for associate in applied science degree programs.

Students may be considered for admission to associate in applied science degree programs offered by the University's Thompson School of Applied Science in Durham as well as associate in arts or science degrees at the Manchester campus. Candidates applying as high school seniors must submit the application, secondary school record, and results of the SAT or ACT, both with essay results. Students granted first-year admission to the Thompson School are eligible to live in a University residence hall.

### **Eligibility for Degree Candidacy**

Applicants may be candidates for any undergraduate degree offered by the University. However, applicants having a bachelor of arts (B.A.) degree will not be admitted into a program of study that awards the same degree (e.g., B.A. History and B.A. Zoology). Applicants can earn more than one bachelor of science (B.S.) degree, provided that each degree is in a different field. Applicants may also be admitted into a program awarding a different degree

(e.g., B.A. History and B.S. Biology; or B.A. History and A.A.S. Applied Business Management).

### **Readmission**

An undergraduate who withdraws, does not register for UNH coursework in a given semester, or is suspended or dismissed from the University thereby terminates degree candidacy and must apply for readmission by the following deadlines: fall semester, June 1; spring semester, November 1. Readmission applications are processed in the Office of Admissions; however, decisions regarding readmission are made in consultation with the Division of Student and Academic Services and the dean's office of the University college division to which the student is applying.

Before seeking readmission, students on academic suspension must remain away from school for at least one semester. Suspended students should include a statement about their readiness to resume University work with their application.

Only under extraordinary circumstances will students be readmitted after dismissal for academic reasons. Applications submitted by dismissed students are reviewed by the University's Academic Standards and Advising Committee.

It may not be possible for readmission applicants to enroll in programs with established enrollment limitations.

### **Transfer Students**

UNH encourages applications from transfer students. Admission consideration includes review of course selection, academic achievement, and the extent to which that selection addresses the University's general education requirements. Transfer credit is awarded for completed courses taken at an institution that is fully accredited by one of the regional accrediting associations with a grade of C or better, provided those courses are comparable to courses offered at UNH. Each course must carry at least 3 semester credits and receive a letter grade to qualify for general education consideration.

The application deadline for fall semester admission is April 1 (February 1 for those applying to nursing); October 15 for spring semester. Some programs have enrollment limitations. Students enrolled in one of the University's associate degree programs who desire admission to a bachelor's degree program at UNH apply as transfer students through the Office of

## Admissions.

Transfer students may contact the Department of Housing (603) 862-2120 to determine the availability of on-campus housing or the Office of Commuter Services at [www.unhmub.com/off\\_campus](http://www.unhmub.com/off_campus) for assistance with off-campus housing. In most situations, on-campus housing is not guaranteed to transfer students.

### **New England Regional Student Program**

The University participates in the New England Regional Student Program, in which each state college and university in New England offers certain undergraduate majors to students from other New England states. Under this program, admitted students pay the UNH in-state tuition plus an additional percentage. Students must indicate on the application the specific major for which they are applying. Information about the curricula may be obtained from the New England Board of Higher Education, 45 Temple Place, Boston, MA 02111, [www.nbhe.org](http://www.nbhe.org), or call (617) 357-9620. Visit <http://admissions.unh.edu/tuitionfees/new-england-regional-student-program/> for available UNH majors through this program.

### **Full-Time Special Student Status**

UNH offers a special student classification for persons who wish to participate in University coursework on a full-time basis without entering a degree program. In evaluating requests for special full-time status, the Office of Admissions generally applies the same criteria used in the review of applicants for admission to degree candidacy. Full-time special students have full access to academic support services but are not eligible for University-based financial aid. Students must maintain satisfactory achievement to continue with University coursework. Full-time special (non-degree) students register for coursework through the Registrar's Office.

### **Resident Status**

All students attending any division of UNH in any capacity shall be charged tuition at a rate to be determined by their primary, legal domicile. Those domiciled within the state of New Hampshire pay the in-state rate. Those domiciled elsewhere pay the out-of-state rate.

Students are classified as residents or nonresidents for tuition purposes at the time of admission to the University. The decisions, made by the Office of Admissions, are based upon information furnished in students' applications and any other relevant information.

All enrolling students living in New Hampshire are required to submit a notarized statement to the effect that they, if financially independent, or their parents, if financially dependent, have been legally domiciled in New Hampshire continuously for a period of at least twelve months immediately prior to registering for the term for which the student is claiming in-state status. Students admitted from states other than New Hampshire or from foreign countries are considered nonresident throughout their attendance at the University unless they have acquired bona fide domicile in New Hampshire.

If students maintain residency apart from that of their parents, they must clearly establish that they are financially independent and that their residence in New Hampshire is for some purpose other than the temporary one of obtaining an education at the University. To qualify for in-state status, students must have been legally domiciled in New Hampshire continuously for a period of at least twelve months prior to registering for the term for which in-state status is claimed.

The burden of proof in all cases is upon the applicant. The University reserves the right to make the final decision concerning resident status for tuition purposes.

A copy of the rules governing residency may be obtained from the Office of Admissions and on the following website: <http://www.usnh.edu/olpm/BOT/IV.Fin/F.htm>.

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#### « [Financial Aid](#)

The University Financial Aid Office assists students who are unable to meet educational expenses entirely from their own family resources. Aid is available in the form of grants and scholarships, loans, and part-time employment. The financial aid website gives program information, application procedures, and deadlines.

In many communities, scholarships and loans are available locally. School principals and guidance counselors have information about these sources of assistance, which are available to both high school seniors and adult students.

Before applicants may be considered for assistance by the University, they must submit the Free Application for Federal Student Aid (FAFSA). Applicants will find this at [www.fafsa.ed.gov](http://www.fafsa.ed.gov).

The financial aid application deadline for aid awarded by the University is March 1. This is the date by which your fully completed FAFSA must be received by the federal processor.

The importance of meeting this deadline cannot be overstated. While there are some types of aid (e.g., Pell Grants and Direct Loans) for which you may apply after this deadline, it is likely that you will receive substantially less total aid if your application is late. For the past several years, applicants applying after the deadline did not receive any aid awarded by UNH (SEOG, tuition grant, Perkins Loan, or work study).

It is the University's position that the student applicant is accountable for the accuracy and timely submission of the FAFSA. We realize that in most cases a student's parent(s) also participates in completing the form. However, it is the student who is ultimately responsible for monitoring the application process. Students should not wait until being admitted to the University before applying for financial aid.

**Note: There is reference on the FAFSA to a "deadline" of May 1. Do not be misled by this**



**date. It is not the financial aid deadline at UNH or most other colleges.**

### **Grants and Scholarships**

Admitted undergraduate degree candidates who will attend UNH on a full- or part-time basis may be considered for tuition grants and University scholarships. The basic consideration is financial need, although some scholarships are awarded on the basis of scholastic attainment, participation in extracurricular activities, or meeting specific requirements of a donor.

The University participates in the federally sponsored Federal Supplemental Educational Opportunity Grant Program, which is designed to assist needy students who are admitted degree candidates.

### **Federal Pell Grant Program**

Students may apply directly to the federal government for a Pell Grant using the FAFSA. Students must reapply each year for a grant.

### **Loan Programs**

Two loan funds are administered by the University: UNH Loan Fund and Federal Perkins Loans. Admitted undergraduate and graduate degree candidates who will attend the University on at least a half-time basis may be considered for these loans. Financial need must be clearly demonstrated, and loans may be used only for educational expenses.

The University also participates in the federal government's Direct Student Loan Program.

### **Part-Time Employment**

The Federal Work-Study Program, both academic year and summer, assists students who, as determined by the Financial Aid Office, need financial assistance for their educational expenses. Admitted undergraduate and graduate degree candidates attending at least half time are eligible for consideration.

Students who do not qualify for the Work-Study Program may find part-time employment on or

near campus.

### **ROTC Scholarships**

Reserve Officer Training Corps scholarships are offered on a competitive basis by both the Army and the Air Force. Entering freshmen may compete for four-year scholarships during the last year of high school. A variety of scholarships are also available to students already attending the University.

Scholarships pay up to full tuition, all mandatory fees, and required textbooks. In addition, all scholarship recipients receive a tax-free monthly subsistence allowance. Finally, students with a four-year or three-year ROTC scholarship compete for a room and board grant for the entire time they are on the scholarship.

For more information, contact the Admission Officer: Army ROTC, at (603) 862-107, or the Air Force, at (603) 862-1480.

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#### « [Campus Life](#)

At the University of New Hampshire, getting involved is a big part of campus life. Inside the classroom and beyond, UNH students bring energy and passion to everything they do.

#### [Housing](#)

The University offers students a variety of housing options, from small halls of approximately 100 students to medium halls and large halls (ranging from 400 to 600 students). Our newest residence halls offer suite style living for groups ranging in size from four to eight students. Upperclass undergraduates may also choose to live in one of the two on-campus apartment complexes, The Gables and Woodside. These apartment complexes are designed to meet the more independent and self-reliant life-styles of upperclass students. Theme-based housing is offered in many buildings on campus as are Residential Learning Communities where students live and take a specific class together. The themed communities include Fairchild Hall where the focus is on international and intercultural activities and Engelhardt Hall which houses the Chem-Free Living theme for students who have chosen not to use alcohol or any chemical substances.

The Department of Housing and the Residential Life Office are committed to providing living environments that maintain high standards of health and safety. Full-time professional directors manage the residence halls and apartments and work with a student staff to offer special programs and enforce hall and community standards.

Undergraduate housing is available to all full-time baccalaureate degree candidates and to associate in applied science degree candidates. Offers of housing to associate in arts degree and non-degree students are considered on a case-by-case basis. Students are not required to live on campus.

Offers for on-campus housing are sent to all accepted new freshmen. Transfer and readmitted students may apply for housing via the housing waitlist. Offers will be made on a space-

available basis. Application information and materials are available at the Department of Housing located at 10 Academic Way and on the department's website at [www.unh.edu/housing](http://www.unh.edu/housing).

For more information, please contact the Department of Housing (603) 862-2120 or visit the department's website at [www.unh.edu/housing/](http://www.unh.edu/housing/).

### **Dining**

UNH Dining is committed to exceeding the expectations of our guests and we take pride in maintaining our position as a leader in the food service industry. The freshest ingredients, flexible menus, a variety of meal plans, and exciting special events have earned us more than 20 awards from the National Association of College and University Food Services.

Flexible meal plans give students the option of eating at one any of the three dining halls or using Dining Dollars or Cat's Cache at one of nine retail locations around campus. Our three dining halls serve all-you-care-to-eat meals in comfortable surroundings. Menu choices include popular favorites such as pizza, burgers, and stir-fry as well as vegan and vegetarian options, a well-stocked deli, and tremendous salad bars. Fruits, fresh-baked breads, desserts, and many other selections also are available.

Students who have special dietary needs or concerns can meet with our registered dietician and executive chef. Parents can purchase goodie packages and personalized birthday cakes though UNH Dining to send to students.

UNH Dining is committed to the sustainability mission of the University. We strive to source as much local and regional foods as possible. In 2010 we sourced 23 percent of our products locally and regionally, defined as within 250 miles of the UNH campus. We have invested in energy efficient equipment and fixtures, composted 25 tons of food waste last year alone and operate a sustainably themed restaurant, The UNH Dairy Bar. We are also a key player in the Healthy UNH initiative, striving to make UNH the healthiest campus in the nation by 2020. We have eliminated virtually all trans-fats, introduced all-natural and organic foods, are actively reducing sodium in our offerings, and have implemented the Guiding Stars nutritional navigation system.

### **Memorial Union Building**

The Memorial Union Building (MUB) is the University's community center and is the official war memorial of the state of New Hampshire. The MUB provides opportunities for student involvement and offers space for programs, meetings, and study, as well as for major public events, movies, and other entertainment. Students, faculty, and staff serve on the Memorial

Union Board of Governors and work with the director to set policies and establish the budget for the building's operation. The original building was a gift from UNH alumni and first opened its doors in 1957. Currently, the MUB has complete wireless capabilities in all public spaces and meeting rooms.

Headquartered in the MUB are the Information Center; Office of Multicultural Student Affairs, two movie theaters; the UNH Copy Center; the UNH Bookstore; the Ticket Office; specific lounge/study space for nontraditional, veteran, commuter, and graduate students; and Granite Square Station & Shipping, which provides undergraduate mail boxes and package shipping services. Information Technology provides a computer cluster. The UNH Computer store is located on the second floor. The Games Room is equipped with pool tables, ping pong tables and several electronic gaming stations. The Entertainment Center and Wildcat Den provide a comfortable atmosphere for relaxing with live acoustical performances as well as socializing and study space. The Food Court offers expanded dining options. The Student Senate Office, Graduate Student Senate, WUNH-radio, The New Hampshire (the student newspaper), and more than 75 other student organizations also have office space in the MUB.

The Leadership Center (MUB 122) currently serves as the hub for student involvement at the University of New Hampshire and is home to four offices: Greek Life, Commuter Student Services, Student Organization Services, and Project L.E.A.D. Whether a student is interested in joining a student organization or starting a new one, participating in one of many leadership development programs, or simply learning about campus resources—this is the place! Student and professional staff members oversee the University recognition process for all student organizations and are available for advising or training on topics related to organizational development and program planning.

Commuter Student Services strives to connect the half of the student population who do not live in University housing to campus. Programs, such as Good Morning Commuters and the Commuter Connection listserv, bring information to students about campus happenings, events, and activities. Commuter Student Services also helps students understand the ins and outs of moving off campus by providing educational sessions in the residence halls.

Recognized student organizations and University departments are encouraged to use rooms in the MUB. Reservations can be arranged via the scheduling Web site [www.unh.edu/mubscheduling](http://www.unh.edu/mubscheduling), calling MUB Scheduling at (603) 862-1526, or stopping in the Office of the Memorial Union to fill out a form. For a complete listing of Memorial Union programs, services, and events, call the Information Center at (603) 862-2600 or visit the MUB web site at [www.unhmub.com](http://www.unhmub.com).

## Cultural Events

Students at the University can participate in a rich cultural life. Numerous lectures, films, concerts, exhibitions, meet-the-artist receptions, master classes, dance performances, and theatrical productions are offered throughout the year. The UNH Celebrity Series, the Museum of Art, and the Departments of Music, Theatre and Dance, and Art and Art History bring artists of international stature to campus.

The fine and performing arts are an integral part of undergraduate education. Programs are frequently incorporated into coursework. For further information contact the departments and organizations listed below:

Paul Creative Arts Center, [www.unh.edu/pcac](http://www.unh.edu/pcac)

Department of Art and Art History, (603) 862-2190 [www.unh.edu/arts](http://www.unh.edu/arts)

Department of Music, (603) 862-2404, [www.unh.edu/music](http://www.unh.edu/music)

Department of Theatre and Dance, (603) 862-2919, [www.unh.edu/theatre-dance](http://www.unh.edu/theatre-dance)

The Museum of Art, (603) 862-3712, [www.unh.edu/moa](http://www.unh.edu/moa)

UNH Celebrity Series, (603) 862-3242 or [www.unh.edu/celebrity](http://www.unh.edu/celebrity)

Traditional Jazz Series, (603) 862-2404, [www.unh.edu/music/tradjazz](http://www.unh.edu/music/tradjazz)

Memorial Union Ticket Office, (603) 862-2290, [www.unhmub.com](http://www.unhmub.com)

Of course, check the University calendar as well, <http://www.unh.edu/calendar>.

## Campus Recreation

Many opportunities for recreational and leisure activities, regardless of skill or ability, are offered through the Department of Campus Recreation. The Hamel Student Recreation Center is available to all full-time matriculating students and recreation pass holders, seven days a week (excluding UNH holidays and shutdowns). The center offers participants two multipurpose courts, a group exercise studio, club/martial art studio, an 8,000 square foot fitness center with more than 100 exercise stations (some with TV monitors), a cardio-theater area including five TVs, three basketball/volleyball courts, an indoor track, a climbing boulder, a lounge, several classrooms, locker rooms, towel and lock service at the equipment room, saunas, and synthetic sports fields. Many outdoor adventure trips are also available each year.

The Department of Campus Recreation offers a variety of activities designed to make it easier

to reach personal **fitness** goals and have fun. Participants may take part in one of the many group exercise classes, such as step aerobics, Reebok cycling, water aerobics, or cardio kickboxing. Other opportunities include yoga, Pilates, racquetball, personal training, massage therapy, or running in the Homecoming 5K Race. Noncredit courses are also offered including CPR and First Aid, and many more.

The **intramural sports** program consists of 25 different sports and activities offered to co-rec, men's and women's teams. Intramural sports are organized, competitive leagues and tournaments officiated by trained students. These activities generally take place Sunday through Thursday evenings and are three- to five-week leagues or short elimination tournaments.

The Department of Campus Recreation assists special interest groups or **sport club** teams to reflect the varied recreation and cultural preferences of campus community members. Some of the 29 clubs are intensely competitive, requiring a daily commitment to workouts and conditioning. They compete either on an intercollegiate basis with New England teams or sponsor University tournaments. Other clubs meet on a casual "come when you can" basis. The wide variety of clubs can meet every interest or skill level.

Campus Recreation's **aquatics program** oversees the Swazey indoor pool (located in the Field House) and the UNH outdoor pool. The indoor pool is an 8-lane by 25-yard facility with 1- and 3-meter diving boards. Offerings include many open swim hours, water aerobics classes, American Red Cross courses and swim lessons, masters swimming, and many other programs/events/rentals.

The UNH outdoor pool is located beside the recreation center and is operated seasonally and hosts several special events throughout the summer. Offerings include private and group swim lessons, masters swimming, birthday party rentals, and other special events.

In addition to the Recreation Center, the Department of Campus Recreation manages the Whittemore Center Arena. Open skating for students and employees is available as well as opportunities for sport clubs and intramurals for practice and competition.

Campus Recreation manages a large outdoor recreation facility on Mendum's Pond in Barrington, N.H. with its own sailing and canoe center, runs a children's camp (Camp Wildcat) in the summer, and supports the crew boat house. One of the largest student employers on campus, the Department of Campus Recreation provides opportunities for more than 350 student employees in a variety of positions. For further information call (603) 862-2031 or visit [campusrec.unh.edu](http://campusrec.unh.edu).



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From international education to residential life, academic advising to internships and writing, the University offers programs and services to help every student get the most out of his or her college experience.

#### [Advising Services](#)

Every UNH student is assigned an academic adviser, who provides help in choosing courses and planning a program of study. Each college within the University also has an advising office. Other sources of help, for academic or personal problems, are described below.

#### *Center for Academic Resources (CFAR)*

The Center for Academic Resources offers a comprehensive program of academic-related services to undergraduate students. Participants work on an individual basis or in group seminars with trained staff members to improve their academic performance and enhance their educational experience. The center offers learning skills instruction, drop-in subject area tutoring, study groups, computer usage, course information, clarification of academic goals, personal advising, and referral. The center serves approximately 1,600 students a year. There is no cost associated with these services.

Additional services are available through the Student Support Services component for students enrolled in four-year programs who meet income and disability criteria. These services include individualized subject-area tutoring, support for students with disabilities, graduate school advising and preparation, computer support, and scholarship search assistance. Student Support Services is 80 percent federally funded through a \$329,415 TRIO grant from the U.S. Department of Education. UNH contributes 20 percent or \$84,258 as matching funds.

Located on the second floor of Smith Hall, the center is open weekdays from 8:00 a.m. to 4:30 p.m. and evenings by appointment. For further information call (603) 862-3698 (voice/TTY), fax (603) 862-4043, or visit the website at [www.cfar.unh.edu](http://www.cfar.unh.edu).

### ***Counseling Center***

The Counseling Center offers confidential professional consultation, individual and group therapy, and educational workshops for a broad range of emotional, psychological, and interpersonal concerns. Services are provided for all students who have paid their Health Services/Counseling fee and who may be facing a major crisis, confusion, depression, family difficulties, or other personal problems.

The center provides a scheduled intake system. Intake appointments can be made over the phone or in person. In addition, emergency services are offered by the Counseling Center during regular business hours, 8:00 a.m.-5:00 p.m., Monday through Friday, and after hours by calling the Counseling Center at (603) 862-2090. When necessary, the center's staff assists with outside mental health referrals.

The staff, which includes licensed psychologists, counselors, and consulting psychiatrists, is committed to the welfare and development of UNH students. The staff is available for consultation with faculty, administrative staff, and parents on matters relating to the welfare of students. The Counseling Center is fully accredited by the International Association of Counseling Services, Inc. and offers a predoctoral internship training program that is accredited by the American Psychological Association.

All information about a student's visits to the Counseling Center is confidential and cannot be released without the written permission of the student.

For information or to schedule an appointment, call (603) 862-2090 or visit the Counseling Center's Web site at [www.unhcc.unh.edu/index.html](http://www.unhcc.unh.edu/index.html).

### **Athletics, Men's and Women's**

UNH participates in the following intercollegiate men's athletics programs: basketball, cross country, football, hockey, skiing, soccer, cross country, and track and field. UNH also participates in the following intercollegiate women's athletics programs: basketball, cross country, field hockey, gymnastics, ice hockey, lacrosse, skiing, soccer, swimming, track and field, and volleyball. An undergraduate ID provides access to sporting events; men's hockey requires picking up a ticket. (See also Campus Recreation.)

### **Cat's Cache**

Cat's Cache is a debit account accessed with a UNH ID card. Cat's Cache is a convenient way

to make purchases on-campus at many locations including all UNH dining operations, the UNH bookstore, and most vending machines, the pro shop at the Hamel Recreation center, as well as many off-campus merchants. There are no minimums, no fees, and no penalty for withdrawals. Account balances carry from semester to semester and year to year. Cat's Cache is available to all campus community members including students, faculty, and staff.

All UNH Student ID cardholders have a Cat's Cache account. Faculty and Staff members need to request an account before making a deposit. To make a deposit, use one of our convenient account management centers with cash or a credit or debit card, at [www.blackboard.unh.edu](http://www.blackboard.unh.edu) with a credit or debit card, or in person at the Dining and ID Office located in Room 101 of Holloway Commons with cash or a check. You may also make deposits through the online remittance form during eligible periods.

Cat's Cache is intended for purchases and not for cash withdrawals as an ATM card would allow. You cannot withdraw cash from your account unless you withdraw the entire amount. There is a limit of two withdrawals per semester. For more information about Cat's Cache, visit [www.unh.edu/dining](http://www.unh.edu/dining) and follow the Cat's Cache links.

### **Information Technology (IT)**

#### **UNH Information Technology (IT)**

[www.it.unh.edu](http://www.it.unh.edu)

**Computer Access.** All students have access to networked computing resources on campus. UNH has five student computing clusters that offer more than 225 computer systems running Windows XP, Mac OS X, and Linux, as well as scanners and high-speed color laser printers. All clusters are completely networked, offer a suite of productivity and design software, provide access to the Internet, and give students personal network storage for documents. The clusters are staffed by student consultants who assist with questions or problems. Two locations are available 24 hours a day. For information and cluster hours, visit [clusters.unh.edu](http://clusters.unh.edu).

**Computer Store.** The UNH Computer Store offers students, faculty, and staff access to the highest quality standardized, mainstream microcomputer products and services, coupled with expert advice and excellent customer service. Products include Apple and Dell laptop and desktop computers; iPads, iPods; Epson, Canon, Dell, and Hewlett-Packard printers; and a variety of supplies, peripherals, and software at educational pricing to members of the UNH academic community. Visit [computerstore.unh.edu](http://computerstore.unh.edu) for more information, including price lists, or visit us in person at MUB, Level 2, East, across from the student mailboxes.

**Computer Repair.** UNH Computer Repair Services provides UNH students, faculty, and staff warranty service and computer maintenance and repair. A complete list of services is available

online at <http://tps.unh.edu/crs>. The Computer Repair Service Center is conveniently located next to the Computer Store, at the MUB, Level 2, East, across from the student mailboxes.

**Computer Training.** Each semester, UNH IT courses are offered on a variety of topics, including Microsoft Office products. Register for a course via the Web at <http://ittraining.unh.edu>. For more information, call (603) 862-4242.

**Technology Support.** UNH IT provides UNH students, faculty, and staff with support for telephones, network connectivity, computing accounts, supported software applications, exam scanning, and a wide variety of personal computer issues.

***By Phone***

**IT Help Desk**

(603) 862-4242

[it.unh.edu/helpdesk](http://it.unh.edu/helpdesk)

***In Person***

**Dimond Academic Commons IT Support Center**

Dimond Library – Level 3 (Main Level)

[www.library.unh.edu/dac](http://www.library.unh.edu/dac)

***On the Web***

Fill out a support request form at: [it.unh.edu/contactus](http://it.unh.edu/contactus)

***On-Site***

Available to residence hall students only. Call the IT Help Desk or visit the IT Support Center to request this service.

**Web Solutions.** Web Solutions expert web design and development staff work with faculty, staff, and students with developing and maintaining Web-based content. IT Web Solutions supports the UNH Web presence, which is distributed over multiple sites and servers, including UNH's main Web site ( [it.uh.edu](http://it.uh.edu)). For more information or to fill out a request form, visit Web Solutions at [it.unh.edu/websolutions](http://it.unh.edu/websolutions).

**Disability Services for Students**

The University of New Hampshire (UNH) and the Office of Disability Services for Students (DSS) are committed to creating equal access for all UNH students with disabilities. It is our goal to help meet the needs of individuals registered and documented through the office. The University will make reasonable accommodations to promote student independence and accessibility to a full range of college activities at UNH.

We strive to see that no student is excluded or discriminated against in participating in any

program, function, or activity, while maintaining the highest level of academic integrity. We advocate responsibility for an accessible and holistic learning environment, through removal of informational, physical, and attitudinal barriers.

All UNH students with disabilities who anticipate the need for reasonable accommodations and services must self-identify and provide appropriate documentation to Disability Services for Students. Guidelines for documentation of a disability and the timeline for accommodations are available at [www.unh.edu/disabilityservices](http://www.unh.edu/disabilityservices). Please visit the DSS website to learn more about the office. Disability Services for Students is located in Smith Hall, Room 201, (603) 862-2607 (voice/TTY); (603) 862-4043 (fax), or e-mail [disability.office@unh.edu](mailto:disability.office@unh.edu).

### **General Information for Students with Disabilities**

Students seeking academic accommodations, services, and accessibility should contact Disability Services for Students (DSS) at (603) 862-2607 (voice/TTY).

Most major buildings have ramps and many have elevators and adapted restroom facilities. Contact DSS or Affirmative Action with questions about building facilities.

Students with disabilities who require accessible parking permits for on-campus use must seek the permits from the Department of Motor Vehicles (DMV) of their home state (that is, the state where their driver's license was issued). Applications for New Hampshire accessible permits are available at Parking Services. Processing of New Hampshire permits, however, must still be done by the DMV of the student's home state. Please note: All students using accessible parking permits must still purchase either a commuter or on-campus resident pass. Questions about temporary accessible parking should be directed to Parking Services at (603) 862-1010.

For information about dietary restrictions and needs due to a diagnosis or disability, please see <http://www.unh.edu/dining/nutrition>.

Students with disabilities who need accessible housing and plan to live in campus residence halls should contact DSS early to allow for timely arrangements of appropriate rooms and location.

UNH has specifically equipped vans with lifts which transport students on campus to other locations along the Wildcat transit routes. These are known as Wildcat Access Vans. For information on this service or for special arrangements possible during periods of inclement weather; please contact Disability Services for Students (603) 862-2607.

All B.A. candidates must fulfill the University's foreign language requirement by the end of their sophomore year. A student with a documented disability may petition the foreign language board for course substitutions on the basis that the disability will prevent him or her from

successfully mastering the foreign language requirement. Students wishing to pursue this process must contact Disability Services for Students to learn about the process.

No otherwise qualified individual may be excluded from or denied access to any program, course of study, or any other offering of the University, solely on the basis of a disability. Concerns regarding the institution's compliance with the Americans with Disabilities Amendments Act (ADAA) of 2008, or Section 504 of the Rehabilitation Act of 1973 should be addressed to the ADA/504 Compliance Officer, in the Affirmative Action Office at (603) 862-2930 (Voice/TTY).

### **Greek Life at UNH**

Greek life at UNH has a long and rich history, with the first fraternity founded in 1881 and the first sorority founded in 1913. Today the Greek community at UNH has more than 1,100 members, representing about nine percent of the student body. The Greek community is made up of five National Panhellenic Conference sororities, ten North American Interfraternity Conference fraternities, a National Multicultural Greek Council sorority, an agricultural sorority and a co-ed society. The governing bodies for the majority of these organizations are the Interfraternity and Panhellenic Councils and the United Greek Association. As values-based organizations, fraternities and sororities are committed to intellectual growth, leadership and campus/community involvement, social development, philanthropy and community service, and friendship.

Believing that involvement in or with a Greek organization can promote learning, development, and growth, the Office of Greek Life aims to cultivate a values-based and inclusive Greek community of excellence at UNH. This office is staffed by a full-time coordinator and several student interns. More information about the UNH Greek community can be found by visiting the Office of Greek Life at the Memorial Union Building Leadership Center (Room 122), visiting [www.unhmub.com/greek](http://www.unhmub.com/greek), or by calling (603) 862-1002.

### **International Students and Scholars**

The Office of International Students and Scholars (OISS) promotes international education at UNH by facilitating the enrollment and employment of foreign nationals and by providing them with essential support services. The OISS coordinates programs which encourage interaction between the international, campus, and local communities, thereby fostering awareness and appreciation of other cultures. It is the responsibility of the OISS to ensure University compliance with U.S. immigration and employment regulations and to assist international students, exchange scholars, faculty, and staff in the achievement of their academic and



professional goals.

The OISS staff provides immigration advising, information on University policies, administrative support, and referral services. A variety of social and educational programming activities are offered, including orientation for incoming students, faculty, and staff, and others designed to enhance student interaction with the broader community and provide opportunities for sharing in family events. For more information on programs and services, visit the OISS Web site at [www.unh.edu/oiss](http://www.unh.edu/oiss). To schedule an appointment, call (603) 862-1288 or send e-mail to [OISS@unh.edu](mailto:OISS@unh.edu).

All international students are encouraged to maintain contact with the OISS and are required by law to report changes of address, academic program, or source of educational funds.

### **Multicultural Student Affairs**

The Office of Multicultural Student Affairs (OMSA) creates opportunities for people to participate in an inclusive community and to explore and understand diversity, injustice, and equity. Their work is grounded in an understanding of diversity that includes people of all abilities, ages, ethnicities, genders, nationalities, races, religions/spiritual traditions, socioeconomic classes, and sexual orientations.

Providing support and development for students of color (Asian/Asian American/Pacific Islanders, Black/African American, Latino/a, Middle Eastern, Native American/First Nation, Biracial/Multiracial), and for lesbian, gay, bisexual, transgender, questioning and allied students (LGBTQA) is at the heart of their work.

OMSA offers cultural and educational programs; offers opportunities for exploring leadership potential within a multicultural context; provides referrals to obtain support and help from other people and programs on campus; gets students connected; helps students to learn more about race, sexuality, gender; and other social identities; responds to acts of intolerance; and helps all members of the University community to feel safe and welcome at UNH.

The office provides computers for student use, social and study space, a media library, and educational resources for faculty and staff. Staff members include the director, the LGBTQ coordinator, and a multicultural coordinator. For more information, stop by the office in Room 327 of the Memorial Union Building (MUB), phone (603) 862-2050, or e-mail [omsa.info@unh.edu](mailto:omsa.info@unh.edu).

### **Nontraditional Student Services**

Since the 1970s, the nontraditional student population at the University of New Hampshire has

been an active, hardworking group. These students remain dedicated to their education, to their families, and to helping one another deal with issues and concerns often experienced by those having challenging lives apart from a university setting.

To assure that the University and its activities respond to the needs, desires, and lives of nontraditional students, Commuter Student Services provides support, resources and services.

Commuter Student Services is located in the Leadership Center, within the Memorial Union Building, room 122. Information about services, resources, campus and local communities can be found at [www.unhmub.com/off-campus](http://www.unhmub.com/off-campus) or call (603) 862-0303.

### **Office of Conduct and Mediation**

The Office of Conduct and Mediation administers the student conduct process. Through the Student Code of Conduct, the office maintains community standards of behavior that are intended to preserve and protect the University's educational mission of teaching, research, and public service, as well as promote the student's academic achievement and personal development. To attain these aspirations, students must live, work, and learn in an environment of civility and respect where both rights and responsibilities are deeply valued. For the University community to thrive, the rules of conduct must be clear and understood by all members of the community. The Student Code of Conduct codifies and explains community standards of behavior and responsibility, as well as the rights and remedies accorded to all members of the community. It is available online at [www.unh.edu/student/rights](http://www.unh.edu/student/rights).

More specific information regarding the Student Code of Conduct and the conduct process can be found in ***Student Rights, Rules and Responsibilities***. For more information, please call the Office of Conduct and Mediation at (603) 862-3377, or visit the website at [www.unh.edu/ocm](http://www.unh.edu/ocm).

The UNH Mediation Program provides community members with an opportunity to talk about and resolve disputes in an alternative and non-adversarial manner. Students or University community members or organizations can access mediation or conflict resolution training or consultation by self-referral. Mediation and/or conflict resolution training or consultation is also available as an alternative to filing conduct charges against a student in some situations. Mediation is provided by trained neutral mediators, who are in charge of and guide the process in a neutral setting and confidential process. The mediators are not involved in the dispute, do not take sides, and do not make any decision for the disputants. The mediators are part of this community-based mediation program and are supervised by the Office of Conduct and Mediation Programs. Some examples of situations appropriate for mediation include issues arising out of relationships such as roommate, friendships, dating partners, neighbors,

teammates, organization members, landlord/tenants, etc. Through mediation, disputants are able to identify the issues in a conflict, have their perspective be heard and acknowledged, and communicate about how to better understand and solve their problem(s). The mediators, who are often peers, facilitate communication between the parties and empower the students to generate options for resolution and ultimately assist the development of their own resolution to the dispute. The Mediation Program is a larger component of the effort to provide students with the opportunity to develop important life skills such as conflict resolution, anger management, and effective communication skills. For more information, call (603) 862-3377, or visit the website at [www.unh.edu/mediation](http://www.unh.edu/mediation).

#### **President's Commission on the Status of People of Color**

The UNH President's Commission on the Status of People of Color proposes, recommends, and evaluates programs, policies, and services aimed at enhancing diversity and supporting people of color within the UNH community. Established in 1997, the commission acts to ensure implementation of goals to increase campus diversity through minority student, faculty, and staff recruitment and retention, and through curriculum development. As an advocacy group, the commission identifies, recommends, and supports creative strategies for promoting and supporting campus diversity; it responds to issues, needs, and concerns identified within the community; it works to establish effective and collaborative working relationships among departments, offices, committees, commissions, and special programs that play a role in fostering diversity on campus and ensuring that the environment is supportive of diverse and ethnic populations. The commission is located in Thompson Hall G14. Call (603) 862-1058 or visit the commission's web page at <http://www.unh.edu/cspc> for more information.

#### **President's Commission on the Status of People with Disabilities**

At all levels of the University, the President's Commission on the Status of People with Disabilities, established in 2009, promotes equal opportunity, fair treatment and the elimination of physical, programmatic and attitudinal barriers for individuals with disabilities. Acknowledging the fact that people with disabilities are a diverse group who present with visible and nonvisible disabilities, the commission serves as a forum for discussion and assessment of community disability-related issues, policies, services, attitudes and practices. The commission is located in Thompson Hall G14. Call (603) 862-1058 or visit the Diversity Initiatives web page at <http://www.unh.edu/inclusive/>.

A central resource for people with disabilities on campus is the Office of Disability Services for Students, located in the Memorial Union Building, Room 118, (603) 862-2607 (voice/TTY); (603) 862-4043 (fax); or e-mail [disability.office@unh.edu](mailto:disability.office@unh.edu). Find the disability services office on the web at <http://www.unh.edu/disabilityservices/>.

### **President's Commission on the Status of GLBT Issues**

The mission of the UNH President's Commission on the Status of Gay, Lesbian, Bisexual and Transgender Issues is to facilitate the development of a university community that is equitable and inclusive of all sexual orientations and gender identities and expressions. The commission assists the president in monitoring the campus climate for gay, lesbian, bisexual, and transgender faculty, staff, and students; reviews policies and programs; and makes recommendations for improving the campus climate.

Established in 1992, the commission meets monthly during the academic year. Its membership includes gay, lesbian, bisexual, transgender, and allied University faculty, staff, and students who are appointed by the president. Students from the gay, lesbian, bisexual, transgender, and allied community who are interested in participating on the commission are encouraged to contact the chair. Call (603) 862-1058, or visit the commission's web page at <http://www.unh.edu/glbtc>.

### **President's Commission on the Status of Women**

The mission of the UNH President's Commission on the Status of Women is to create equal employment and educational opportunities for all UNH women by promoting an environment free of sexism and discrimination through policy, advocacy, and education. Established in February 1972, to serve as a sister organization to the New Hampshire State Commission on the Status of Women, its functions include: collecting information on the status of women in the UNH community; recommending policies to the president and other University administrators; providing education and programs to help women develop their skills; increasing networking among women; and informing the community of issues related to the status of women. The commission reports annually to the president on its activities and findings. Commission membership consists of a chairperson and volunteer representatives from University students, faculty, and staff. Candidates for membership are recommended by the commission and appointed by the UNH president. Located in Thompson Hall, the commission also maintains a Facebook page for those interested in its activities. Call (603) 862-1058, e-mail [womens.commission@unh.edu](mailto:womens.commission@unh.edu), or visit the commission's web page at <http://www.unh.edu/womens-commission> for more information.

### **Police, University**

The University Police Department is committed to enforcing the laws of the State of New Hampshire and University policies while supporting the rights and dignity of all persons and maintaining a campus environment in which learning may thrive. Officers, professionally trained in their respective areas, staff both the Police and Support Services divisions. The department

holds accreditation from both CALEA and IACLEA.

University Police Department personnel participate in a number of safety programs for the UNH community including adopt-a-dorm and a nationally recognized women's self-defense program called R.A.D.—the Rape Aggression Defense Basic Personal Defense System. Department personnel will meet with groups to provide crime prevention information and tips for increasing personal safety and protection of personal property. A walking patrol provides an escort service for students, faculty, and staff. Engraving pencils to inscribe identification numbers on property in case of theft are loaned free of charge to members of the campus community. To take advantage of any of these services, contact the University Police Department, (603) 862-1427.

### **Residential Life**

Residential Life staff members focus on integrating students' learning outside the classroom with traditional learning in the classroom. Staff members work with students, helping them to succeed academically, become positively involved in the hall and University community, and make friends. They accomplish this by providing students with social and educational opportunities, along with daily interaction.

The Residential Life staff includes a director, a team of 32 professional staff members, and 150 resident assistants (RAs) who are a carefully selected group of undergraduate and graduate students. Each residence hall is staffed with at least one full-time professional and several resident assistants.

The director of residential life also serves as assistant vice president for student and academic services. In addition, Residential Life staff members often initiate responses to individual student emergencies. The assistant vice president also assumes co-responsibility for leadership development, establishing joint ventures with academic programs, orienting new students to the University, and educational and social programming.

Students are welcome to stop by the Residential Life Office, located in 13A Hitchcock Hall, or call (603) 862-2268 for more information.

### **Sexual Harassment and Rape Prevention Program (SHARPP)**

SHARPP is a University of New Hampshire-based crisis intervention center dedicated to providing free and confidential services to survivors of sexual assault, relationship abuse, sexual harassment, childhood sexual abuse, and stalking, and their allies. In addition, SHARPP's Outreach Program provides education and awareness programs on sexual and relationship violence to the greater University of New Hampshire community. SHARPP's services are largely supported by volunteers. Volunteering for SHARPP provides many

opportunities for hands-on experience working with survivors and for the development of leadership skills.

SHARPP's Direct Services include a 24-hour crisis line, emergency medical accompaniment, criminal justice and University judicial support, systems advocacy, academic intervention, support groups, and information and referrals. SHARPP also provides crisis services and support for those who are close to the survivor, including roommates, parents, friends, family members, and instructors.

SHARPP's Outreach program provides the highest quality awareness and educational programming, including education programs for students in the residential halls, classrooms, and Greek life, and orientation activities and training for athletic teams, student organizations, and faculty and staff. SHARPP also sponsors awareness events and activities throughout the year.

The SHARPP office is located at Wolff House, in front of Health Services at the corner of Pettee Brook and Main Streets.. The office is open Monday through Friday, 8:00 a.m.-4:30 p.m. The website is <http://www.unh.edu/sharpp/> and features *Ask an Advocate* , an online resource for help and information. SHARPP's support line and administrative number is (603) 862-3494. SHARPP is also available through a toll free number at 1-888-271-7233 and by TTY at 1-800-735-2964. After hours, all calls will be returned by a trained advocate within 10 minutes. All calls are free and confidential.

### **Student and Academic Services**

The University of New Hampshire has made a commitment to “provide students an innovative, high quality, coherent, and integrated educational experience.” This commitment challenges us to create a learning environment that offers students the greatest opportunity to grow and that provides sufficient connection to the “outside world” to test the relevance and the effectiveness of what they are learning. Such an approach to higher education also requires that we provide the support and direction necessary for the success of our students' endeavors.

The Division of Student and Academic Services seeks to forge integral links between the academic and non-academic aspects of students' lives, to create better connections between curriculum and co-curricular experiences, and to foster high expectations for academic and personal excellence for all students. The focus of this division is on assisting students to be successful at UNH, contributing to a process of intellectual, personal, and social development that produces graduates who are well-educated, well-adjusted, and prepared to realize their goals and contribute to their communities and society with intellect, professional competence, social awareness, the capacity for effective civic engagement, and respect and understanding

for the diversity of people and the world around them.

The Office of the Vice President for Student and Academic Services provides students with information and assistance in problem resolution. For more information or assistance, call the office at (603) 862-2053.

### **University Advising and Career Center**

[www.unh.edu/uacc](http://www.unh.edu/uacc)

The University Advising and Career Center, Hood House, (603) 862-2064, provides academic advising to undeclared students in the College of Liberal Arts and to provisional English and provisional psychology majors. It supports all students and alumni in career exploration. The center's professional staff provides assistance to students in clarifying their interests and skills as they relate to developing a program of study at the University and declaring a major, offering opportunities to explore career possibilities, and aiding in securing employment. Vocational assessments (Myers-Briggs type indicator and Jackson Vocational Interest Survey) are offered to help individuals to identify potential majors and careers. A nationwide parent/alumni career mentor network comprises more than 500 members, and an internship office help students explore career possibilities. Internship and job opportunities are posted online in the Center's Wildcat Careers. Additionally, the center sponsors fairs and activities that bring students into contact with prospective employers and internship opportunities, and help to prepare students for careers.

The center is also the campus resource for students seeking admission to medical and related health profession schools and law school. More broadly, the center assists students considering graduate education, sponsors a graduate and professional school fair, administers national tests for post-baccalaureate study, and guides individuals to resources across the University.

### **University Internships**

Supported by the federally funded Job Locator Development Program, the internship office in University Advising and Career Center helps students locate preprofessional internships in settings ranging from traditional business and research facilities to more uniquely tailored environments that reflect academic and career interests. Students who wish to engage in career-oriented work experiences should consult with an appropriate faculty sponsor regarding the possibility of receiving academic credit.



Students who wish to secure internships should consult the internship postings listed on the Wildcat Careers link on the center's Web site. Postings are also listed in the center. Several academic departments also have internship listings posted.

For more information regarding internships, consult the center's website at [www.unh.edu/uacc](http://www.unh.edu/uacc) or contact the center at (603) 862-2064.

### **Veterans Information**

The UNH veterans coordinator, located in the Registrar's Office at (603) 862-1595, provides counseling on all aspects of veterans benefits and assistance in procuring and completing the required forms and certifications for veterans benefits. The veterans coordinator maintains a comprehensive directory to assist veterans in contacting state, local, and University resources for housing, day care, career planning, employment, financial aid, tutorial assistance, remedial training, handicapped services, and Veterans Outreach. The coordinator also provides a framework for networking among campus veterans. For further information, go to [www.unh.edu/veterans](http://www.unh.edu/veterans) ; e-mail [UNH.Veterans@unh.edu](mailto:UNH.Veterans@unh.edu).

### **University Writing Program**

The University Writing Program is dedicated to making all UNH students successful writers. The University Writing Committee and program staff research, organize, develop, and support a wide range of activities that help students and faculty. The writing program conducts routine and directed assessments of the University writing requirement and the writing intensive (WI) courses that all undergraduates must take. The Writing Committee reviews applications for WI course status as well as student petitions and waivers that allow non-standard and transfer courses to count as writing intensive. UNH has a highly successful writing fellows program that allows specially prepared students to work with writers in specific writing intensive courses. Frequent seminars, workshops, and classes offer both faculty and students the opportunity to learn more about writing, teaching with writing, and emerging technologies for writing.

### **Robert J. Connors Writing Center**

The Robert J. Connors Writing Center provides individual writing conferences to members of the University community. Collaborating on writing helps students excel in classes and beyond. Writers of all skill levels are encouraged to visit the center to have conversations about their writing. Peer tutors are trained to help students with writing issues from thesis clarity to sentence structure to questions about genre writing and citation styles.

The Connors Writing Center stresses a focus on higher level concerns such as organization,

development of ideas, and clarity, but writing assistants are also equipped to discuss sentence-level concerns such as grammar and punctuation. The center welcomes all students, including those whose first language is not English. Writing assistants are trained to work with ESL and EFL students of all levels.

The center offers one-on-one conferences by appointment or by walk-in. Conferences are free and usually last about 50 minutes. The writer's goals set the course for the conference, and students decide whether tutors communicate the results of the conference to their instructors.

Students may call (603) 862-3272 for an appointment or visit the Writing Center in Hamilton Smith, room 7. The Writing Center also offers a walk-in satellite location at Dimond Library. Visit the Writing Program's website at [www.unh.edu/writing](http://www.unh.edu/writing).

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**« Health Services**

The University has a nationally accredited ([aaahc.org](http://aaahc.org)) health and wellness program.

**Health and Counseling Fee**

All undergraduate and graduate degree candidates and all non-degree candidates taking more than 12 credits are required to pay a mandatory health and counseling fee. For the academic year 2011-2012, the expected health and counseling fee is \$581. This prepaid fee covers many outpatient care needs that are available at Health Services. However, charges not covered by the health fee are the responsibility of the student. Students should check with the Health Services business office at (603) 862-2840 with any questions.

**Health Insurance**

UNH requires health insurance as a condition of enrollment for full-time degree students at its Durham and Manchester campuses. Students who already have health insurance are able to waive coverage under the University-sponsored plan if their insurance plan meets or exceeds the established waiver criteria by completing a waiver prior to the deadline. International students with F-1 and J-1 visas will be required to purchase the UNH Health Benefits Plan.

**Health Record Requirement**

In order to provide effective care, Health Services requires that undergraduate students who have been formally accepted for bachelor's or associate's degree candidacy must have health information on file with Health Services. This information will include three forms provided by Health Services on its Web site at [www.unh.edu/health-services](http://www.unh.edu/health-services). These include a physical assessment and immunization form, to be completed by a medical provider and mailed to Health Services, and a health history form, to be completed and submitted by the student online.

Documentation of proof of immunity to MMR (measles, mumps, and rubella) is required (UNH Academic Policy 02.14). Students must meet one of the following criteria for proof of immunity: received two vaccinations at least one month apart after 12 months of age; three positive

measles, mumps and rubella titers (blood test); health provider documentation of past history of the diseases including three positive measles, mumps and rubella titers proving immunity; or born before 1957. Students requesting a religious exemption from measles vaccinations must complete the UNH Health Services Request for Exemption and submit appropriate documentation. Students from countries where TB is endemic are required to either provide documentation of being tested within six months prior to enrollment or provide documentation of treatment for either latent or active TB or a negative chest radiograph if the test is positive. It is the responsibility of students to complete the forms before the beginning of classes. Any student failing to complete these requirements may not be cleared to register for future classes.

### **Medical Services**

Health Services provides comprehensive, student-focused, primary medical care through a team approach. The clinical staff consists of board-certified physicians, nurse practitioners, nurses, and medical assistants who are committed to prevention and holistic care. Primary medical care is provided for a large variety of common concerns. Examples include respiratory illnesses, injuries, asthma, dermatologic issues, intestinal disorders, and mental health.

Women's health services include annual examinations, diagnoses and treatment related to abnormal Pap smears, testing and treatment for sexually transmitted infections, contraceptive services, pregnancy testing and counseling, limited sexual assault services, and other women's health concerns. An outreach nurse assists with problems arising from hospitalization and health withdrawals and return to campus. Other services include allergy/immunization clinics, and travel clinic. Students may speak by telephone with a triage nurse for advice at any time. Clinical support services include laboratory, radiology, and pharmacy. Not all services are available during the summer or breaks.

During the academic year, UNH Health Services has an agreement with a local hospital to provide after-hours services when a student's medical needs cannot wait until Health Services is open.

Well-staffed and well-equipped community hospitals are nearby and emergency ambulance service is available in Durham at all times.

### **Medical/Psychological Withdrawals**

All students seeking assistance with health-related (physical or mental) withdrawals from the University, or those who will be out for extended periods of time due to health issues, should be in touch with Health Services at 862-1098. Information is also available on the web at [www.unh.edu/health-services/withdrawals.html](http://www.unh.edu/health-services/withdrawals.html).

### **Office of Health Education and Promotion**

The Office of Health Education and Promotion coordinates health promotion activities on

campus. Services provided include educational programs/workshops, individual and group support to promote healthy lifestyle choices, education and support to students living with chronic illnesses, confidential HIV testing and counseling, alcohol and other drug counseling, nutritional counseling, stress management counseling, biofeedback, light therapy, massage therapy, smoking cessation services, and a resource library with materials on a variety of health and wellness topics. For more information, visit the Health Services Web site at [www.unh.edu/health-services](http://www.unh.edu/health-services).

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#### « Fees and Expenses\*

*\*All charges quoted in this section reflect anticipated 2011-2012 rates.*

The expected cost for 2011-2012 at the University will average about \$28,000 for residents of New Hampshire and about \$41,000 for nonresidents. See the following chart for a breakdown of these costs.

UNH bills are sent electronically only. Bills are posted to student MyUNH

([blackboard.unh.edu](http://blackboard.unh.edu)) accounts. Students are notified through UNH assigned e-mail addresses when new bills are posted.

#### Fees and Expenses (2011-2012)\*\*

	In-state residents	Non-residents
<b>Tuition</b>	<b>\$12,060</b>	<b>\$25,380</b>
<b>Fees</b>		
Activity fee	98	98
Recreational fee	472	472
Memorial Union fee	337	337
Student athletic fee	926	926
Health and counseling fee	581	581
Technology fee	170	170
Transportation fee	106	106
Deferred maintenance fee	500	500
<b>Subtotal of Required Expenses</b>	<b>\$15,250</b>	<b>\$28,570</b>
<b>Room and Board</b>		
Double room	5,844	5,844
Silver Meal Plan	3,608	3,608
<b>Subtotal</b>	<b>\$9,452</b>	<b>\$9,452</b>
<b>Estimated Expenses</b>		
(to cover books, supplies, transportation, misc.)	3,000	3,000

<b>Approximate Costs</b>	<b>\$28,000</b>	<b>\$41,000</b>
--------------------------	-----------------	-----------------

Health Insurance is required as a condition of enrollment for all full-time students. Students may provide proof of adequate coverage through another plan, or may elect coverage under the University's plan. Cost of the University plan for the 2010-2011 academic year is \$2,010.00.

*\*\* Note: The University reserves the right to adjust charges for such items as tuition, board, student fees, and room rent. Such charges will be announced as far in advance as possible.*

### **Tuition\***

The tuition rates for the 2011- 2012 academic year are \$12,060 for N.H. residents and \$25,380 for nonresidents. The rates per credit hour in 2011-2012 are \$503 for N.H. residents and \$1,058 for nonresidents.

Students are permitted to enroll for more than 20 credits only with the approval of their college or school dean. Persons carrying more than 20 credits will be billed a per-credit fee for each credit above 20 credits, whether or not a student has obtained the dean's approval. (See per-credit hour rates above.) Courses taken for audit are charged at the same rates as for-credit registrations. No refund will be made if a student subsequently drops a course, bringing the credits to 20 or fewer. Undergraduates registering for fewer than 12 credits pay the per-credit hour charge, plus a registration fee of \$20 per semester. Undergraduates registered for less than 12 credits are charged 50% of the usual mandatory fees. Students registered for fewer than 5 credits pay the technology fee but are not charged for the other mandatory fees. The minimum charge for any recorded course is the per-credit charge of 1 credit hour.

Tuition differential charges apply to some majors. Students in the College of Engineering and Physical Sciences (CEPS), including engineering and computer science, and the Whittemore School of Business and Economics (WSBE), will be charged a tuition differential. The differential is the same rate for both N.H. residents and nonresident students. In 2011-2012 the anticipated CEPS differential will be \$892 per academic year and the anticipated WSBE differential will be \$875 per academic year. CEPS and WSBE students who register for fewer than 12 credits pay a differential per-credit hour (\$37 for CEPS and \$36 for WSBE per-credit in 2011-2012). Music majors are charged an applied music fee of \$400 each semester.

All admitted students must pay an enrollment fee. The fee is \$350 for residents and nonresidents. If a student decides not to attend the University, these payments may be refunded on a prorated basis until August 15, according to the guidelines set by the Office of Admissions.

Three-fourths of tuition and mandatory fee charges will be refunded to students withdrawing or

dropping courses within one week of the first day of classes; one-half after one week and within 30 days; and none thereafter (see the [University Calendar](#)). Students receiving federal financial aid will have their return of unearned aid calculated in accordance with the U.S. Department of Education regulations in effect at the time of their withdrawal. For more information concerning withdrawal, call Business Services, (603) 862-2230. A degree candidate who withdraws from UNH and subsequently enrolls as a special student within the following year will be billed for tuition and fees on the same basis as degree candidates. Students with outstanding financial obligations to the University must clear their accounts before their registration will be confirmed.

A \$25 fee must be paid by all students dropping courses after the third Friday of classes. The \$25 fee will not be charged to persons changing to a reduced load or withdrawing; in both of these cases, the regular tuition rebate policy will apply. If a student has received permission to add a course after the third Friday of classes, a \$25 fee will be assessed for each course added. A change of section within the same course is accomplished by a “drop” of one section and an “add” of another; however, only one \$25 fee is assessed under these circumstances.

#### **Fees\***

Expected mandatory fees for 2011-2012 include a Memorial Union fee (\$337) for the use and administration of the student union; a recreational fee (\$472) for support of recreational facilities; a student activity fee (\$98) for support of the undergraduate newspaper, yearbook, student government, student lawyer, student radio station, and other student organizations; a technology fee (\$170); a student athletic fee (\$926) to provide support for athletic programs; a health and counseling fee (\$581) to provide general health care through University Health Services; a deferred maintenance fee (\$500) to support the University's physical plant; and a transportation fee (\$106) to provide student transportation services.

There are no waivers of these fees. The services and facilities are available to all--the extent to which each student uses them cannot be the factor by which assessment is determined. Students who withdraw or drop to part-time after classes begin are eligible for refund of fees at the same rate as tuition refunds listed previously.

As a condition of enrollment, all full-time UNH students will be required to carry health insurance. Students may elect coverage under the University's student health benefits plan, or may waive the requirement by providing proof of adequate coverage through another plan.

International students with F1 or J1 visas are required to purchase the UNH-sponsored coverage. There are no exceptions to this policy.



**Mandatory Fees Include**

*Recreation Fee*

Use of indoor pool at the field house

Use of athletic facilities at the Whittemore Center, which includes:

Aerobics

Saunas

Locker rooms

With an additional fee:

CPR/First Aid course

Ballroom dancing

Lifeguard instruction

*Health Services Fee*

For information, see Health Services.

*Memorial Union Fee*

For more information, see Memorial Union.

*Athletic Fee*

Admittance to all home games of organized sports at UNH

Financial support for athletes and athletic teams

*Activity Fee*

Support for the following organizations:

The undergraduate newspaper

Yearbook

Student government

Student lawyer

Student radio station

Movies at reduced rates

For more information, check the *Get Involved* guide available at the Memorial Union Building.

*Technology Fee*

Support for the following:

Student computing clusters

Walk-in Help Desk services

Technology-enhanced classrooms infrastructure

Academic technology liaisons

Technology-enhanced learning

### *Transportation Fee*

Student transportation Services:

Campus Connector

Wildcat Transit

Safe rides

Amtrak Quik Ticket trip

Non-emergency rides

### **Room and Board\***

Anticipated room and board charges will average \$9,452 for the 2011-2012 academic year for a double room with a mandatory meal plan.

New students accepting a space on campus must include a \$200 housing deposit with their housing application; for returning students, the deposit is \$500. Written notification of cancellation of the room application or assignment received before August 15 will result in forfeiture of the deposit only. Written notification of cancellation after August 15 and before Friday of the first week of class will result in a charge of one-fourth of the full semester's housing fee.

If the student fails to occupy the assigned room by Friday of the first week of class or cancels the agreement by mutual consent, or if for disciplinary or nonrenewal actions the agreement is canceled, the student will receive a 75 percent refund of the semester's housing fee. Cancellation after the first Friday of classes and before 30 days after registration will result in a 50 percent refund of the semester's housing fee. Cancellation 30 days after registration will result in no refund of the housing fee. Students who check in or move in to a hall or apartment, move out, and do not withdraw from the University are charged the full housing fee. If the agreement is canceled, the total amount of the housing deposit will be applied against any unpaid University charges.

Refunds of meal plans will be granted only with approval or upon withdrawal from the University. If a refund is approved for an unlimited meal plan, the refund will be prorated by the number of weeks the student attended classes or used the meal plan. Block meal plans will be prorated by the number of meals consumed and charged at the highest prevailing meal rate. Unspent dining dollars will be refunded.

### **Rebates**

Any amount owed to the University will be deducted from any rebate due to a student.

### **Deposits and Course Fees**

Refundable deposits may be required to cover locker keys or loss or breakage in certain departments. A semester charge will be made for individual lessons in music, as noted in the description of applied music courses. (Non-music majors will be charged a fee upon completion of an audition). A charge will be made for riding lessons and SCUBA, as noted in the sections on animal sciences and physical education. Some courses carry special fees to cover the costs of special equipment, field trips, etc.; these are noted in the course descriptions. Thompson School students pay curriculum fees to cover special costs in their programs (see the Thompson School section). Students will be charged a computer use fee for courses requiring computer access and/or common access accounts. For certain courses, there are also lab fees.

### **Other Expenses**

Books and classroom supplies cost approximately \$800 annually. These may be purchased at the University Bookstore.

Personal expenses vary considerably with individual students and include clothing, laundry, recreation, incidentals, and travel.

### **Payment**

All bills for tuition, fees, room and board, and other semester charges are due in full on the payment due date for each semester. A late fee may be assessed to student accounts not paid in full by that payment due date. Student accounts not paid in full within 30 days after the payment due date may be assessed additional late fees, default charges, interest and/or collection costs, and the student may be subject to deregistration from classes.

Parents and students who wish to make periodic payments for tuition, fees, room and board and other semester charges should contact UNH Business Services, well in advance of the semester payment due date, for information on approved payment plans.

Undergraduate bills are sent electronically through posting to students' MyUNH ([blackboard.unh.edu](https://blackboard.unh.edu)) accounts. Tuition bills are posted twice a year, in mid-July for the fall semester and in mid-November for the spring semester. Monthly statements are also posted as needed. E-mails are sent to student's UNH-assigned e-mail addresses notifying students when new bills have been posted. Students may set up Parent Portal accounts to allow parents or others to access their student accounts.

Through the online system students can view a history of electronic bills and payments and access a real-time view of their accounts. Payment may be made online by check, or the bill may be printed and mailed with payment. UNH does not accept credit card payments from Durham undergraduates.

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The University complies with federal guaranteed student loan regulations and will supply information about the employment of its graduates who have majored in specialized degree programs that normally lead to specific employment fields. This information may be obtained upon request from the University's Career Services, which is available to all students. The University does not guarantee employment to its graduates, but their chances for employment are enhanced if they have begun career planning early in their undergraduate days.

The University provides information pertaining to the Family Educational Rights and Privacy Act of 1974 (the "Buckley Amendment") in the annual student handbook. Information also is available from the Office of the Vice President for Student & Academic Services and the Office of the Provost and Vice President for Academic Affairs. The annual student publication, ***Student Rights, Rules, and Responsibilities*** (<http://www.unh.edu/student/rights>), also contains University regulations and policies regarding student conduct.

Program descriptions may vary from the actual content or requirements because of advancements in the discipline or the active nature of academic planning and decision making. Accordingly, the University reserves the right to make whatever changes are deemed necessary in schedules, course content, requirements, academic programs (including their termination), calendar, tuition and fees, services, or any other aspect of the University's operations, giving whatever notice thereof is reasonable under the circumstances. Therefore, the provisions of this catalog are not an irrevocable contract between the students and the University. The University is also not responsible for failure to provide or for delay in providing expected services and/or facilities when such failure arises from causes beyond the reasonable control of the University.

All aforementioned publications are available in alternate formats upon request.

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## Undergraduate Course Catalog 2011-2012

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**Enrollment Statistics - Fall Semester - UNH Durham**

	2007-08	2008-09 (Men/Women-Total)	2009-10	2010-11
Freshman	1,088 / 1,527 - 2,615	1,121 / 1,549 - 2,670	1,292 / 1,687 - 2,979	1,233 / 1,616 - 2,849
Sophomore	1,316 / 1,777 - 3,093	1,197 / 1,587 - 2,784	1,208 / 1,557 - 2,765	1,391 / 1,690 - 3,081
Junior	1,246 / 1,538 - 2,784	1,317 / 1,741 - 3,058	1,200 / 1,574 - 2,774	1,252 / 1,558 - 2,810
Senior	1,171 / 1,538 - 2,709	1,297 / 1,606 - 2,903	1,462 / 1,832 - 3,294	1,339 / 1,722 - 3,061
TSAS - Freshman	131 / 98 - 229	140 / 89 - 229	132 / 77 - 209	101 / 73 - 174
TSAS - Senior	123 / 68 - 191	124 / 77 - 201	126 / 79 - 205	129 / 79 - 208
DCE - AA <sup>1</sup>	0 / 1 - 1	NA	NA	NA
Graduate - Postbacc Certificate	7 / 9 - 16	9 / 17 - 26	9 / 13 - 22	26 / 30 - 56
Graduate - Masters	726 / 1,175 - 1,901	674 / 1,111 - 1,785	671 / 1,023 - 1,694	680 / 1,013 - 1,693
Graduate - Ed.S. <sup>2</sup>	21 / 16 - 37	17 / 19 - 36	12 / 13 - 25	13 / 14 - 27
Graduate - Doctoral	254 / 241 - 495	257 / 255 - 512	252 / 273 - 525	258 / 252 - 510
<b>Total Degree Candidates</b>	<b>6,083 / 7,988 - 14,071</b>	<b>6,153 / 8,051 - 14,204</b>	<b>6,364 / 8,128 - 14,492</b>	<b>6,422 / 8,047 - 14,469</b>
Continuing Education Credit	355 / 627 - 982	277 / 483 - 760	336 / 483 - 819	297 / 389 - 686
Summer Session	1,086 / 1,932 - 3,018	1,071 / 1,837 - 2,908	1,177 / 1,873 - 3,050	1,070 / 1,827 - 2,897

**Baccalaureate Counts by College**

<b>Life Sciences &amp; Agriculture</b>				
Freshman	374	412	454	519
Sophomore	441	398	455	460
Junior	402	503	444	542
Senior	406	438	568	546
<b>Total</b>	<b>1,623</b>	<b>1,751</b>	<b>1,921</b>	<b>2,067</b>

<b>Liberal Arts</b>				
Freshman	1,187	1,132	1,118	1,227
Sophomore	1,398	1,286	1,182	1,272
Junior	1,117	1,149	1,074	992
Senior	1,025	1,079	1,153	1,052
<b>Total</b>	<b>4,727</b>	<b>4,646</b>	<b>4,527</b>	<b>4,543</b>

<b>Engineering &amp; Physical Sciences</b>				
Freshman	393	398	481	444
Sophomore	394	390	395	471
Junior	331	380	403	439
Senior	339	387	468	492
<b>Total</b>	<b>1,457</b>	<b>1,555</b>	<b>1,747</b>	<b>1,846</b>

<b>Whittemore School</b>				
Freshman	384	399	572	341
Sophomore	492	412	397	529
Junior	471	505	418	407
Senior	423	476	514	447
<b>Total</b>	<b>1,770</b>	<b>1,792</b>	<b>1,901</b>	<b>1,724</b>

<b>Health &amp; Human Services</b>				
Freshman	277	329	354	318
Sophomore	368	298	336	349
Junior	463	521	435	430
Senior	516	523	591	524
<b>Total</b>	<b>1,624</b>	<b>1,671</b>	<b>1,716</b>	<b>1,621</b>

<b>UNH Manchester - Associate and Baccalaureate</b>				
Associate	108 / 101 - 209	99 / 104 - 203	119 / 125 - 244	97 / 103 - 200
Baccalaureate	245 / 319 - 564	250 / 339 - 589	270 / 330 - 600	315 / 368 - 683
<b>Total Degree Candidates</b>	<b>353 / 420 - 773</b>	<b>349 / 443 - 792</b>	<b>389 / 455 / 844</b>	<b>412 / 471 - 883</b>
Continuing Education Credit	152 / 214 - 366	139 / 166 - 305	113 / 121 - 234	110 / 125 - 235

<sup>1</sup> Effective Spring 2005, AA General Studies no longer offered.

<sup>2</sup> Education Specialist (Ed.S.) replaces Certificate of Advanced Graduate Study (CAGS)



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## Undergraduate Course Catalog 2011-2012

### University Academic Requirements ▼

#### « [University Academic Requirements](#)

To graduate from the University of New Hampshire, all baccalaureate and associate in art students enrolling for academic year 2011-2012 must fulfill four types of University requirements: writing, Discovery (core curriculum), degree, and major.

#### [University Writing Requirement](#)

<http://www.unh.edu/writing/>

As the cornerstone of any higher education, academic and disciplinary literacy is the concern of the entire faculty and the whole University curriculum. Understanding that literacy is a long-term development process, the University community is committed to the following goals for student writing and learning:

- Students should use writing as an intellectual process to learn material, to discover, construct, and order meaning.
- Students should learn to write effectively in various academic and disciplinary genres for professional and lay audiences.
- Students should learn to display competence with the generic features and conventions of academic language.

#### **Writing Intensive Courses**

All bachelor's degree candidates are required to complete four "writing intensive" courses, which must include English 401 (Freshman Composition) and three additional "writing intensive" courses, one of which must be in the student's major, and one of which must be at the 600-level or above. Specific courses that fulfill the writing requirement are listed at [unhinfo.unh.edu/registrar/registration.html](http://unhinfo.unh.edu/registrar/registration.html). Some courses have both writing intensive and nonwriting intensive versions, such as HIST 405 and HIST 405W. In those cases, only the sections attached to the "W" courses will be writing intensive.

Please note that some cross-listed courses are also writing intensive. For the most current information on cross-listed courses, visit the website listed above.

### **Discovery Program (Core Curriculum Requirement)**

When we discover what we had not before known, we experience wonder. When Keats first read Homer, he felt "like some watcher of the skies / When a new planet swims into his ken." The Discovery Program, like Homer to Keats, serves as the beginning of a great journey of learning and teaching that students and faculty take together.

When we learn and teach in Discovery, we take four questions as our common ground: How do we know the world? What questions and what tools shape our knowledge? How do we determine what we value? How do our different perspectives--intellectual and personal--inform each other?

Professors in Discovery have a common mission: to help students from all departments and programs understand better the organization of knowledge in the modern world. Faculty are responsible not only to colleagues and students in their own disciplines, but also to others learning and teaching in the program from across the university's variegated intellectual terrain.

Students, too, have a common mission: to claim their own educations with curiosity, open mindedness, and discipline. They are responsible for active and tangible engagement in the intellectual life of the University, in classrooms, on campus, and within the wider community. Students are partners in the learning process. Together, students and faculty seek to understand the world as it is and as it might be and to take their places as independent thinkers in the world they will help to shape.

The Discovery Program provides the intellectual framework for students in any major. It represents the faculty's collective belief in what constitutes and contributes to essential knowledge of the world. Together, students and faculty attempt to understand fully and use ethically that knowledge, both in the present and as a reservoir from which to draw in the future.

Each course in the Discovery Program fulfills an obligation not only to its own field, but also to others. Individually, courses illuminate the disciplines and ask that students understand their foundational methods, tools, and questions. Collectively, the Discovery Program aspires to help students recognize complexity and elegance in the relationships amongst the disciplines, to chart constellations of human knowledge. Like Keats, we are "watchers of the skies."

"He who learns but does not think is lost. He who thinks but does not learn is in great danger."  
Confucius.

## Discovery Program Requirements

### Discovery Foundation Skills:

- **Inquiry course.** This course may fulfill a Discovery category and/or a departmental requirement. It should be taken during a student's first or second year or prior to completion of 57 credits. *For students who transfer in with 58 or more credits, the INQ requirement is waived automatically.*
- **One course in writing skills.** Most students will satisfy the first-year writing requirement with English 401. This course should be taken during a student's first year or prior to completion of 32 credits.
- **One course in quantitative reasoning.** This course is normally completed by the end of the first year or 32 credits.

### Discovery in the Disciplines:

Students must take one course from each Discovery category at the 400 - 600 levels. Inquiry courses that carry Discovery category designations may be used to satisfy this requirement.

- One course in **Biological Science (BS);\***
  - One course in **Physical Science (PS);\***
  - One course in **Environment, Technology, and Society (ETS);**
  - One course in **Fine and Performing Arts (FPA);**
  - One course in **Historical Perspectives (HP);**
  - One course in **Humanities (HUMA);**
  - One course in **Social Science (SS);** and
  - One course in **World Cultures (WC)** (also may be satisfied by approved study abroad programs).
- \* One of these courses must have a lab component (**DLab**).

### Discovery and Integrative Understanding:

One senior capstone experience, supervised and approved within the major. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning. Departments may allow honors theses, mentored research projects, and other special student activities to substitute for designated department capstones.

The University Dialogue, focusing on grand challenges we face as a society, is an opportunity



to engage in the intellectual life of the University. Each year, the University engages a different theme, presented through experiences in and outside the classroom. It is not a course and does not require registration.

### **Additional Information**

Discovery Program requirements shall not be waived on the basis of special examinations or placement tests, except for the College Board Advanced Placement tests and the College Level Examination Program (CLEP) tests. All students transferring to UNH in academic year 2011-12 will come in under Discovery Program requirements. For students who transfer in with 58 or more credits, the INQ requirement is waived automatically.

**Note to Faculty:** *Waiver of requirements in the Discovery Program*—Students may petition the Discovery Committee to waive or replace a requirement. The student's petition must be approved by his or her major adviser and the dean of his or her college.

The required courses cannot be taken on a pass/fail basis. No single course may be counted in more than one Discovery discipline category. Academic departments may or may not permit Discovery courses to count toward requirements for a major. TSAS courses may not be used for general education (1984-2009), writing intensive, or foreign language requirements. TSAS courses that are 400-600 level and Discovery-approved may count for Discovery requirements. All Discovery courses carry 3-4 credits.

The most current list of Discovery courses may be found on the Registrar's Office website.

- » **Discovery Foundations:**
- » **Discovery in the Disciplines:**
- » **Discovery and Integrative Understanding:**

### **Discovery Program courses**

The complete list of Discovery courses can be found on the Registrar's Office website. Click [here](#) and select Discovery Program Information from the list of links on the left-hand side of the page to open the list in PDF.

### **Writing Skills (WS)**

ENGL 401

### **Quantitative Reasoning (QR)**

+ADM 403

BIOL 528, 555,

EREC 525  
HHS 540  
MATH 420, 424A, 424B, 425, 439  
PHIL 412  
PSYC 402  
SOC 502

**Inquiry (INQ)**

Click [here](#) and select Discovery Program Information from the list of links on the left-hand side of the page to open the list in PDF.

**Biological Science (BS)**

ANSC 401  
(DLAB)  
ANTH 415 (DLAB)  
BIOL 411 (DLAB), 412 (DLAB), 413 (DLAB), 414 (DLAB), 420 (DLAB)  
BMS 407, 444A (DLAB), 501 (DLAB), 507 (DLAB), 508 (DLAB)  
BSCI 405 (DLAB), 406 (DLAB), 421, 422, 431 (DLAB)  
ECE 444 (DLAB)  
HMP 501 (DLAB)  
KIN 527 (DLAB), 607  
NR 410 (DLAB), 433 (DLAB), 444E  
NUTR 400 (DLAB)  
OT 513 (DLAB)  
PBIO 400 (DLAB), 412 (DLAB), 421 (DLAB)  
ZOO 401 (DLAB), 412 (DLAB), 444, 444A

**Physical Science (PS)**

CHE 410  
CHEM 403 (DLAB), 404 (DLAB), 405 (DLAB), 409, 444, 444A, 444B, 444G  
ESCI 401 (DLAB), 402 (DLAB), 405, 409 (DLAB), 420, 444, 501 (DLAB)  
GEOG 473 (DLAB), 572  
MS 401  
NR 504 (DLAB)  
PHYS 401 (DLAB), 402 (DLAB), 405, 406 (DLAB), 407 (DLAB), 408 (DLAB), 409 (DLAB),  
444A

**Fine & Performing Arts (FPA)**

ARTS 444, 444A, 480, 487, 532, 574  
CA 444, 502

HUMA 510A, 511A, 512A, 513A, 514A, 515A  
ITAL 525  
LLC 444D  
MUSI 401, 402, 444, 511  
PHIL 421  
THDA 435,436, 438, 440, 442, 444, 444A, 459, 462, 463, 583

**Historical Perspectives (HP)**

AMST 444D  
ANSC 444  
BMS 444B  
CLAS 405, 406, 444C, 550, 560  
FS 444  
HIST 405, 406, 410, 421, 422, 435, 436, 444, 444A, 444B, 444C, 444D, 444E, 444F, 483, 506,  
511, 521, 522, 532, 565, 579  
HUMA 510C, 511C, 512C, 513C, 514C, 515C  
ITAL 681A, 682A  
KIN 444B, 561  
LLC 540  
POLT 403  
+PS 501, 503  
PSYC 571  
RS 483  
RUSS 525  
SW 525  
WS 444A, 444C, 505

**Humanities (HUMA)**

AMST 444B, 444E, 501, 502  
ANSC 444B  
CLAS 401, 421, 422, 444, 444A, 444B, 520, 530  
CMN 444, 456  
CSL 406  
+ECN 444  
  
ECS 550  
ENGL 403, 444D, 444E, 444G, 444J, 444K, 444M 511, 512, 513, 514, 515, 516, 517, 518, 521,  
533, 550, 555  
HUMA 401, +411, +412, 444, 444A, 444B, 444C, 500, 510D, 511D, 512D, 513D, 514D, 515D,  
519

ITAL 521, 522, 681B, 682B  
LLC 444, 444C, 444E, 444F  
PHIL 401, 430, 436, 444A  
POLT 401, 444A, 524  
+PS 504  
RMP 511  
WS 405

**Social Science**

ADMN 444

ANTH 412  
CEP 415  
CLAS 506  
CMN 455, 457  
CSL 401  
+ECN 411, 412  
ECON 401, 402, 444  
EDUC 444, 444A, 444B, 520  
ENGL 405, 444B, 444F  
EREC 411  
FS 444A, 525, 545  
GEOG 581, 582  
HHS 444  
HMP 401  
+INTR 438  
KIN 444A, 444C  
LING 405, 444B, 444F

NURS 535  
NUTR 405  
POLT 402, 512, 560  
+PS 502, 505  
PSYC 401, 444A  
RMP 444, 444A, 490  
SOC 400, 444, 540  
SW 444, 550  
WS 401, 444, 444B

**World Cultures (WC)ANSC 510**

ANTH 411, 500, 501

CHIN 425,503,504

COMM 525

ENGL 581

EREC 444

FREN 503, 504, 525, 526

GEOG 401, 402, 550

GERM 503, 504, 525

GREK 503, 504, 505, 506

HIST 425, 563

HMP 444A

HUMA 510B, 511B, 512B, 513B, 514B, 515B

ITAL 425, 503, 504

JPN 425, 503, 504

LATN 503, 504

LLC 444A, 444B, 503, 504

POLT 550

RUSS 425, 503, 504

SPAN 503, 504, 525, 526

**Environment, Tech & Society (ETS)**

ANSC 444A

ARTS 552

BIOL 520, 444A, 544

BMS 650

CIE 402, 444

CIS 405, 411

CS 401, 444

DS 444

ENE 520

HMP 444

JUST 405

MATH 445

MGT 444

NR 415, 435, 444B, 444C, 502

NURS 450

OT 444

PBIO 405  
PHIL 424, 435, 444, 447, 450  
PHYS 444, 444B  
POLT 444  
SOC 444A, 565  
WS 444D

+ = *UNHM*  
(*DLAB*) = *Discovery*

### **Degree Requirements**

Requirements in this catalog apply to students who enter the University between July 1, 2011, and June 30, 2012. (Students who entered the University at an earlier time but who wish to change to the requirements of this catalog must apply to the appropriate office for the change.) Students will be held responsible for all work required for graduation and for the scheduling of all necessary courses.

Modifications tend to occur in major programs during the period of students' undergraduate careers. Students are expected to conform to these changes insofar as they do not represent substantive alterations in their course of study.

*Note:* Although the University will try to provide sufficient facilities so that students may pursue any major or curriculum for which they meet the requirements, such a privilege cannot be guaranteed, since rapidly increasing enrollment sometimes results in the overcrowding of required specialized courses. On occasion, students may remain in a crowded curriculum if they are willing to take certain courses during the summer session.

- » **Bachelor of Arts**
- » **Bachelor of Fine Arts, Bachelor of Music**
- » **Bachelor of Science**
- » **Associate in Arts**
- » **Associate in Applied Science**
- » **Dual Degrees**
- » **Minimum Graduation Average**
- » **Quota of Semester Credits**
- » **Residence**
- » **Leave of Absence or Withdrawal from the University**

## **Majors, Minors, and Options**

Majors and some interdisciplinary minors are described under their various schools and colleges; other interdisciplinary and intercollege minors are described in the section on **Special University Programs**.

- » **Student-Designed Majors**
- » **Second Majors**
- » **Minors**
- » **Options**

## **Grades**

Grading and honors policies as stated in this catalog apply to all undergraduate students.

Instructors assign grades as listed below; grade points per credit are indicated in parentheses. For all undergraduate courses, grading standards established by the Academic Senate are that a C indicates competent, acceptable performance and learning; B indicates superior performance and learning; and A indicates excellent performance and learning. These standards apply to all undergraduate courses, instructors, departments, subjects, and colleges. The University reserves the right to modify grading and honors practices.

A (4.0) Excellent

A- (3.67) Intermediate grade

B+ (3.33) Intermediate grade

B (3.0) Superior

B- (2.67) Intermediate grade

C+ (2.33) Intermediate grade

C (2.0) Satisfactory, competent

C- (1.67) Intermediate grade

D+ (1.33) Intermediate grade

D (1.0) Marginal grade

D- (0.67) Intermediate grade

F (0.0) Failure - Academic performance so deficient in quality as to be unacceptable for credit.

AF (0.00) - Administrative F (usually indicates student stopped attending without dropping the course); is included in grade-point average.

CR - Credit: given in specific courses having no letter grades, designated credit/fail.

P - Passing grade in a course taken under the student pass/fail grading alternative.

W Withdrawal - Assigned if withdrawal is later than fifth Friday of classes (but not after midsemester); is not included in grade-point average.

WP - Withdrawal: assigned if withdrawal is after mid-semester and if student is passing; is not included in grade-point average.

WF - Withdrawal: assigned if withdrawal is after mid-semester and if student is failing; is included in grade-point average.

AU - Audit: no credit earned.

IC - Grade report notation for student's incomplete coursework.

IA - Indicates "incomplete" in a thesis or continuing course of more than one semester; the grade earned will replace "IA" assigned in previous semesters.

IX - Grade not reported by instructor.

Students earning a semester or cumulative grade-point average less than 2.00 are placed on "academic warning."

### *Pass/Fail*

While earning a bachelor's degree, students may choose the pass/fail grading alternative for a maximum of 4 credits per semester up to a total of 16 credits toward the degree.

Pass/fail cannot be used for Discovery requirements, for writing intensive courses, for courses required by a student's major or second major, for option or minor requirements, for ENGL 401, or for repeated courses. In addition, B.A., B.F.A., and B.M. degree candidates may not use pass/fail for courses taken to meet the foreign language requirement, and no Whittemore School course may be taken on a pass/fail basis by a student majoring in administration, economics, or hospitality management.

The minimum passing grade for credit is a D- (0.67); any grade below this minimum is a fail. All grades will be recorded on the grade roster as A, B, C, D, F, or intermediate grades. The pass/fail marks will be placed on students' transcripts and grade reports by the Registrar's Office. The course will not be included in the grade-point calculation, but the pass or fail will be recorded, and in the case of a pass, the course credits will be counted toward degree



requirements. Associate in Arts students, see the [University of New Hampshire at Manchester](#).

### *Honors*

An undergraduate degree student, after completion of at least 12 graded credits in University of New Hampshire courses, is designated as an honor student for a given semester if the student has (a) completed at least 12 graded credits for that semester and earned at least a 3.20 semester grade-point average; or (b) earned at least a 3.20 cumulative grade-point average and at least a 3.20 semester grade-point average regardless of the number of graded credits that semester.

These categories are used: 3.20 to 3.49 (honors); 3.50 to 3.69 (high honors); and 3.70 to 4.00 (highest honors).

Bachelor's degree candidates who have earned honors for their entire work at the University will be graduated with honors based on the final cumulative grade-point average, provided that a minimum of 64 graded credits have been completed in University of New Hampshire courses. The Latin equivalent of the honors classification will appear on the student's academic record and diploma. The student's honors classification will be noted in the commencement program.

### **Academic Honesty**

Academic honesty is a core value at the University of New Hampshire. The members of its academic community both require and expect one another to conduct themselves with integrity. This means that each member will adhere to the principles and rules of the University and pursue academic work in a straightforward and truthful manner, free from deception or fraud. The academic policy can be found in the annual publication [Student Rights, Rules, and Responsibilities](#).

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## Undergraduate Course Catalog 2011-2012

### University Academic Requirements ▼

**« Discovery Program Requirements****Discovery Foundation Skills:**

- **Inquiry course.** This course may fulfill a Discovery category and/or a departmental requirement. It should be taken during a student's first or second year or prior to completion of 57 credits. *For students who transfer in with 58 or more credits, the INQ requirement is waived automatically.*
- **One course in writing skills.** Most students will satisfy the first-year writing requirement with English 401. This course should be taken during a student's first year or prior to completion of 32 credits.
- **One course in quantitative reasoning.** This course is normally completed by the end of the first year or 32 credits.

**Discovery in the Disciplines:**

Students must take one course from each Discovery category at the 400 - 600 levels. Inquiry courses that carry Discovery category designations may be used to satisfy this requirement.

- One course in **Biological Science (BS);\***
- One course in **Physical Science (PS);\***
- One course in **Environment, Technology, and Society (ETS);**
- One course in **Fine and Performing Arts (FPA);**
- One course in **Historical Perspectives (HP);**
- One course in **Humanities (HUMA);**
- One course in **Social Science (SS);** and
- One course in **World Cultures (WC)** (also may be satisfied by approved study abroad programs).

\* One of these courses must have a lab component (**DLab**).

**Discovery and Integrative Understanding:**

One senior capstone experience, supervised and approved within the major. The capstone requirement may be satisfied through a course, created work or product, or some form of

experiential learning. Departments may allow honors theses, mentored research projects, and other special student activities to substitute for designated department capstones.

The University Dialogue, focusing on grand challenges we face as a society, is an opportunity to engage in the intellectual life of the University. Each year, the University engages a different theme, presented through experiences in and outside the classroom. It is not a course and does not require registration.

### **Additional Information**

Discovery Program requirements shall not be waived on the basis of special examinations or placement tests, except for the College Board Advanced Placement tests and the College Level Examination Program (CLEP) tests. All students transferring to UNH in academic year 2011-12 will come in under Discovery Program requirements. For students who transfer in with 58 or more credits, the INQ requirement is waived automatically.

**Note to Faculty:** *Waiver of requirements in the Discovery Program*—Students may petition the Discovery Committee to waive or replace a requirement. The student's petition must be approved by his or her major adviser and the dean of his or her college.

The required courses cannot be taken on a pass/fail basis. No single course may be counted in more than one Discovery discipline category. Academic departments may or may not permit Discovery courses to count toward requirements for a major. TSAS courses may not be used for general education (1984-2009), writing intensive, or foreign language requirements. TSAS courses that are 400-600 level and Discovery-approved may count for Discovery requirements. All Discovery courses carry 3-4 credits.

The most current list of Discovery courses may be found on the Registrar's Office website.

### **Discovery Foundations:**

#### **Inquiry**

All Inquiry courses must contain four individually necessary and collectively sufficient features:

1. *Inspire curiosity*: an Inquiry student will compose open-ended questions that lead to further investigation into increasingly focused problems and issues.
2. *Develop understanding and perspective*: an Inquiry student will explain a central issue or question of the course using at least two unique perspectives.
3. *Clarify standards of thinking*: an Inquiry student will be able to identify, compare, and

evaluate different interpretations (hypotheses, explanations) of a given phenomenon.

4. *Create effective communicators*: an Inquiry student will present in clearly organized form the results of the investigation into questions or problems s/he has posed.

A complete list of Inquiry courses can be found on the Registrar's Office homepage. Click [here](#) to download a PDF version of the page.

### **Writing Skills**

Please refer to the [University Writing Requirement](#) section for complete information about this Discovery Foundation.

### **Quantitative Reasoning**

Quantitative reasoning refers to the ability to think critically and analytically using abstract formal methods with broad application. Mathematics is the foundation for the physical sciences and, increasingly, for the biological sciences. Its principles and processes illuminate significant aspects of the social sciences as well. In its most precise forms, it enables the design of bridges and the orbiting of satellites. Mathematics discloses invisible truths about the world, makes sense of patterns of which we may or may not be aware, and introduces some order to chaos. In its purest form, it creates its own world of beauty and logic. In its more applied forms, it attempts to make sense of individual and collective human behaviors and complex systems. Many courses listed under this category will help students appreciate the principles of mathematics and gain some skill in its applications to realistic situations, while other courses will introduce kindred subjects including symbolic logic, information theory, statistics, and computer science.

### **Discovery in the Disciplines:**

#### **Biological Sciences**

Biology is a branch of science that investigates the structure and function of living organisms. Scientists investigate ideas and observations that solidify our understanding of the diversity of life from single cells to complex organisms. Biology has deep relations with agriculture, chemistry, psychology, and many other fields of study, and it is the foundation of our knowledge of health and disease. Courses under this category deal with the basic structure and function of organisms, the interaction of organisms with their environment, human health, biotechnology, and the concepts and mechanisms of evolution as a fundamental biological

paradigm. All courses will provide some understanding of the methods of scientific inquiry and seek knowledge about the living world.

### **Environment, Technology, and Society**

The exponential growth of the sciences and engineering has bred an equally dramatic growth in technological advances. From the flint arrowhead to the latest communication device or weapon, human beings have been inventing things and transforming their lives, their societies, and their environments as they do. But they seldom foresee all the transformations and consequences their inventions bring about. This category stresses the interplay between at least two of these three realms: environment, technology and society. Topics might include, but are not limited to, the history of a particular kind of technology (such as transport, fuel, writing, or weaponry), how technological change comes about in general, the scientific and/or social bases for a given technology, its impact for good or ill on human society and the natural environment, the effects of a changing environment on the arts and literature, and/or the ethical questions these topics raise.

### **Fine and Performing Arts**

The arts communicate through the intellect, the emotions, and the body, sometimes all at once, in ways simple and subtle, direct and subliminal, gentle and soul shaking. Understanding and appreciating them enriches our lives and preserves our cultural heritage for the future.

Through its performances, publications, and exhibits, UNH offers many artistic experiences for students and the larger community, some of which are linked to courses under this category.

Such courses, which may be about painting, sculpture, architecture, music, dance, theater, or film, will often include learning through practical experience.

### **Historical Perspectives**

Even though we are faced daily with evidence of change in our social world and technology, we easily forget that how we live, where we live, and what we see around us are transient states of affairs. It is important to be able to look on one's own world with an imaginative grasp of its history and the forces behind that history. Courses under this category will give students the opportunity to learn about major historical developments and how these developments have shaped contemporary life in all its complexity. Through the study of particular periods and places, students will gain both "historical perspective" and some skill at the methods of historical inquiry. Common to all courses in historical analysis is the presumption that the categories of social analysis are themselves historical and historically contingent, and that to understand the past requires entering imaginatively into languages, institutions, and worldviews quite different from those of the present day.

### **Humanities**

The humanities arose in Renaissance universities as an alternative to theology and consisted mainly of Greek and Latin literature, which dealt with any and every aspect of human life; they became central to the liberal arts. Since the nineteenth century, the humanities also have embraced modern literature, the creative arts, philosophy, and history. They focus on questions about meaning, ethics, aesthetics, and the foundations of knowledge; they are as concerned with form as with content. Courses under this category explore major works, ideas, and traditions that have shaped our understandings of the world and our sense of self at different times and places while examining the distinctive methods of humanistic inquiry.

### **Physical Sciences**

The physical sciences seek to discover the components, structures, properties, and laws of the material world from subatomic particles to the entire universe. Through them, we appreciate both the wondrous complexity of the world and its order. The traditional domains of chemistry, physics, astronomy, cosmology, and Earth sciences are the foundations of knowledge in numberless arenas of human activity, while the intersections between these domains and the biological sciences yield astonishing discoveries about living organisms. All courses will provide some understanding of the methods of scientific inquiry, seek knowledge about the physical universe, and evaluate claims in both technical literature and popular media.

### **Social Sciences**

The social sciences investigate human beings and their societies from the smallest bands of hunter gatherers to huge nations and global institutions. Everything from marriage and kinship to law and crime, from ceremonial gift giving to mortgage derivatives, from witchcraft to health insurance, from ancient ritual to modern communication, is a subject of a social science. Courses under this category will explore different theories, methods, and data-gathering techniques as they apply to different social issues. They also will examine how individuals create, interact with, and are shaped by social groups and institutions, including those associated with politics, economics, religion, family, the arts, health, and education.

### **World Cultures**

Living in a world of many cultures has created both cooperation and conflict across borders, between and within nations. This category, which includes intermediate language courses and approved study abroad programs, encourages students to become cosmopolitan citizens by gaining knowledge and understanding of cultures other than those of the United States. Students will learn to recognize others' values and, ultimately, accept the many ways in which we all are human. They are thus encouraged to see their own culture with fresh eyes and know the sheer diversity of human outlooks.

**Discovery Lab, please note:** A course that fulfills the laboratory requirement in the Discovery Program should provide students with hands-on experience that reinforces, supports, and/or augments the material presented in other formats throughout the course. It should teach them how the discipline uncovers and validates knowledge; how phenomena are understood through observation, experimentation, and quantitative analysis; how data are collected and interpreted; how hypotheses are created, tested, modified, confirmed, or invalidated. These experiences also are likely to provide insights into how scientific theories and models are constructed. A significant portion of specified course time must be devoted to laboratory and laboratory-related activities. For example, a conventional model for a 4-credit laboratory course consists of three 50-minute (or two 75-minute) weekly lecture periods plus one 80-minute weekly laboratory period. However, courses may include different and/or innovative laboratory experiences provided the total amount of course and laboratory time is comparable.

**Discovery and Integrative Understanding:**

The senior capstone experience must meet one or more of the following criteria:

1. The capstone synthesizes and applies disciplinary knowledge and skills.
  2. The capstone fosters reflection on undergraduate learning and experience.
  3. The capstone demonstrates emerging professional competencies.
  4. The capstone applies, analyzes, and/or interprets research or data or artistic expression.
  5. The capstone explores areas of interest based on the integration of prior learning.
- The capstone requirement will vary across departments and colleges and may be satisfied through a course, thesis, created work or product, mentored research project, or some form of experiential learning (e.g., fieldwork).
  - The capstone should occur during the student's senior year.
  - Departments designate capstones as appropriate to their respective disciplines following the usual administrative procedures for their college or school.
  - Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors.

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## Undergraduate Course Catalog 2011-2012

### University Academic Requirements ▼

#### « Degree Requirements

Requirements in this catalog apply to students who enter the University between July 1, 2011, and June 30, 2012. (Students who entered the University at an earlier time but who wish to change to the requirements of this catalog must apply to the appropriate office for the change.) Students will be held responsible for all work required for graduation and for the scheduling of all necessary courses.

Modifications tend to occur in major programs during the period of students' undergraduate careers. Students are expected to conform to these changes insofar as they do not represent substantive alterations in their course of study.

*Note:* Although the University will try to provide sufficient facilities so that students may pursue any major or curriculum for which they meet the requirements, such a privilege cannot be guaranteed, since rapidly increasing enrollment sometimes results in the overcrowding of required specialized courses. On occasion, students may remain in a crowded curriculum if they are willing to take certain courses during the summer session.

#### Bachelor of Arts

1. At least 128 credits in courses numbered 200-799, with a cumulative grade-point average of 2.0 for all courses taken at the University in which a grade is given.
2. Completion of Discovery Program (University core curriculum) requirements.
3. Completion of the University writing requirement.
4. Proficiency in a foreign language at the level achieved by satisfactory work in a one-year, college-level course. This requirement may be fulfilled by taking a College Board foreign language achievement test or by completing the equivalent of a full-year elementary course in

any foreign language (must be 8 UNH credits or equivalent), or by completing the equivalent of a semester of a course in a foreign language beyond the elementary year (must be 4 UNH credits or equivalent), or by completing the equivalent of a one-year college-level course in American Sign Language (must be 8 UNH credits or equivalent). Students should be aware that not all majors accept American Sign Language as a means to satisfy departmental foreign language proficiency requirements and should check with their advisers. The proficiency in a foreign language requirement must be satisfied by the end of the sophomore year. No credit is awarded for elementary year college coursework if the student has had two or more years of that language in high school.

*Note:* A student with a documented disability who wishes accommodation on the basis that the disability will prevent him or her from successfully mastering a foreign language requirement, or whose foreign language requirement was waived in high school because of a documented disability, must contact the Disability Services for Students Office, Smith Hall, (603) 862-2607 (Voice/TDD).

### **Bachelor of Fine Arts, Bachelor of Music**

Requirements for the B.F.A. degree are outlined in the [Department of Art and Art History](#), College of Liberal Arts; for the B.M. degree, go to the [Department of Music](#), College of Liberal Arts.

### **Bachelor of Science**

1. At least 128 credits in courses numbered 200-799, with a cumulative grade-point average of 2.0 for all courses taken at the University in which a grade is given.
2. Completion of Discovery Program (University core curriculum) requirements.
3. Completion of the University writing requirement.
4. For specific requirements, check individual departmental or program listings.

### **Associate in Arts**

For degree requirements, see the [University of New Hampshire at Manchester](#).

## **Associate in Applied Science**

For degree requirements, see the **Thompson School of Applied Science**.

## **Dual Degrees**

The opportunity to pursue simultaneously two undergraduate degrees enhances and broadens the education of certain students. The program is only for those students who can adequately handle the requirements for two different degrees and who can reasonably allocate the additional time and effort needed for the program. Except for specific five-year degree programs, a student may not pursue two different degree levels simultaneously.

### *Requirements*

1. Students desiring dual degrees must petition the college dean or deans involved for permission.
2. Students must have a minimum 2.5 cumulative grade-point average.
3. Students planning to take one degree in a highly prescribed curriculum should register as freshmen in the appropriate school or college for that curriculum.
4. It is expected that candidates for two degrees will complete 32 credits beyond those required for the first degree.
5. Students can earn more than one bachelor of science (B.S.) degree, provided that each degree is in a different field. Students cannot earn more than one bachelor of arts (B.A.) degree.
6. Transfer students already holding a baccalaureate degree from another accredited institution may pursue an additional baccalaureate degree at the University of New Hampshire provided they fulfill the previously listed requirements. The degree received at the first institution will be accepted by UNH as awarded by that institution.

### *Supervision*

As soon as a student is accepted as a candidate for two degrees, the appropriate dean(s) will appoint supervisors for each of the proposed majors. The supervisors and the student will work out a basic course plan for the two degrees and inform the appropriate dual degree dean(s) of the plan. The supervisors will maintain joint control over the student's academic program. The college offices and the supervisors will receive copies of grade reports and other records for

students pursuing two degrees.

### **Minimum Graduation Average**

A cumulative grade-point average of 2.0 in University of New Hampshire courses is the minimum acceptable level for undergraduate work in the University and for graduation. In addition, some majors require a grade-point average greater than 2.0 in certain courses or combinations of courses. The Academic Standards and Advising Committee examines the records of students periodically and may place academically deficient or potentially deficient students on warning, or may exclude, suspend, or dismiss those who are academically deficient.

### **Quota of Semester Credits**

Students registering for more than 20 credits must receive the approval of the college dean. Additionally, students taking more than 20 credits in a single term will pay a per credit surcharge.

Baccalaureate and Associate in Arts undergraduates are assigned class standing on the basis of semester credits of academic work completed with a passing grade, as follows: to be a sophomore, 26 credits; to be a junior, 58 credits; to be a senior, 90 credits.

### **Residence**

"Residence" means being enrolled in University of New Hampshire (including UNH Manchester) courses after admission to and matriculation in a degree program. Students who are candidates for a bachelor's degree must attain the last one-quarter of total credits for the degree in residence unless granted permission by the Academic Standards and Advising Committee to transfer part of this work from other accredited institutions.

### **Leave of Absence or Withdrawal from the University**

Students who leave the University are required to file formal notification with the Registrar.

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## Undergraduate Course Catalog 2011-2012

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**« Majors, Minors, and Options**

Majors and some interdisciplinary minors are described under their various schools and colleges; other interdisciplinary and intercollege minors are described in the section on **Special University Programs**.

**Student-Designed Majors**

See **Special University Programs** for requirements for a student-designed major.

**Second Majors**

Bachelor's degree students may choose to fulfill the requirements of two dissimilar major programs, provided they obtain the approval of their principal adviser and the dean(s) of the college(s) in which the programs are offered, and comply as follows:

1. If the two majors are offered in different schools or colleges within the University, the admissions requirements of each must be satisfied.
2. If the two majors have two distinct degrees; e.g., B.A., B.S., or some other designated degree, students must choose which of the two degrees is to be awarded and fulfill all requirements for that degree.
3. No more than 8 credits used to satisfy requirements for one major may be used as requirements for the other major.

**Minors**

Bachelor's degree students may earn a minor in any undergraduate discipline designated by

the University. A list of minors is available from the advising coordinator in each college or school (or see the program descriptions for each college or school in this catalog). Students must consult with their major adviser and also the minor supervisor. A minor typically consists of 20 credits with C- or better and a 2.0 grade-point average in courses that the minor department approves. Courses taken on the pass/fail basis may not be used for a minor. No more than eight credits used to satisfy major requirements may be used for the minor. Students should declare an intent to earn a minor as early as possible and no later than the end of the junior year. During the final term, an application should be made to the dean to have the minor shown on the academic record.

### Options

Some degree programs offer a selection of options (e.g., art history and art studio through the Department of Art and Art History). These concentrations allow students to specialize within a discipline. The choice of option is recorded on the student's transcript.

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## Undergraduate Course Catalog 2011-2012

### Degrees and Major Programs of Study ▼

#### College of Liberal Arts

Please note that the teacher education division of the College of Liberal Arts coordinates the five-year undergraduate/graduate teacher education program.

**\*Designated degree (the name of the specialization is included on the diploma; e.g., B.S. in Chemistry).**

**\*\*Also Master of Arts in Teaching.**

##### *Bachelor of Arts*

**Anthropology**

**Art History**

**Art Studio**

**Classics**

**Communication**

Business Applications

Media Practices

**English**

**English/Journalism**

**English Literature**

**English Teaching**

**European Cultural Studies**

**French**

**French Studies**

**Geography**

**German**

**Greek**

**History**

**Humanities**

**International Affairs (dual major)**

**Justice Studies (dual major)**

**Latin**



**Linguistics**

**Music**

Liberal Studies  
Composition  
Performance Study  
Preteaching

**Philosophy**

**Political Science**

**Psychology**

**Russian**

**Sociology**

**Spanish**

**Theatre**

Dance

**Women's Studies**

*Bachelor of Fine Arts*  
**Fine Arts**

*Bachelor of Music*  
**Music Education**  
**Performance**  
**Theory**

**College of Engineering and Physical Sciences**

*Bachelor of Arts*  
**Chemistry**  
**Earth Science Teaching**  
**Earth Sciences**

Oceanography

**Mathematics**

**Physics**

*Bachelor of Science*  
**Chemical Engineering\***

Bioengineering

Energy  
Environmental Engineering

**Chemistry\***

**Civil Engineering\***

**Computer Engineering\***

**Computer Science\***

Bioinformatics

**Electrical Engineering\***

**Environmental Engineering\***

Industrial Processes

Municipal Processes

**Environmental Sciences\***

Hydrology

Ecosystems

Soil and Watershed Management

**Geology\***

**Information Technology**

**Mathematics\***

**Mathematics Education\***

Elementary

Middle/Junior High

Secondary

**Mathematics, Interdisciplinary**

Computer Science

Economics

Electrical Science

Physics

Statistics

**Mechanical Engineering\***

**Physics\***

Astronomy

Chemical  
Materials Science

## **College of Health and Human Services**

*Bachelor of Science*

**Athletic Training**

**Communication Sciences and Disorders**

**Family Studies**

Child and Family Studies

**Health Management and Policy**

Public Health

**Kinesiology**

Exercise Science

Outdoor Education

Physical Education Pedagogy

Sport Studies

**Nursing**

**Occupational Therapy**

**Recreation Management and Policy**

Program Administration

Therapeutic Recreation

**Social Work**

## **College of Life Sciences and Agriculture**

*Bachelor of Arts*

**Plant Biology**

**Zoology**

*Bachelor of Science in Forestry*

**Forestry**

*Bachelor of Science*

**Biochemistry, Molecular and Cellular Biology**

**Biology**

**Biomedical Science**

Medical Laboratory Science  
Medical Microbiology  
Medical and Veterinary Sciences

**Community and Environmental Planning**

**Dairy Management**

**Ecology, Evolution and Behavior**

**Environmental and Resource Economics**

**Environmental Conservation Studies**

**Environmental Horticulture**

**Environmental Sciences\***

Ecosystems  
Hydrology  
Soil and Watershed Management

**Equine Studies**

Equine Industry and Management  
Therapeutic Riding  
Equine Science

**Genetics**

Genomics

**Marine, Estuarine and Freshwater Biology**

**Nutrition**

Dietetics  
Nutrition and Wellness  
Nutritional Sciences

**Plant Biology**

**Tourism Planning and Development**

**Wildlife and Conservation Biology**

**Zoology**

**Whittemore School of Business and Economics**

*Bachelor of Arts*

**Economics**

Financial and Managerial Economics  
International and Development Economics  
Public Policy Economics

*Bachelor of Science*

**Business Administration**

Accounting  
Entrepreneurial Venture Creation  
Finance  
Information Systems Management  
International Business and Economics  
Management  
Marketing  
Student-Designed

**Economics**

**Hospitality Management**

**Thompson School of Applied Science**

*Associate in Applied Science*

**Applied Animal Science**  
**Applied Business Management**  
**Civil Technology**  
**Community Leadership**  
**Culinary Arts and Nutrition**  
**Forest Technology**  
**Horticultural Technology**

**University of New Hampshire at Manchester**

*Associate in Arts*

**General Studies**

*Associate in Science*

**Biological Sciences**  
**Business Administration**

*Bachelor of Arts*

**Biological Sciences**  
**Business**  
**Communication Arts**

**English**

**History**

**Humanities**

**Politics and Society**

**Psychology**

*Bachelor of Science*

**Computer Information Systems**

**Electrical Engineering Technology\***

Computer Technology

**Mechanical Engineering Technology\***

**Sign Language Interpretation**

## **Five-Year Degree Programs**

Bachelor of Arts and Master of Education\*\*

Bachelor of Science and Master of Education\*\*

Bachelor of Science and Master of Science in Accounting

Bachelor of Science and Master of Science in Biochemistry

Bachelor of Science and Master of Science in Occupational Therapy

## **Interdisciplinary Majors**

*Bachelor of Arts/Bachelor of Science*

**International Affairs**

**EcoGastronomy**

*Bachelor of Science*

**Environmental Sciences**

Hydrology

**Neuroscience and Behavior**

## **Interdisciplinary Minors**

**Adolescent and Youth Development**

**Africana and African American Studies**

**Agribusiness**

**Air Force Leadership Studies**

**American Studies**  
**Animal Behavior**  
**Architectural Studies**  
**Asian Studies**  
**Child Life**  
**Cinema Studies**  
**Deaf and Hard of Hearing Studies**  
**Disabilities**  
**Environmental Engineering**  
**Gerontology**  
**History and Philosophy of Science**  
**Humanities**  
**Hydrology**  
**Justice Studies**  
**Latin American Studies**  
**Marine Biology**  
**Materials Science**  
**Ocean Engineering**  
**Oceanography**  
**Race, Culture, and Power**  
**Religious Studies**  
**Russian Studies**  
**Sustainable Living**  
**Technology, Society, and Values**  
**War and Peace Studies**  
**Wetland Ecology**  
**Women's Studies**

## **Advisory Committees**

**Prelaw**  
**Premedical/Prehealth Care Professional**

## **Graduate School**

**Master of Arts**

Master of Science  
Master of Arts in Liberal Studies  
Master of Arts in Teaching  
Master of Business Administration  
Master of Education  
Master of Fine Arts  
Master of Public Administration  
Master of Public Health  
Master of Science for Teachers  
Master of Social Work  
Education Specialist  
Doctor of Philosophy

**\*Designated degree (the name of the specialization is included on the diploma; e.g., B.S. in Chemistry).**

**\*\*Also Master of Arts in Teaching.**

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## Undergraduate Course Catalog 2011-2012

### Program Abbreviations ▼

#### College of Liberal Arts

ANTH	<b>Anthropology</b>
ARTS	<b>Art and Art History</b>
CHIN	<b>Chinese</b>
CLAS	<b>Classics</b>
COLA	<b>College of Liberal Arts</b>
CMN	<b>Communication</b>
EDUC	<b>Education</b>
ENGL	<b>English</b>
ECS	<b>European Cultural Studies</b>
FREN	<b>French</b>
GEOG	<b>Geography</b>
GERM	<b>German</b>
GREK	<b>Greek</b>
HIST	<b>History</b>

HUMA	<b>Humanities</b>
	<b>International Affairs Dual Major</b>
ITAL	<b>Italian Studies</b>
JPN	<b>Japanese</b>
JUST	<b>Justice Studies Dual Major</b>
LLC	<b>Languages, Literatures, and Cultures</b>
LATN	<b>Latin</b>
LING	<b>Linguistics</b>
MUSI	<b>Music</b>
MUED	<b>Music Education</b>
NSB	<b>Neuroscience and Behavior</b>
PHIL	<b>Philosophy</b>
POLT	<b>Political Science</b>
PORT	<b>Portuguese</b>
PSYC	<b>Psychology</b>
RS	<b>Religious Studies</b>
RUSS	<b>Russian</b>
SCSC	<b>Social Science</b>
SOC	<b>Sociology</b>

SPAN **Spanish**

THDA **Theatre and Dance**

WS **Women's Studies**

## **College of Engineering and Physical Sciences**

CHE **Chemical Engineering**

CHEM **Chemistry**

CIE **Civil Engineering**

CS **Computer Science**

ESCI **Earth Sciences**

ECE **Electrical and Computer Engineering**

ENE **Environmental Engineering**

IT **Information Technology**

IAM **Integrated Applied Mathematics**

**International Affairs (dual major)**

MS **Materials Science**

MATH **Mathematics and Statistics**

ME **Mechanical Engineering**

PHYS **Physics**

TECH **Technology**

## **College of Health and Human Services**

### **Athletic Training**

COMM **Communication Sciences and Disorders**

FS **Family Studies**

HHS **Health and Human Services**

HMP **Health Management and Policy**

### **International Affairs (dual major)**

KIN **Kinesiology**

NURS **Nursing**

OT **Occupational Therapy**

RMP **Recreation Management and Policy**

SW **Social Work**

## **College of Life Sciences and Agriculture**

ANSC **Animal Sciences**

BMCB **Biochemistry, Molecular and Cellular Biology**

BIOL **Biology**

BMS **Biomedical Science**

CEP **Community and Environmental Planning**

### **Dairy Management**

EEB **Ecology, Evolution and Behavior**

**EREC Environmental and Resource Economics**

**Environmental Conservation Studies**

**Environmental Horticulture**

**Environmental Sciences**

**EQST Equine Studies**

**Forestry**

**GEN Genetics**

**International Affairs (dual major)**

**LSA Life Sciences and Agriculture**

**MEFB Marine, Estuarine and Freshwater Biology**

**NR Natural Resources**

**NSB Neuroscience and Behavior**

**NUTR Nutrition**

**PBIO Plant Biology**

**SAFS Sustainable Agriculture and Food Systems**

**TOUR Tourism Planning and Development**

**Wildlife and Conservation Biology**

**ZOOL Zoology**

## **Whittemore School of Business and Economics**

ACFI **Accounting and Finance**

ADMN **Business Administration**

DS **Decision Sciences**

ECOG **Ecogastronomy**

ECON **Economics**

HMGT **Hospitality Management**

**International Affairs (dual major)**

MGT **Management**

MKTG **Marketing**

## **Thompson School of Applied Science**

AM **Agricultural Mechanization**

AAS **Applied Animal Science**

ABM **Applied Business Management**

CT **Civil Technology**

CSL **Community Leadership**

CAN **Culinary Arts and Nutrition**

FORT **Forest Technology**

HT **Horticultural Technology**

COM **TSAS Communication**

TSAS [TSAS Courses](#)

MTH [TSAS Mathematics](#)

SSCI [TSAS Social Science](#)

## **University of New Hampshire at Manchester**

ASL [American Sign Language and Deaf Studies Minor](#)

BSCI [Biological Sciences](#)

BIOL [Biology](#)

ADM [Business](#)

CA [Communication Arts](#)

CIS [Computer Information Systems](#)

ET [Engineering Technology](#)

[English](#)

ENG [English](#)

HIST [History](#)

HUMA [Humanities](#)

PS [Politics and Society](#)

[Psychology](#)

INTR [Sign Language Interpretation](#)

[The Undeclared Option](#)

UMIS **UNHM Independent Study**

UMST **UNHM Special Topics**

## **Continuing Education and Summer Session**

### **Special University Programs**

**Fellowships Office**

**Hamel Center for Undergraduate Research**

**University Honors Program**

**Earth, Oceans, and Space**

GERO **Gerontology**

INCO **Intercollege Courses**

IA **International Affairs (dual major)**

**Marine Sciences**

OE **Ocean Engineering**

RCP **Race, Culture, and Power**

**Student-Designed Majors**

**War and Peace Studies**

**Prelaw**

**Premedical/Prehealth Care Professional Study**

**Consortium (NHCUC) Student Exchange Program**



**Exchange Programs Within the U.S.**

**New England Land-Grant Exchange Program**

**UNH/UNHM Cross Registration**

**Study Abroad Programs**

AERO **Aerospace Studies**

MILT **Military Science**

ROTC **Reserve Officer Training Corps Programs**

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### Special University Programs

#### Introduction Programs

## Undergraduate Course Catalog 2011-2012

### Special University Programs ▼

#### Introduction ▼

This section describes University-wide programs (including the University Honors Program and the Hamel Center for Undergraduate Research), interdisciplinary study opportunities, preprofessional programs (prelaw, premed/prehealth, and prevet), off-campus and study abroad programs, and other special programs at UNH.

For details about a specific program of study, please visit the [Programs](#) link.

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### Special University Programs

#### Introduction

#### Programs

##### University-Wide Programs

- Fellowships Office
- Hamel Center for Undergraduate Research
- University Honors Program

##### Interdisciplinary Programs

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- Gerontology
- Intercollege Courses
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- Marine Sciences
- Ocean Engineering
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- Student-Designed Majors
- War and Peace Studies

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- UNH/UNHM Cross Registration

##### Study Abroad Programs

- Study Abroad Programs

## Undergraduate Course Catalog 2011-2012

### Special University Programs ▼

### University-Wide Programs

#### Fellowships Office ▼

The UNH Fellowships Office provides information, counsel, and editorial support to high achieving students applying for national and international fellowships and scholarships. The office also assists faculty members who serve as mentors and recommenders and arranges for members of the faculty to take part in interviews and screening committees.

Established in 2005, the Fellowships Office is situated in the University Honors Program. In recruiting, advising, and supporting students with exceptionally strong records of academic excellence, the office staff collaborates campus-wide with other offices and departments of the University, including the Center for International Education and the Hamel Center for Undergraduate Research, in support of the University's Academic Plan.

The services of the Fellowships Office are available to undergraduates, graduate students, and alumni of the University. The Fellowships Office staff holds membership in the National Association of Fellowships Advisors. For more information, please contact Robert E. Stiefel, coordinator and adviser, Fellowships Office, 220 Hood House, (603) 862-0733; e-mail:

[Robert.Stiefel@unh.edu](mailto:Robert.Stiefel@unh.edu).

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#### Hamel Center for Undergraduate Research ▼

» <http://www.unh.edu/undergrad-research/>

In keeping with this research University's mission to create and disseminate knowledge, UNH's Hamel Center for Undergraduate Research offers undergraduates—working in concert with UNH faculty mentors—both funding and administrative support for individually designed academic projects ranging from laboratory research to humanist scholarship and fine and

### Other Programs

- Aerospace Studies
- Military Science
- Reserve Officer Training Corps Programs

performing arts creations. Once completed, projects and their student authors may receive further support from Undergraduate Research for presentations at national and international conferences and for on-line publication in the undergraduate research journal, *Inquiry*.

Initially known as UROP (Undergraduate Research Opportunities Program), the Hamel Center for Undergraduate Research currently offers year-round academic opportunities both in the U.S. and abroad via competitive grant applications. Undergraduate Research Awards (URA) are available each semester (research time commitment is flexible); Summer Undergraduate Research Fellowships (SURF) awards for the U.S. and abroad offer support between academic years. By registering for INCO 590: Student Research Experience, students can work directly with faculty members while receiving academic credit and support for research expenses. The International Research Opportunities Program (IROP), a research summer abroad under the direction of both a UNH mentor and a colleague at the research location, offers nearly unlimited possibilities for exploration of any topic anywhere in the world (recent destinations: Mongolia, Thailand, Namibia, Germany, Australia; recent topics: moose habitats, neonatal care in China, Bangkok police department organization, impressionist strategies for open-air painting).

Grants from the Hamel Center for Undergraduate Research open doors on real-world disciplinary practice, graduate schools, post-baccalaureate fellowships, and careers; undergraduate research develops first-hand knowledge of the world and one's place in it. For information about all awards, programs, and *Inquiry*, contact the Hamel Center for Undergraduate Research, 209 Hood House, (603) 862-4323, or visit the Web site at [www.unh.edu/undergrad-research](http://www.unh.edu/undergrad-research).

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## University Honors Program ▼

» <http://www.unh.edu/honors-program>

The University Honors Program (UHP), established by the Academic Senate in 1983, recognizes the achievements and capabilities of outstanding students. The program enriches undergraduate education by offering a personal, intensive approach to learning through small classes of 25 or fewer students. UHP students take a minimum of four honors-designated courses in their freshman and sophomore years, one of which must be an honors 444 seminar. These courses count toward the Discovery Program requirements that all students must fulfill. Students also must complete their department's honors-in-major requirements in order to earn a "University Honors" designation upon graduation (see the "Honors-in-Major" description below).

Honors Discovery Program courses are listed in the Time and Room Schedule under "Honors." Enrolling in honors courses requires permission from the UHP Office, located at 211 Hood

House. Honors courses are open with special permission to non-honors students with a 3.2 or higher GPA on a space-available basis.

## Honors-in-Major

Currently, there are more than 50 different departments from all five of the University's undergraduate schools and colleges offering honors-in-major programs. Academic work for honors in major requires a minimum of 16 credits, at least four of which will be devoted to a senior thesis project. Students should familiarize themselves with their departments' requirements and should meet with their departmental Honors liaison (<http://www.unh.edu/honors-program/liaisons.html>). After successful completion of the program, students will earn an honors designation on their transcripts and diplomas.

### Honors-in-Major Programs

Animal Science	Anthropology	Arts	Biochemistry
Biology	Business Administration	Chemistry	Chemical Engineering
Civil Engineering	Classics	Communication	Communication Disorders
Computer Engineering	Computer Science	Earth Sciences	Economics
Electrical Engineering	English	Environmental Conservation Studies	Environmental Horticulture
Environmental & Resource Economics	Environmental Sciences	Family Studies	Forestry
French	Geography	German	Health Management Policy
History	Hospitality Management	Humanities	Kinesiology
Linguistics	Mathematics	Mechanical Engineering	Medical Laboratory Science
Microbiology	Music	Nursing	Nutritional Sciences
Occupational Therapy	Outdoor Education	Philosophy	Physics
Plant Biology	Political Science	Psychology	Recreation Management Policy
Russian	Social Work	Sociology	Spanish
Theatre	Wildlife and Conservation Biology	Women's Studies	Zoology

### Admissions and Aid

Students gain admittance into the UHP in one of two ways:

1. The Office of Admissions identifies a number of qualified incoming freshmen to be admitted to the honors program.
2. Freshmen who demonstrate academic excellence are also invited to join the program.

To satisfy University Honors Program requirements, UHP students must meet designated grade-point average requirements. Students admitted to the program prior to the fall semester of 2008 must have a final cumulative grade-point average of 3.2, while students admitted to the fall semester of 2008 or thereafter must have a final cumulative grade-point average of 3.4. All students must meet the grade-point average requirements of their honors-in-major program.

Full-tuition and partial-tuition merit-based scholarships are available to a select number of incoming freshmen. Several partial-tuition scholarships are also awarded to upper-class students. For more information, contact Monica Chiu, Director, University Honors Program, 211 Hood House, (603) 862-3928, or visit the UHP website at [www.unh.edu/honors-program](http://www.unh.edu/honors-program).

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## **Interdisciplinary Programs**

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### **Earth, Oceans, and Space ▼**

» [www.eos.sr.unh.edu](http://www.eos.sr.unh.edu)

*Professor:* Amitava Bhattacharjee, Martin A. Lee, Eberhard Möbius, Barrett N. Rock, Andrew A. Rosenberg, James M. Ryan, Roy B. Torbert

*Research Professor:* David S. Bartlett, Charles J. Farrugia, Terry Forbes, Stephen E. Frolking, Christopher W. Glass, Philip A. Isenberg, Changsheng Li, Charles W. Smith III

*Affiliate Professor:* John D. Aber

*Associate Professor:* Benjamin D. Chandran, James Connell, Linda Kalnejais, Lynn M. Kistler, Mark L. McConnell, Scott V. Ollinger, James M. Pringle, Joachim Raeder, Nathan A. Schwadron

*Research Associate Professor:* Jack E. Dibb, Mark A. Fahnestock, Antoinette B. Galvin, Erik A. Hobbie, Harald A. Kucharek, Marc R. Lessard, Clifford Lopate, Alexander A. P. Pszenny, Douglas C. Vandemark, Ruth K. Varner, Bernard J. Vasquez, Cameron P. Wake

*Assistant Professor:* Kai Germaschewski, Wilfred M. Wollheim

*Research Assistant Professor:* Peter Forbes Bloser, Ulisse Bravar, Li-Jen Chen, Fatemeh Ebrahimi, Richard Lammers, Mary E. Martin, Chung-Sang Ng, Michael W. Palace, Joseph Salisbury, Jingfeng Xiao

*Affiliate Research Associate Professor:* Barkley C. Sive

The Institute for the Study of Earth, Oceans, and Space (EOS) is UNH's largest research

organization and its first University institute. It brings together under common themes a number of well-established research programs. Research activities are focused in EOS's four centers: the Climate Change Research Center, the Complex Systems Research Center, the Ocean Process Analysis Laboratory, and the Space Science Center.

EOS scientists are exploring processes on the Sun, solar influences on Earth and its magnetosphere, the chemistry and dynamics of the atmosphere, changing climate, and large-scale ecosystems in terrestrial and marine environments, emphasizing complex impacts on and by human activities. Research takes EOS investigators from the most distant energetic phenomena in the universe to the Earth's environment in space; to tropical, temperate, and boreal forests; from the coast of New Hampshire to the Gulf of Maine and the world's great oceans; from the grasslands and agricultural fields of China to those of the American Midwest; from the great ice sheets of Greenland and Antarctica to the summit of Mount Washington. EOS scientists and students use satellites, aircraft, ships, and computers to explore and investigate the most important processes in the universe, in our solar system, and on our planet.

The primary educational theme of the Institute is the training and mentoring of graduate students through participation in advanced research funded by major national and international organizations; for example, the National Aeronautics and Space Administration, the National Science Foundation, and the National Oceanic and Atmospheric Administration. However, EOS faculty teach and mentor undergraduate students as well, and there are numerous opportunities for undergraduates to participate in the research activities of the Institute. Undergraduates interested in EOS activities should contact either EOS faculty in their academic departments, or e-mail the EOS director's office, [eos.director@unh.edu](mailto:eos.director@unh.edu).

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## **Gerontology (GERO) ▼**

» [Click to view course offerings](#)

The gerontology interdisciplinary minor provides students with the opportunity to examine and evaluate the aging process as it affects the individual and society. Through in-depth inquiry, personal encounters, and classroom discussion, students develop an understanding of aging from a variety of perspectives. Students are encouraged to analyze the historical and philosophical foundations from which policies, programs, and professional activities affecting the aged are developed, implemented, and evaluated.

Gerontology minors are required to take a minimum of 20 credits (five courses) from the

following approved list:

GERO 600, Introduction to Gerontology

GERO 795, Independent Study (a practicum arranged by the coordinator of the minor, or by the appropriate designee)

FS 525, Human Development

KIN 607, Biology of Aging

NURS 535, Death and Dying

OT 501, Developmental Tasks of Adulthood

PSYC 582, Adult Development and Aging

PSYC 741, Cognitive Aging

SW 525, Introduction to Social Welfare Policy

SW 550, Human Behavior and Social Environment I

SW 701, Women and Aging

Students who wish to minor in gerontology should consult the College of Health and Human Services Dean's Office.

» [Click to view course offerings](#)

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## Intercollege Courses (INCO) ▼

» [Click to view course offerings](#)

Courses appearing in previous editions of this catalog under the caption INCO 404 Honors: Introductory Seminar are offered this year with subject codes and the course number 444H. For more information, see [University Academic Requirements](#). INCO 404 is reserved as a course designation for possible use in future years.

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## International Affairs (dual major) (IA) ▼

» [Click to view course offerings](#)

*Lecturer:* Biniam Iyob, Mary Wallace

The Center for International Education offers undergraduate students the opportunity to pursue a dual major in international affairs. The dual major requires completion of the interdisciplinary



international affairs program and any other major. The purpose of the program is to expand students' global horizons, enhance their disciplinary major, and expand their career opportunities into the international arena. The courses in the dual major program are multidisciplinary, taught by faculty from many different departments in the University. They are designed to help students appreciate the complex interrelationships and interdependencies among nations and peoples and to equip students with the analytical skills and broad perspectives necessary for both public and private sector international careers.

Students who wish to declare international affairs must earn a C or better in IA 401, have declared (or be prepared to declare) a disciplinary major, and have a 2.5 cumulative grade-point average. After declaration, students are expected to maintain at least a 2.5 grade-point average, which is also the minimum required for study abroad at UNH.

**For students who matriculated into UNH prior to fall semester 2010, please refer to the undergraduate catalog of your year of matriculation.**

**Required Core Courses (4 total)**

IA 401, International Perspectives: Science, Geography, and Politics

IA 501, Global Issues in International Affairs

IA 701, Seminar in International Affairs

ECON 401A, Principles of Economics (Macro) **or** ECON 402A, Principles of Economics (Micro)

**Please note:** IA 401, a prerequisite for IA 501, should be taken no later than spring of the sophomore year. IA 501 should be taken prior to foreign experience. **Electives (3 total)**

**Choose one elective course from each category below.**

Foreign Area (to be taken prior to foreign experience)

Science, technology, and the private sector

Policy and Theory in international affairs

**Competency in a Foreign Language**

Functional reading, writing, and speaking ability equivalent to a third-year, second-semester college level

**Foreign Experience**

Minimum of eight weeks. The International Affairs foreign experience is ordinarily conducted in a country consistent with the student's language study, but may also be conducted in a select list of countries where English is an official language, or where UNH does not offer language training. Students who desire to study in such a country must petition the Center for International Education. Plans of study must include rigorous local language training while in-

country.

The foreign experience (usually completed during the junior year), and the foreign language requirement are completed before taking IA 701 in the senior year. To acquire the knowledge, skills, and experience that come from residence in a foreign culture, students may spend an academic year, semester, or summer in an academic institution, in an internship with a private or public organization, or in purposeful travel/research. All foreign experiences must be pre-approved by the IA major advisor or the University Committee on International Studies.

The completion of the dual major requires no additional credits for graduation beyond the 128 required of all UNH students. All coursework required for international affairs must be completed with a grade of C or better. For information, contact the Center for International Education, Hood House, (603) 862-2398, [www.unh.edu/cie](http://www.unh.edu/cie).

\* The Department of Civil Engineering has worked with the UNH Center for International Education to develop a dual-major program in civil engineering and international affairs. Civil engineering students participating in this program spend at least one semester studying abroad in a foreign language. Students can complete this program in five years or less and do not need to have pre-existing skills in a foreign language to participate. For more information, contact Ray Cook at (603) 862-1411 or by e-mail to [ray.cook@unh.edu](mailto:ray.cook@unh.edu).

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## Marine Sciences ▼

*Professor:* Kenneth C. Baldwin, Wayne R. Fagerberg, Larry G. Harris, W. Huntting Howell, Aaron B. Margolin, Arthur C. Mathieson, Larry A. Mayer, Subhash C. Minocha, Christopher D. Neefus, Andrew A. Rosenberg, Stacia A. Sower, Paul C. Tsang, Charles W. Walker, Colin Ware, Winsor H. Watson III

*Research Professor:* Janet W. Campbell, Christopher W. Glass, Raymond E. Grizzle, Michael P. Lesser, Frederick T. Short

*Affiliate Professor:* Andrew Armstrong

*Associate Professor:* Mimi Larsen Becker, David L. Berlinsky, Jessica A. Bolker, Allen D. Drake, Anita S. Klein, James M. Pringle, Robert A. Robertson

*Research Associate Professor:* Lee Alexander, David M. Burdick, Brian R. Calder, Stephen H. Jones, Yuri Rzhanov, Douglas C. Vandemark, Cameron P. Wake, Larry G. Ward

*Assistant Professor:* Joel E. Johnson, Linda Kalnejais

*Research Assistant Professor:* Gregg E. Moore, Thomas Weber

*Clinical Assistant Professor:* Elise R. Sullivan

*Extension Associate Professor:* Julia M. Peterson

*Extension Assistant Professor:* Kenneth J. LaValley

Undergraduate programs in marine science and ocean engineering at the University of New Hampshire reflect the diversity of the ocean itself and are enriched by easy access to a variety of natural laboratories, including tidal rivers, estuaries, coastal areas, and the open ocean.

Studies in marine science and ocean engineering are offered through various departments of the University. Students identify the discipline (ranging from zoology through earth sciences to mechanical engineering) they like best and pursue marine specializations related to that area of study. Studies can take place in research laboratories on campus as well as at various field stations or aboard UNH research vessels.

### ***Marine Program***

The Marine Program provides a campus-wide umbrella for marine activities and maintains specialized facilities to support efforts of faculty in individual departments and organized research units. Academic programs are focused broadly on marine biology, ocean engineering, and ocean science, and the Marine Program supports experiential learning opportunities beyond the formal classroom through three centers: the Center for Marine Biology, the Center for Ocean Engineering, and the Center for Ocean Sciences.

Estuarine research is pursued at the Jackson Estuarine Laboratory on Great Bay, which is designated a National Estuarine Research Reserve. The Coastal Marine Laboratory, a major running-seawater facility, is located in nearby Newcastle. Research on salmonids and other freshwater animals is conducted at the Anadromous Fish and Aquatic Invertebrate Research Laboratory, located near the Durham reservoir. The Institute for the Study of Earth, Oceans, and Space is a major center for ocean sciences research. The on-campus Chase Ocean Engineering Laboratory houses both educational and research activities. Off-shore and coastal studies are carried out aboard the University's 50-foot research vessel, the *Gulf Challenger*. During the summer, students may live and study at the Shoals Marine Laboratory on Appledore Island, one of the Isles of Shoals. There, UNH and Cornell University cooperatively offer undergraduate courses in marine sciences in a summer field laboratory setting. Each of the marine program facilities features modern, specialized equipment and opportunities for undergraduate students to work and carry out independent research.

### ***Curricula in the Marine Sciences***

There are currently two undergraduate majors and four minors in the marine sciences. The

College of Life Sciences and Agriculture offers a B.S. in Marine, Estuarine and Freshwater Biology and the Department of Earth Sciences offers an option in oceanography as part of its B.A. Earth Sciences program. In addition to these offerings, students can declare a major in any established discipline and augment it with a minor in marine biology, ocean engineering, oceanography, or wetland ecology.

Students are encouraged to declare their intention to follow these programs as soon as possible.

### ***Marine Biology Minor***

See College of Life Sciences and Agriculture Interdisciplinary Programs-Marine Biology at [www.unh.edu/undergrad-catalog/colsa/marinebiology](http://www.unh.edu/undergrad-catalog/colsa/marinebiology).

### ***Ocean Engineering Minor***

The ocean engineering minor allows undergraduate engineering students to acquire a nucleus of knowledge about engineering pertaining to the ocean and the coastal zone.

To meet the University minor requirement, students must satisfactorily complete a minimum of five courses from the following list: ESCI 501, Introduction to Oceanography; OE 690, Introduction to Ocean Engineering; ESCI 752, Chemical Oceanography; ESCI 758, Introductory Physical Oceanography; ESCI 759, Geological Oceanography; OE 710, Ocean Measurements Lab; OE 744, Corrosion; OE 745, Environmental Acoustics I; OE 754, Ocean Waves and Tides; OE 756, Principles of Naval Architecture and Model Testing; OE 770, Fundamentals of Ocean Mapping; OE 771, Geodesy and Positioning for Ocean Mapping; OE 785, Environmental Acoustics II; OE 795, Special Topics in Ocean Engineering; ENE 747, Introduction to Marine Pollution and Control; OE 757, Coastal Engineering and Processes; and TECH 797, Undergraduate Ocean Research Program. Ordinarily, students typically take ESCI 501, TECH 797, and OE 690 plus two additional engineering courses from the above list to complete the minor.

Students wishing to take the ocean engineering minor should indicate their interest to the ocean engineering minor adviser, Kenneth C. Baldwin, (603) 862-1898, Chase Ocean Engineering Laboratory, no later than the beginning of the junior year. During the final semester, students must apply to the dean to have the minor shown on their transcript.

### ***Oceanography Minor***

The minor in oceanography is available to all students in the University interested in obtaining a broad background in oceanography and is offered through the Department of Earth Sciences. The minor consists of a minimum of five courses with grades of C (2.0) or better and no

pass/fail courses. No more than 8 major requirement credits may be used. All courses in the program are selected in consultation with the oceanography minor adviser, James Pringle, (603) 862-5000, Department of Earth Sciences.

Required courses include 1) ESCI 501, Introduction to Oceanography; 2) two of the following courses: ESCI 750, Biological Oceanography; ESCI 752, Chemical Oceanography; ESCI 758, Introductory Physical Oceanography; or ESCI 759, Geological Oceanography; 3) any two of the following courses, or a suitable substitute approved by the minor adviser (at least one of these courses should be in the biological sciences): P BIO 625, 722; CIE 757; ENE 747, 753; ESCI 653, 658, 754, 756, 760, 770, 771; MICR 707; OE 690, 710, 753, 754, 757, 785; EREC 611; TECH 797; ZOOL 503, 560, 674, 720, 725, 730, 751, 753, 772, 775; or ZOOL/ESCI/750.

Students are encouraged to declare their intention to minor in oceanography before the end of the junior year. During the final semester, students should apply to the dean to have the minor shown on their transcript.

### ***Shoals Marine Laboratory***

The Shoals Marine Laboratory (SML), operated jointly by UNH and Cornell University, is located on Appledore Island seven miles off the coast of New Hampshire. SML focuses on undergraduate education in marine biology and related subjects.

Island teaching and research facilities support intense, hands-on college credit courses < [http://www.sml.cornell.edu/sml\\_students\\_creditcourses.html](http://www.sml.cornell.edu/sml_students_creditcourses.html) > and internships < [http://www.sml.cornell.edu/sml\\_students\\_internships.html](http://www.sml.cornell.edu/sml_students_internships.html) > ranging from field marine biology to underwater research, forensics, and marine vertebrates. Many classes fulfill UNH major requirements <<http://www.mefb.unh.edu/>>. The island campus [http://www.sml.cornell.edu/sml\\_welcome\\_lifeonappledore.html](http://www.sml.cornell.edu/sml_welcome_lifeonappledore.html) > includes labs with flow-through seawater, lecture space, dorms, dining hall, library, and a dive locker. The island's "green grid" incorporates a wind turbine and solar panels, making it a site for sustainable engineering projects < [http://www.sml.cornell.edu/sml\\_students\\_internengin.html](http://www.sml.cornell.edu/sml_students_internengin.html) > as well as field studies in marine and intertidal ecology, migratory bird banding, and other areas < [http://www.sml.cornell.edu/sml\\_research.html](http://www.sml.cornell.edu/sml_research.html) >.

UNH students have unique opportunities for dedicated UNH fellowships and for application of SML courses to their degree requirements <<http://www.mefb.unh.edu/>>. SML courses may be taken for Honors credit by UNH students with permission.

Shoals also hosts UNH's unique "Marine Immersion" course < <http://marine.unh.edu/sml/marineimmersion.html> > for incoming freshmen interested in marine biology.

For further information, contact UNH Associate Director for Shoals Jessica Bolker (603-862-0071; [jbolker@unh.edu](mailto:jbolker@unh.edu)).

### ***Diving Program***

UNH has maintained an active research diving program for the past 36 years to provide assistance for faculty, staff, and students with both instruction and support for research diving, allowing many certified student divers to participate in University-sponsored underwater research projects. Today the UNH Diving Program consists of two areas: the academic portion where students, faculty, and staff may enroll in courses for academic credit (through the Department of Kinesiology), and the research portion, which supports faculty and student divers in University-sponsored underwater projects.

For further information about the UNH Diving Program as well as the offered workshops in rescue diving and diving accident management, contact Liz Kintzing ([ek@cisunix.unh.edu](mailto:ek@cisunix.unh.edu)), diving program officer, through the Diving Program Office at (603) 862-3896.

### ***Marine Research***

There are many opportunities for undergraduates to participate in marine research under the supervision of UNH faculty.

The University has a Sea Grant College Program that supports research, teaching, and service projects through numerous partnerships with the National Oceanic and Atmospheric Administration. Marine research projects are also supported through the National Science Foundation, the Environmental Protection Agency, the Office of Naval Research, and other state and federal agencies, foundations and private donors.

Extensive research, interdisciplinary academic programs, and the extraordinary variety of marine environments and facilities allow students to observe and learn about the frontiers of science and technology being explored in the ocean. For further information about marine opportunities, contact the Marine Program Office in the Jere A. Chase Ocean Engineering Laboratory or through the Marine Program Web site at [marine.unh.edu](http://marine.unh.edu).

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## **Ocean Engineering (OE) ▼**

» [Click to view course offerings](#)

*Professor:* Kenneth C. Baldwin, Barbaros Celikkol, Larry A. Mayer, M. Robinson Swift, Igor I.

Tsukrov, Colin Ware

*Research Professor:* Lee Alexander, James Irish

*Affiliate Professor:* Andrew Armstrong, Christopher E. Parrish

*Associate Professor:* Allen D. Drake

*Research Associate Professor:* Brian R. Calder, Thomas C. Lippmann, Yuri Rzhanov, Larry G. Ward

*Affiliate Associate Professor:* David Monahan

*Research Assistant Professor:* Shachak Pe'eri, Kurt Schwehr, Thomas Weber

*Affiliate Assistant Professor:* John Kelley

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## **Race, Culture, and Power (RCP) ▼**

» [Click to view course offerings](#)

This program of study enables students to develop critical perspectives on the ways in which cultural differentiation and racial formulations have been used to maintain social, economic and political power and justify inequalities and injustices. Students will engage both U.S. and international perspectives and contexts as they examine how dominant powers use “culture” to maintain subordination and how subordinated peoples use “culture” to resist exploitation.

Students pursuing completion of the program will enroll in an interdisciplinary introductory course (INCO 450: Introduction to Race, Culture and Power), which examines “race” through multiple lenses and explores how constructions of racial difference underpin and impact the organization of societal institutions, programs, and cultural norms around the U.S. and the world.

The Race, Culture, and Power minor consists of five courses. To complete a minor, students are required to enroll in INCO 450, the introductory course, and they must enroll in at least one approved elective at the 600/700-level. Students must earn a C- or better in each course, and must maintain a 2.0 grad-point average in courses taken for the minor.

### **Elective Courses**

Electives are approved by the coordinator and announced each semester in the Time and Room Schedule. Ordinarily, no more than two electives may be taken from the same academic department. A relevant internship may be substituted for one of the electives. Students should consult with the minor coordinator before registration.

For further information, please contact the coordinator, Cait Vaughan, in the Center for the Humanities, Huddleston Hall room 322, (603) 862-2179, [cait.vaughan@unh.edu](mailto:cait.vaughan@unh.edu). Or visit

[www.unh.edu/rcp](http://www.unh.edu/rcp) for course listings and program details.

» [Click to view course offerings](#)

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## Student-Designed Majors ▼

Under special circumstances, students may design their own majors. This option is offered for highly motivated and self-disciplined students who seek a course of study that is not available through existing programs at the University. It allows students, with the close supervision of faculty members, to cross department and college lines and to create educational experiences on and off campus as part of individual programs of study.

Student-designed majors are administered by a committee of elected faculty that operates through the Office of the Provost and Vice President for Academic Affairs. Students who want to design their own majors are expected to give the committee evidence of careful thought and planning in a proposal submitted on or before October 15 during the student's junior year. The committee will convene soon after October 15 to review the proposals.

Submissions after this deadline are strongly discouraged, but if an application is late for reasons beyond the student's control, the SDM Committee may review the application on a case-by-case basis.

Proposal guidelines are available in the Office of the Provost and Vice President for Academic Affairs and on the Academic Affairs Web site, [www.unh.edu/academic-affairs/student-designed-major-sdm](http://www.unh.edu/academic-affairs/student-designed-major-sdm). Click on "Academic Enrichment".

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## War and Peace Studies ▼

War is the scourge of humankind. Tribes, cities, and nations have gone to war against each other for as long as we have records; only here and there, among some small "precivilized" groups, has war been absent or strictly controlled. For as long as we have records, too, we find thoughtful people crying out against war and pleading for peace, arguing for principles to govern war's conduct and laboring to mitigate war's effects, imagining a world where war is abolished, and taking steps to bring that world about. As the scale of war has grown to a size



now great enough to devastate the entire globe in a single conflict, more and more people have devoted themselves to preventing war and finding acceptable substitutes. In the nuclear era, age-old moral and religious discussion has joined with historical study and practical, even technical, research to produce a set of related disciplines sometimes called "war and peace studies."

To meet the requirements for the war and peace studies minor, students must complete two core courses (8 credits) and 12 credits of elective courses with a grade of C- or better. Ordinarily, no two electives (or no more than 4 credits) may be taken from the same academic department. No elective may count for both a student's major and the war and peace minor. A relevant internship may be substituted for one of the electives. As they are announced, other relevant courses may be added to the list of acceptable electives. Students may request others not so listed. Courses carrying fewer than four credits will be counted as partial satisfaction of an elective requirement. If a good case can be made for it, a departure from any of these rules may be approved by the adviser for the minor and the coordinator.

All students will be assigned an adviser from the membership of the Committee on War and Peace Studies, ordinarily one not in the student's major department. The adviser will assist students in constructing a coherent program that suits their particular interests.

The core courses are INCO 401, War, and INCO 402, Peace. Occasionally a new core course may be included.

**Departmental elective courses will include courses such as these**

AERO 681, National Security Forces in Contemporary American Society (3 cr.)

CMN 456, Propaganda and Persuasion

HIST 617, Vietnam War

HIST 537, Espionage and History

NR 435, Contemporary Conservation Issues and Environmental Awareness

POLT 562, Strategy and National Security Policy

POLT 778, International Organization

SOC 780, Social Conflict

**Special offerings that may serve as electives**

ANTH 797, Advanced Topics in Anthropology (e.g., War and Complex Society)

ECON 698, Topics in Economics (e.g., Economics of War and Peace)

ENGL 595, Literary Topics; ENGL 693, 694, Special Topics in Literature; ENGL 797, 798, Special Studies in Literature (e.g., Literature of World War I, Literature of the Vietnam War)

HIST 600, Advanced Explorations (e.g., Comparative Revolutions)

HUMA 730, Special Studies (e.g., Nonviolence, Thinking about War and Peace)  
INCO 404P, Honors: Introductory Seminar (e.g., Understanding War)  
POLT 660, Special Topics in International Politics (e.g., Arms Control and Disarmament)

For more information, contact Michael Ferber, Department of English, (603) 862-3973.

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## **Preprofessional Programs**

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### **Prelaw ▼**

Many graduates of UNH attend law school. The faculty and staff advisers of the Prelaw Advising Committee work closely with students and alumni to identify interests and explore opportunities within legal education. The committee helps students undertake the best possible preparation for legal education while also bringing the excitement of law to UNH students. The committee achieves this goal through careful consideration of the American Bar Association's (ABA) statement on preparation for legal education (found on the Web at <http://www.abanet.org/legaled/prelaw/prep.html>).

In that statement, the ABA explains why no single major or course is required or recommended for students wishing to explore or prepare for legal study. The ABA does, however, describe certain skills and values that are essential to success in law school and to life as a lawyer. These include analytic and problem solving skills, critical reading abilities, writing skills, oral communication and listening abilities, general research skills, task organization and management skills, and the values of serving others and promoting justice.

Prelaw Advising implements the ABA statement by working with student interests and strengths to select UNH courses, internships, and experiences that will develop those skills and values. Programmatically, the committee provides a prelaw resource library, visits to local law schools, and sponsors discussions with law school students, admission and financial aid representatives, and with members of the legal community. The committee also provides support for LSAT preparation, law school search, writing personal statements, and the application and selection processes.

Interested students should register with the committee by contacting the Prelaw Advising Office, 106 Hood House, at (603) 862-3485. Additional information is available at [www.unh.edu/prelaw-advising/](http://www.unh.edu/prelaw-advising/).

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## Premedical/Prehealth Care Professional Study ▼

The Pre-professional Health Programs Advising Office in Hood House provides advising for all students preparing for postgraduate careers in medicine, dentistry, optometry, chiropractic, podiatry, physical therapy, and physician assistant programs (for information on the pre-veterinary medicine option in animal sciences, see Animal Sciences major). There is no premedical or pre-dental major at UNH. A student's major is not considered in the medical school application process and students from majors in all five UNH colleges have been admitted to postgraduate health professional programs. Though premedical/pre-dental is not a major, interested students are expected to register with the Pre-professional Health Programs Advising Office in Hood House as soon as possible so as to be kept informed of important events, opportunities, and deadlines regarding preparation for application.

### ***A premedical/pre-dental program at UNH consists of the following:***

1. Taking the prerequisite courses for admission to a health professional program. Medical and dental schools generally require biology, physics, general chemistry, and organic chemistry—all two semesters each with laboratory. A semester of biochemistry is also required. A year of English is required, as is one year of math including at least one semester of calculus. Prerequisite courses can be taken as part of a student's major curriculum, as part of the Discovery Program requirements, or as electives.
2. Gaining volunteer/health care experience. Applicants to health professional programs will be expected to demonstrate a sustained involvement in volunteer and community service. A significant portion of this experience must take place in a health professional setting and include direct patient contact. Most students gain this experience by volunteering at a hospital, though volunteer opportunities are available in a wide range of settings, including nursing homes and community clinics.
3. Preparing for the requisite entrance exam. Students applying to medical school are required to take the MCAT exam. Students applying to dental programs are required to take the DAT, and applicants to optometry programs take the OAT. The MCAT, DAT, and OAT are standardized, comprehensive exams that test students' knowledge of biological and physical sciences as well as verbal reasoning and writing skills. Exams are usually taken by students no earlier than the spring of their junior year and should be taken only if the student has completed or is within a month of completing prerequisite coursework. Students applying for physician assistant and physical therapy programs may be required to take the GRE, a more general exam similar to the SAT in structure and content.

### ***Application process***

The Pre-professional Health Programs Advising Office works with the Premedical/Pre dental Advisory Committee—a body of 10-12 UNH faculty members with interest and/or experience in medical/dental education—to provide students with comprehensive, confidential evaluation services at the time of application. An orientation meeting is held each September to outline the application process and establish timetables/deadlines. Students should note that the medical and dental school application process begins a full two years before matriculation; i.e., in the fall of a student's junior year if they wish acceptance following graduation. However, a delay of a year or more between graduation and admission is neither unusual nor detrimental, and in many cases, students can use this time to improve their credentials by taking additional courses and/or gaining exposure to the profession.

It is important that students understand that in order to gain admission to a health professional program they must not only satisfy the prerequisite requirements, they must satisfy these requirements at a high level of achievement. The Pre-professional Health Programs Advising Office can provide students with information on competitive grade-point average and entrance exam scores for each of the postgraduate health professional programs.

The Pre-professional Health Programs Advising Office is located in Hood House and can be contacted by phone at (603) 862-2064 or by e-mail at [Premed.Advising@unh.edu](mailto:Premed.Advising@unh.edu). The office also has a Web site at [www.unh.edu/premed-advising](http://www.unh.edu/premed-advising).

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## **Off-Campus Programs**

### **Consortium (NHCUC) Student Exchange Program ▼**

Under the Student Exchange Program of the New Hampshire College and University Council (NHCUC), UNH students may be eligible to enroll for one course per semester, one semester of courses, or a full year of coursework at a member school on a space-available basis. The NHCUC exchange allows matriculated undergraduates to use educational resources that are not available at the home campus and are considered appropriate for their degree programs. This exchange will be used only when academic reasons or other special circumstances warrant it. Approval of the UNH academic adviser and college dean is required, and students must meet all UNH Study Away eligibility standards. Schools in the NHCUC consortium include Chester College, Colby-Sawyer College, Franklin Pierce University, New England College, Southern New Hampshire University, Rivier College, Saint Anselm College, UNH Durham,

UNH Manchester, Keene State College, and Plymouth State University. Students will remain as degree candidates and continue to pay normal UNH tuition and fees, but must make their own room and board arrangements if they plan to spend a full semester at another consortium school. For more information and application forms, students should contact the National Student Exchange Office, Hood House, (603) 862-3485.

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## Exchange Programs Within the U.S. ▼

The University offers many opportunities for exchange study with other institutions within the U.S. The National Student Exchange program provides an educational experience in a different environment, within North America. It is hoped that students will develop new ways of viewing the country and expand their knowledge of our complex society.

Through the National Student Exchange (NSE), UNH students can study at one of more than 180 colleges and universities throughout the United States, U.S. territories (Guam, Puerto Rico, and U.S. Virgin Islands), and Canada. Several historically black colleges and universities are exchange members, and several are members of the Hispanic Association of Colleges and Universities. In addition, a one-semester or full-year exchange program is available with the University of California, Santa Cruz.

To qualify for exchange study, students must be full-time undergraduate degree candidates in good standing, with at least a 2.5 grade-point average, have earned at least 32 credits (16 of which must be from UNH at the baccalaureate level), have declared a major, receive permission from their college dean and academic adviser, and receive permission from the UNH NSE Coordinator.

Students in exchange programs are expected to return to UNH to complete their studies. Participation in an exchange program does not disrupt the continuity of a student's educational process. Exchange program participants continue to maintain their status as UNH students, even while temporarily located at another university. Students do not have to withdraw from UNH and later be readmitted. Maintaining UNH student status also facilitates reentry into classes, on-campus housing, and many other dimensions of University life.

Interested students should contact the National Student Exchange office in Hood House, (603) 862-3485, or visit [www.unh.edu/nse](http://www.unh.edu/nse).

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## New England Land-Grant Exchange Program ▼

In order to provide students at the New England land-grant universities with expanded access to unique programs and faculty expertise, the institutions have agreed to encourage student exchanges of one, but not more than two, semesters. To qualify, students must identify a course or combination of courses related to their area of academic interest and not available on their home campus, be degree candidates in good standing with at least a 2.5 grade-point average, be at least first-semester sophomores, and receive permission from the appropriate university exchange authorities at both the home and host institutions. Interested students should contact the National Student Exchange Office, Hood House, (603) 862-3485.

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## UNH/UNHM Cross Registration ▼

Matriculated students at the University of New Hampshire and the University of New Hampshire at Manchester may take UNH courses at either location. Students must have permission from their academic advisers and must register for the courses on a space-available basis during the open registration period for each campus. For more information, students should contact Donna Reed, associate registrar, Stoke Hall, (603) 862-1590, or Doreen Palmer, assistant registrar, UNH Manchester, (603) 641-4164.

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## Study Abroad Programs

### Study Abroad Programs ▼

» <http://www.unh.edu/cie/>

The University offers opportunities for full-time degree candidates meeting eligibility criteria to study abroad in many foreign institutions. UNH-managed programs are described in this section. Students may study abroad in other locations through UNH-approved programs by using the intercollegiate option (INCO). All students who study abroad pay a study abroad or exchange fee. For information on study abroad programs, students should contact the Center for International Education or the department identified in the UNH-managed program descriptions.

### **Study Abroad Eligibility**

Students enrolled in UNH baccalaureate degree programs may participate in approved study abroad programs provided they meet the following eligibility criteria at the time of application:

1. be in good standing with the student conduct system;
2. must have earned at least 32 credit hours, at least 12 of which must have been earned at the University of New Hampshire at the baccalaureate level;
3. must have a minimum of 2.5 cumulative grade point average at the time of application to and at the time of departure for the study abroad program. Study abroad programs provided by UNH or other approved institutions may have higher minimum GPA requirements;
4. must have a declared major. Transfer students, including transfer students from the Thompson School of Applied Science (TSAS) are not eligible to study abroad during the first semester of their baccalaureate program at UNH.

Students enrolled in the degree programs of the Thompson School of Applied Science may participate in approved study abroad programs appropriate for two-year degree candidates.

TSAS students must meet the following eligibility criteria:

1. must have earned 32 credits, at least 12 of which must have been earned at the University of New Hampshire at the associate degree level;
2. must have a minimum 2.5 cumulative grade point average at the time of application to and at the time of departure for the study abroad program. Study abroad programs provided by UNH or other approved institutions may have higher minimum GPA requirements.

### *National Student Exchange*

Additional opportunities for exchange in the US and Canada are available through the National Student Exchange (NSE) program. NSE offers 180 campuses, nine campuses, nine of which are in Canadian provinces, and are available for one semester or full-year exchange. Contact National Student Exchange Office, 106 Hood House, (603) 862-3485 or visit

[www.unh.edu/nse](http://www.unh.edu/nse).

### **Belize**

#### *The UNH Archaeological Field School in Belize*

Offered in the summer, the UNH Archaeological Field School in Belize is a four-week program in archaeological field and lab techniques. Students register for ANTH 675 and earn up to 8 credit hours. Assisted by program staff, each student chooses a topic of original field research to focus on (e.g., analyses of a particular artifact class, architecture, excavation or survey results from the project). The program is directed by Eleanor Harrison-Buck, assistant professor of anthropology, who has worked on archaeological projects in Belize and Guatemala

since 1992. For more information, contact Eleanor Harrison-Buck at [e.harrison-buck@unh.edu](mailto:e.harrison-buck@unh.edu), 603-862-4742, 311 Huddleston Hall, [www.unh.edu/anthropology/belize](http://www.unh.edu/anthropology/belize).

#### *New Hampshire Teacher Program*

EDUC 880/780: Belize - New Hampshire Teacher Program, is open to graduate students in education, upper-level education majors, and professional teachers earning continuing education credits. The 4-graduate credit class offered in the spring semester. Participants will attend pre-trip workshops to learn about the educational, geographical, historical, and cultural background of Belize and design a project to integrate their personal interests and objectives with in-country activities. During February vacation, participants will spend 8-11 days in Belize. Contact Sheila Adams, at [sadamsrjh@gmail.com](mailto:sadamsrjh@gmail.com) or 603-926-9136 or Jerry Kelly, at [jerrykelly20@gmail.com](mailto:jerrykelly20@gmail.com) or 603-436-7472 .

### **Canada**

#### *Montréal Program*

Offered in January term, the Montreal program is an intensive review of French in Montréal, Canada. The 4-credit course, FREN 403Q, is held at the **Université de Québec à Montréal** (UQAM) and taught by UNH faculty, with the addition of conversation with a UQAM instructor and field trips. Through the intensive morning program and the full immersion in Quebec culture, participants will have a better grasp of written and oral French and also gain a deeper understanding of Montréal, Québec, and of Canadian society as a whole. Students must have a minimum cumulative grade point average of 2.5 and be in good standing with the Student Conduct System. For more information, contact [montreal.program@unh.edu](mailto:montreal.program@unh.edu), 603-862-1055, G10B Murkland Hall, [www.unh.edu/languages/montreal](http://www.unh.edu/languages/montreal).

### **Costa Rica**

#### *Costa Rica Program*

A 3-week study abroad program offered during January term, the Costa Rica program is centered around the UNH 4-credit course, The Politics of Costa Rica, POLT 543. The program is designed to explore the many facets of Costa Rican exceptionalism. Under the direct onsite supervision of a UNH faculty member, students will combine the study of Costa Rican politics with field research in Costa Rica. Classes are held at the Universidad Latina de Costa Rica in San Jose. Students must have a minimum cumulative grade point average of 2.5 and be in good standing with the Student Conduct System. For more information, contact [costarica.program@unh.edu](mailto:costarica.program@unh.edu), 603-862-1406, 314 Horton Social Science Center, [www.unh.edu/political-science/costarica](http://www.unh.edu/political-science/costarica).

### **Dominican Republic**

#### *Dominican Republic Program*

Offered in January term, this 4-credit course with 40 contact hours, is open only to WSBE students. Students will participate in a 10-day visit to the Dominican Republic, one of the



commercial hubs of the Caribbean. The course will include three pre-trip classes held in the fall, in which the students will learn about the business culture of the country, as well as a brief introduction to its history and current demographics. The group will travel to Santo Domingo where 4 hours of each weekday (28 contact hours) would be devoted to meeting with business owners and managers from a variety of industries who would discuss business practices. Upon return to Durham, a final 3 hour class would be held to wrap up, assess the learning outcomes and conclude the experience. Contact Audrey Ashton-Savage, the instructor for this course, at [aeu65@unh.edu](mailto:aeu65@unh.edu).

#### *Social Action in the Dominican Republic*

SW 897/797: Social Action in the Dominican Republic is a 3-graduate credit or 4-undergraduate credit course in which students will examine the issues of race, culture, and social justice in the Dominican Republic, through the mediums of service work alongside our Dominican hosts, lectures, discussions, and assignments during UNH's spring break. Open to graduate students in Social Work and undergraduate students studying social work and Spanish language. View [flyer](#). Contact Matthew Toms, course instructor, at [matthew.w.toms@gmail.com](mailto:matthew.w.toms@gmail.com).

### **England**

#### *Cambridge Summer Program*

For six weeks each summer, students from across the United States have the opportunity to participate in the UNH Cambridge Summer Program held at Cambridge University in England. Program participants take courses in English and history, taught by faculty from Cambridge University and UNH. Students live and study at Gonville and Caius College, one of the oldest colleges at Cambridge. The program is open to students who have successfully completed at least one year of college. Participation fulfills UNH's Discovery Program requirement in World Cultures. For more information, contact the director at the Department of English, Cambridge Program Office, 53 Hamilton Smith Hall, [www.unh.edu/cambridge](http://www.unh.edu/cambridge).

#### *Lancaster Exchange Program*

Lancaster University is a comprehensive university similar to UNH in size, setting, and program offerings. The program allows students to spend a semester or a year in Lancaster while still making normal progress toward their UNH degree. Contact the Center for International Education, Hood House, (603) 862-2398 or e-mail [international.exchange@unh.edu](mailto:international.exchange@unh.edu).

#### *London Program*

At Regent's College in the heart of London, the University of New Hampshire sponsors courses in British studies, the arts, humanities, and a wide range of other basic subjects offered during the fall and spring semesters. Taught by British and American faculty members, many of the

courses are specifically concerned with British studies or have a special British emphasis. The program allows students to spend a semester or year in London while still making normal progress toward their U.S. degrees. To be eligible, students must have successfully completed at least 32 credit hours with an overall grade-point average of at least 2.5, and declared a major. Interested students should contact the program coordinator, London Program Office, 53 Hamilton Smith Hall, [www.unh.edu/london](http://www.unh.edu/london).

#### *The London Experience*

Offered during January term, the London Experience is a wonderful opportunity to learn about one of the world's greatest cities, and to see the sights and take in some of the best theatre in the English-speaking world. This 4-credit course meets during the latter part of the fall term for lectures and discussions on British society, art and politics in preparation for the January trip. For more information, contact [london.experience@unh.edu](mailto:london.experience@unh.edu), 603-862-0667, M313 Paul Creative Arts Center, [www.unh.edu/theatre-dance/london](http://www.unh.edu/theatre-dance/london).

### **France**

#### *Summer French Language Program in Brest*

Qualified students in any major may take the equivalent of FREN 503 and/or 504, the UNH intermediate French sequence; the equivalent of FREN 631 and/or 632; and/or FREN 695, a more advanced language course not offered on the UNH campus; or Fren 635, Intro. to Business French. See the UNH online catalogue for specific course prerequisites. A port city in the province of Brittany in western France, Brest is the sister city of Portsmouth, New Hampshire.

The courses are offered summer only in intensive four-week sessions at the Centre International d'Etudes des Langues (CIEL). Students generally live with local families and attend classes a total of 24 hours per week. Students receive UNH credit for these courses. For more information contact Barbara Cooper, Department of Languages, Literatures, and Cultures, Murkland Hall, (603) 862-3771, or visit [www.unh.edu/brest](http://www.unh.edu/brest).

#### *Junior Year, Spring, or Summer Program in Dijon*

The Department of Languages, Literatures, and Cultures sponsors a junior year, a spring semester, and a summer program at the University of Burgundy in Dijon, France. Students generally live with French families in the heart of this historic city and take classes at the university with French students. Credit for all work completed successfully will be automatically transferred to UNH. The academic year, spring, and summer programs are open to those French majors who have completed FREN 631-632 and FREN 651-652 or equivalent, and to French minors who have completed FREN 631-632 and FREN 651 or 652 or equivalent, with a 2.5 GPA or better. The summer program is only open to French double majors who cannot spend a semester abroad for documented reasons. For more information, see Claire Malarte

Feldman, Department of Languages, Literatures, and Cultures, Murkland Hall, (603) 862-1303, or visit [www.unh.edu/dijon](http://www.unh.edu/dijon).

### **German-Speaking Countries**

Students may study for a semester or a full year through any approved American study abroad program or, in special cases, by applying directly to universities in Germany, Austria, or Switzerland. Most programs require a minimum grade-point average of 3.0 and a B average in the major. Programs vary greatly in academic focus, size, language of instruction, living arrangements, services and extra-curricular programming provided, and cost. Some programs accept students only for a full year. Study abroad goals and requirements should be discussed with a German adviser as early as freshman year. Program and application materials may be obtained through the Center for International Education in Hood House. For credit in the German major or minor, the program must be conducted in German. After consultation with the major adviser and the study abroad adviser to establish possible UNH course equivalents and fulfillment of major and/or Discovery Program requirements, students submit a Prior Approval Form indicating the planned course of study abroad. To ensure proper credit transfer, especially if seeking to transfer credits directly from a university abroad without benefit of an American program, students should keep syllabi, course descriptions, and all written work. Students planning study at a university in Germany, Austria, or Switzerland should note major differences in academic calendar (winter semester October-February, summer session April-July), which may be shortened by the American sponsor university to accommodate U.S. academic calendars.

#### *Short-course in Berlin, Germany*

The UNH German Program manages a two-week program in January or June in Berlin, Germany. Students earn 4 credits through German 586, designed to give students a short immersion experience in the German language and culture. In the course of two weeks, students will receive forty hours of intensive language instruction at the appropriate level at the BSI Private Language School in central Berlin. Each weekday afternoon, students will gather for cultural excursions and discussions with the on-site UNH faculty member. A required pre- and post-meeting at UNH will prepare for, and give closure to, the Berlin experience. In line with UNH's goals to educate students to become global citizens, this immersion experience will give students insight into what it means to experience a different culture and language. For more information, contact Mary Rhiel at (603) 862-0063, email [berlin.program@unh.edu](mailto:berlin.program@unh.edu), or visit [www.unh.edu/languages/berlin](http://www.unh.edu/languages/berlin).

#### *Intensive Language Courses through the Goethe Institut*

Students needing to advance rapidly in proficiency beginning at any level and at any time of year may enroll at a Goethe Institut center in Germany for courses ranging from eight to 16

weeks and receive UNH equivalent credit depending on level of exam passed upon completion of course. UNH faculty contact person is Mary Rhiel, (603) 862-0063, or the Center for International Education, (603) 862-2398, or [study.abroad@unh.edu](mailto:study.abroad@unh.edu).

### *German Internship*

Students who have completed GERM 504 or equivalent may apply for an unpaid 4-8 credit internship placement in a German-speaking firm or organization. The internship does not alone fulfill the study abroad requirement for the major, but may count toward the minor and may be coupled with academic course work through UNH or any study abroad program to fulfill the major study abroad requirement. The faculty contact person is Mary Rhiel, (603) 862-0063.

## **Ghana**

### *Ghana Program*

The Ghana Program is a spring semester program at the University of Ghana, one of West Africa's most prestigious universities. With approximately 30,000 students at its campus in Legon, a suburb of **Accra, Ghana's capital city**, the **University of Ghana** offers students a broad range of exciting educational and cultural opportunities. Politically stable, safe, and with English as its official language, Ghana provides an excellent vantage point for experiencing sub-Saharan Africa and for a rich and deep study-abroad experience. All courses are taught by University of Ghana faculty in English. UNH students must have a cumulative GPA of 3.0, have earned at least 32 credits (at least 16 of which must be from UNH), be in good standing with the Student Conduct System, and have a declared major. For more information, contact: [ghana.program@unh.edu](mailto:ghana.program@unh.edu), 603-862-2179, 305 Huddleston Hall, [www.unh.edu/ghana](http://www.unh.edu/ghana).

## **Hungary**

### *Justice Studies Program in Budapest*

The UNH Budapest Program in Justice Studies is designed to introduce students to a broader appreciation of the cross-cultural perspective in Justice Studies. Each fall, fifteen UNH students spend the semester in residence at the Corvinus University of Budapest in Hungary. Hungary offers students an opportunity to witness first-hand the evolution of a criminal justice system within a context of significant cultural, political, economic, and social change. Situated along the Danube in one of central Europe's oldest cities, Corvinus offers a unique educational experience to students interested in the study of criminology, law, and society, and the administration of justice. Under the supervision of a UNH faculty member also in residence, students carry a four-course load, two of which are taught by the UNH faculty member. All courses are taught in English.

Eligible students must hold sophomore standing, have completed either SOC 515 or POLT 507, and one other course in the Justice Studies curriculum, and have a minimum cumulative

grade point average of 2.5. Participating students will meet several times during the spring semester prior to the study abroad semester to prepare for the program. Interested students should contact the Budapest Program in the Justice Studies Office at (603) 862-1716, or visit [www.unh.edu/budapest](http://www.unh.edu/budapest).

#### *Engineering and Physical Sciences Exchange Program in Budapest*

The College of Engineering and Physical Sciences has arranged an opportunity for its students to spend the fall semester of their junior year at the Budapest University of Technology and Economics (BME) in Budapest, Hungary. Courses at BME are taught in English and receive prior approval for degree credit. Students studying at Budapest, therefore, can graduate on schedule at UNH. A general education course on the language, geography, and culture of Hungary, taken at BME, is strongly suggested. The foreign student office at BME will appoint a Hungarian adviser for each student and will assist in obtaining housing either in dormitories, or in apartments. Further information is available from the college's educational assistant and the college's academic counselor, Bobbi Gerry; or Andrzej Rucinski, Foreign Exchange Program Coordinator, (603) 862-1381. For more information, visit the program's Web site at [www.ceps.unh.edu/academics/budapest.html](http://www.ceps.unh.edu/academics/budapest.html).

#### *WSBE in Budapest*

The Whittemore School of Business and Economics has partnered with the Corvinus University of Budapest (formerly Budapest University of Economics Sciences and Public Administration) to offer students a unique opportunity to live and study in Budapest. This partnership allows WSBE students to take courses at Corvinus in the fall semester that directly transfers into the core of the Business Administration or Economics degrees and into most business options. This ensures that students can study abroad and graduate on time. Moreover, Budapest is developing into a commercial and financial center for many U.S. companies. Its importance for the U.S. economy is growing rapidly.

Students travel to Budapest in the last week of August. A WSBE faculty member meets students in Budapest and sets them up in apartments in the city that are close to the University. The school works to make the transition to life in a foreign culture as simple and easy as possible. Additionally, in the future a WSBE faculty member will be teaching at Corvinus during the study abroad semester. For more information, visit the program's Web site at [www.wsbe.unh.edu/study-abroad-budapest](http://www.wsbe.unh.edu/study-abroad-budapest).

### **Italy**

#### *UNH-in-Italy in Ascoli Piceno*

Students may participate in the UNH-in-Italy Program in the medieval city of Ascoli Piceno, for a semester, a year, or a summer session (see ITAL 685-686).

Academic Year Program. Students live in apartments in the heart of the city and take UNH courses, taught in English, by UNH faculty. Students with advanced language skills may take courses taught in Italian. Internships are possible. There is no language prerequisite. Students must have a cumulative grade-point average of at least 2.5, earned 32 credits, and be in good standing with the Student Conduct System. For further information, contact Piero Garofalo, Department of Languages, Literatures, and Cultures, Murkland Hall, (603) 862-3769, [www.unhitaly.unh.edu](http://www.unhitaly.unh.edu).

Summer Program. UNH-in-Italy offers three different summer options. One is a 4-credit workshop in painting. The second is an 8-credit program in Italian studies. The third is an 8-credit program in Nutrition and Culture. Students live in apartments in the historic center of the city. For further information regarding the painting workshop, contact Scott Schnepf, Department of Art and Art History, Paul Creative Arts Center, (603) 862-2190. For further information regarding the Italian Studies program or the Nutrition and Culture program, contact Piero Garofalo, Department of Languages, Literatures, and Cultures, Murkland Hall, (603) 862-3769, [www.unhitaly.unh.edu](http://www.unhitaly.unh.edu).

#### *Ecogastronomy in Pollenzo*

All students who declare the Dual Major in EcoGastronomy must spend a full semester abroad, most likely during their junior year. The University of Gastronomic Sciences (UNISG) in Pollenzo, Italy, will serve as the site of this foreign experience. Founded by **Carlo Petrini**, UNISG is a unique university with a mission "**...to create an international research and training center, working to renew farming methods, protect biodiversity and maintain an organic relationship between gastronomy and agricultural science.**" Dual Majors will complete a series of upper level core courses at UNISG, such as history of cuisine and gastronomy, history of food, aesthetics, food law, food technology processes, and Italian language. For more information, contact Daniel Winans at (603) 862-3327, or visit <http://www.unh.edu/ecogastronomy/foreignexperience>.

#### *The UNH Manchester Florence Summer Program*

The UNH Manchester Florence Summer Program enables UNH students to earn academic credit, while living for six weeks in Florence, Italy, the birthplace of the Renaissance. The program is located in the beautiful and historic Rucellai Palace in central Florence, and is offered in collaboration with the Institute at Palazzo Rucellai. Students are housed in fully-furnished, centrally-located apartments, close to all of Florence's most famous landmarks, such as the Duomo, the Ponte Vecchio, the Uffizi Gallery, and Piazza della Signoria. Students also may contact directly Professor Michael Contarino at [mike.contarino@unh.edu](mailto:mike.contarino@unh.edu) or Professor Melinda Negron-Gonzales at [melinda.negron@unh.edu](mailto:melinda.negron@unh.edu).

#### **The Netherlands**

### *Utrecht University*

The Center for International Education administers an exchange program with Utrecht University, open to undergraduate and graduate students in all fields. Utrecht University is one of the top research universities in Europe, with the largest undergraduate population and the largest research budget in the Netherlands. The size, status, and international population of the university ensure that courses in all areas of study are offered in English; these include the Humanities, Social and Behavioral Studies, Law, Economics, Governance and Geosciences. This is an especially good exchange for students wanting to combine a study abroad option with work in their majors.

### *University College Utrecht*

An Honors exchange is available at the University College Utrecht (UCU), which is an international Liberal Arts and Sciences Honors College of Utrecht University. UCU's mission is to offer ambitious students an academic environment aimed at transforming their broad academic and social interests and their international orientation into academic excellence, intellectual independence and world citizenship. Students have access to all academic, social and recreational facilities that Utrecht University has to offer.

UCU specializes in undergraduate education. Students choose from courses in Humanities, Science and Social Sciences, and they are educated in the spirit of liberal arts. Among the special characteristics are the College's small classes and individual attention.

Located in an especially lovely section of central Holland, Utrecht is the fourth largest city in the Netherlands. It has a classically old-Dutch city center with 17th century buildings, a medieval church, several high-quality museums and terraced canals that encircle the old city. A university town since the medieval period, Utrecht has long enjoyed a vibrant student culture. Utrecht is easily navigable by foot, bicycle, and bus., the center of the Dutch rail system, it enjoys easy access to other cities in the Netherlands and Europe (Amsterdam is 35 minutes away; Paris three hours; London a day trip by plane). Interested students should contact the Center for International Education, Hood House, (603) 862-2398, or [international.exchange@unh.edu](mailto:international.exchange@unh.edu).

### **New Zealand**

#### *UNH-EcoQuest, New Zealand*

In partnership with the UNH Department of Natural Resources and the Environment, the EcoQuest Education Foundation offers an intensive program of applied field studies in ecology, resource management, and environmental policy. New Zealand offers an ideal context for multidisciplinary, field-oriented studies, with its rich cultural traditions, diverse ecosystems, expansive natural areas, and history of innovative approaches to resource management. EcoQuest students engage hands-on in New Zealand's restoration ecology and sustainable



resource management initiatives. Semester participants have the opportunity to carry out directed research projects while working closely with a faculty mentor and in association with New Zealand research partners. The rural seaside campus is located about an hour's drive southeast of Auckland. Students travel throughout New Zealand's North and South Islands to learn more about the unique ecosystems and local culture.

Students may choose either a four-course, 15-week fall or spring term for 16 credit hours, or a two-course, five-week summer session for eight credit hours. The UNH-EcoQuest Academic program coordinator is Kimberly Babbitt. Contact Donna Dowal, the UNH-EcoQuest director of admissions, (603) 862-2036.

### **Nicaragua**

#### *International Service Learning in Nicaragua*

COMM798: International Service learning in Nicaragua, is a 4-credit class offered in Fall and Spring with trips in August and January. Students will be introduced to global, social, economic, health, educational and environmental issues that affect the peoples of Nicaragua by preparing projects for activities at the Women in Action Center in Managua. Open to students interested in Spanish language, sociology, psychology, health and nursing, communication sciences & disorders, deaf and hard of hearing students, economics, social work or environmental sciences. Contact Pamela Broido, ASL Coordinator, at [pbroido@unh.edu](mailto:pbroido@unh.edu) for more information.

### **Portugal**

#### *Classical Dressage Experience in Portugal*

A faculty-led short-term program, students take ANSC 520: Classical Dressage Experience in Portugal, a 2-credit class with a weekly seminar preparing students for 1 week in Portugal where they receive Classical dressage training at L'Escola de Equitação de Alcainça during spring break or at the end of spring semester after exams. Contact Sarah Hamilton at 603-862-1356 or [sarah.hamilton@unh.edu](mailto:sarah.hamilton@unh.edu) .

### **Puerto Rico**

Students may spend one or two semesters at one of nine campuses in Puerto Rico through the National Student Exchange (NSE) program. While having the opportunity to learn in a Latin American environment, participants maintain their status as UNH students, pay UNH tuition, and will be able to graduate from UNH on schedule. The exchange is open to students from all UNH majors. Students must meet all UNH Study Away Eligibility requirements. Participants must provide proof of proficiency in Spanish. Students must contact Paula DiNardo, National Student Exchange Office, 106 Hood House, (603) 862-3485 or visit [www.unh.edu/nse](http://www.unh.edu/nse).

### **Russia**



### *Moscow Program*

Offered in January term, Russian 586 is designed to provide students with an opportunity to experience the Russian language and culture in Moscow, Russia. This two and half week course consists of daily Russian language classes and excursions around the capital. Language classes are taught at the Elementary level, for beginners and as a review in preparation for intermediate Russian. Culture classes are conducted as excursions and field trips supplemented by discussions with the on-site UNH staff. Students must have a minimum cumulative grade point average of 2.5 and be in good standing with the Student Conduct System. For more information, contact [moscow.program@unh.edu](mailto:moscow.program@unh.edu), 603-862-3545, 303 Murkland Hall, [www.unh.edu/languages/moscow](http://www.unh.edu/languages/moscow).

### **Scotland**

#### *Heriot-Watt University Exchange Program*

College of Engineering and Physical Sciences students are eligible to participate in a spring semester exchange with Heriot-Watt University in Edinburgh, Scotland. The current program is designed for civil and environmental engineering majors. For more information, contact Ray Cook at (603) 862-1411, or e-mail [ray.cook@unh.edu](mailto:ray.cook@unh.edu).

### **Spain**

#### *Granada Program*

The Granada Program is administered by the Spanish program of the University of New Hampshire. Students may spend spring semester in a program designed for those who have completed SPAN 631 or its equivalent, have a B average in Spanish and a cumulative grade-point average of 2.5, and have at least sophomore status. Courses taught by professors from the University of Granada fulfill requirements for the Spanish major and minor and general education requirements in humanities areas. For further information, contact the Spanish program, Murkland Hall, or visit [www.unh.edu/granada](http://www.unh.edu/granada).

### **West Indies**

#### *Grenada, West Indies Program*

Offered during January term, this 4-Credit course is for students with an interest and background in botany, coastal ecology and restoration, and conservation. Prerequisites include BIO411/412. This field-based course taught in Grenada, West Indies, will provide an introduction to the physical, chemical and biological processes that form and sustain tropical coastal plant communities with an emphasis on mangroves and seagrasses. Plant adaptations to various environmental stresses will be examined over a range of habitats. As a dynamic ecosystem affected by both natural and anthropogenic disturbances from hurricanes to large-scale development, major environmental impacts and pressures will be examined first hand, and conservation and management actions will be discussed. A variety of on-going,

community-based coastal habitat restoration and ecological monitoring sites will be visited throughout the island. Student participation in management actions will be encouraged through interaction with local students, volunteers, and representatives from governmental environmental agencies and several non-governmental organizations. Contact Gregg Moore in the Dept of Biological Sciences at [gregg.moore@unh.edu](mailto:gregg.moore@unh.edu) for more information.

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### **Reserve Officer Training Corps Programs (ROTC) ▼**

Students attending the University of New Hampshire may enroll in the Air Force Reserve Officer Training Corps (AFROTC) or in the Army Reserve Office Officer Training Corps (AROTC) at the University.

The Army ROTC and Air Force ROTC offer programs leading to a commission as a second lieutenant in their respective services. Students in either ROTC program may pursue any University curriculum that leads to a baccalaureate or higher degree.

Two- and four-year programs are available. The four-year program is open to freshmen, sophomores, and transfer students. The two-year program is open to students who have at least two academic years remaining in their college/university degree program. In addition to on-campus course requirements, students must attend an officer-preparatory training session for a part of one summer.

ROTC scholarships are offered on a competitive basis by both the Army ROTC and Air Force ROTC. Entering freshmen may compete for four-year scholarships during their last year of high school. Additionally, incoming students may compete for scholarships while already in college if they meet specific ROTC requirements. Scholarships may pay up to full tuition, mandatory fees, and required textbooks for college courses. Incoming students with either a four-year or three-year ROTC scholarship may receive a full or partial room and board grant for the entire time they are on an ROTC scholarship. In addition, all scholarship recipients receive a tax-free monthly subsistence allowance. Non-scholarship students in the last two years of the ROTC program also receive the tax-free monthly subsistence allowance.

Both ROTC programs have administrative and medical requirements, which must be met to qualify for a scholarship and a commission.

More specific information about ROTC programs may be obtained by contacting Army ROTC at (603) 862-1078 or Air Force ROTC at (603) 862-1480.

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### 2011-2012 Online Undergraduate Course Descriptions ▼

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Quick-find tip: Select course subject. Type Ctrl-F (PC) or Apple-F (Mac) and enter search term.

Make sure pop-ups are enabled.

For specific course details, please consult the individual course instructor for your section.

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## Accounting and Finance

### **ACFI 620 - Topics in Accounting**

**Credits:** 4.00

Special topics; may be repeated. Prereq: ACFI 621 or ACFI 723 depending on topics and junior standing.

### **ACFI 621 - Intermediate Financial Accounting I**

**Credits:** 4.00

Examination of the nature and applicability of accounting theory and the conceptual framework of accounting. Development of the capacity to address and resolve issues and problems in financial reporting. Topics include valuation and reporting of current and operating assets, and revenue recognition. Prereq: ADMN 502. Students wishing to repeat ACFI 621 must request and obtain departmental approval.

### **ACFI 622 - Intermediate Financial Accounting II**

**Credits:** 4.00

Selected topics within financial reporting such as accounting for investments, leases, pensions, and income taxes. Focus on how and why these issues are accounted for in the manner prescribed by current GAAP. Prereq: ACFI 621.

### **ACFI 640 - Topics in Finance I**

**Credits:** 2.00 to 4.00

Special topics; may be repeated for a maximum of 8 credits. Prereq: ADMN 601 and junior standing.

### **ACFI 650 - Wildcat Investment Fund**

**Credits:** 2.00

Students actively manage the Wildcat Fund, a donor-created fund which consists of cash and stocks. During weekly meetings, students present their stock selections to the group and debate the merits of the presented stocks. Trades are then made accordingly. An officer corps is responsible for structuring and coordinating the group. Students in good standing may retake course up to a maximum of 12 credits. Prereq: permission.

### **ACFI 701 - Financial Policy**

**Credits:** 4.00

Development of analytical tools and practical skills for recognizing and solving complex problems of business finance. Working-capital management, capital budgeting, cost of capital, capital structure, and dividend policy. Prereq: ADMN 601.

### **ACFI 702 - Investments Analysis**

**Credits:** 4.00

Security valuation, efficient markets, portfolio management, options, and alternative investments. Computer research topics. Prereq: ADMN 601.

### **ACFI 703 - International Financial Management**

**Credits:** 4.00

Financial management problems facing multinational firms. Primary focus on effects of currency denominations on financial decisions. Prereq: ADMN 601.

### **ACFI 704 - Derivative Securities and Markets**

**Credits:** 4.00

Derivative assets and markets, and their role in business decision-making and portfolio management.



Emphasis on practical and theoretical aspects of hedging and speculating using futures and options for both commodities and financial assets, including their market mechanics. Prereq: ADMN 601.

### **ACFI 705 - Financial Institutions**

**Credits:** 4.00

Examination of financial institutions and markets. Emphasis on how institutions create value, the regulatory environment under which they operate, and the role of risk management. Prereq: ADMN 601. Writing intensive.

### **ACFI 720 - Topics in Finance II**

**Credits:** 4.00

Special topics. Prereq: ADMN 601 and senior standing. Writing intensive.

### **ACFI 723 - Advanced Managerial Accounting Concepts and Applications**

**Credits:** 4.00

Builds on the basic managerial accounting course by continuing the theme of accounting as a management tool. Emphasis is on cost accounting as a source of data for measuring and improving the economic condition of the enterprise. Newly evolving management themes are integrated into the traditional topics of planning and control, cost analysis, overhead allocation, transfer pricing, and decision modeling. Prereq: ADMN 503.

### **ACFI 724 - Auditing**

**Credits:** 4.00

Philosophy and environment of auditing, with attention to an understanding of the major auditing concepts and objectives and its judgment process. Emphasis on the nature and economic purpose of audits, standards, professional ethics, auditors' legal liability, internal control, and audit evidence. Includes audit procedures, reports, and computer software. Prereq: ACFI 621. Writing intensive.

### **ACFI 725 - Financial Statement Analysis**

**Credits:** 4.00

Methods and tools of analysis and interpretation of financial statement data. Use of financial information in a variety of decision making situations including a prediction of corporate earnings, debt ratings, and financial distress; lending decisions; risk analysis; and equity valuations. Prereq: ACFI 621 and senior standing. Not offered every year.

### **ACFI 726 - Introduction to Federal Income Tax**

**Credits:** 4.00

Federal income tax concepts and law applicable to individuals. Coverage includes taxable income and deductions, passive activities, alternative minimum tax, property transactions and compensation. Prereq: ADMN 502.

### **ACFI 740 - Topics in Accounting II**

**Credits:** 4.00

Special topics. Prereq: ACFI 621 or 723, depending on topics, and senior standing.

### **ACFI 750 - Internships in Accounting**

**Credits:** 1.00 to 4.00

Accounting fieldwork in a business or other type of organization. Supervision provided by the organization, and consultation provided by the faculty sponsor. Written report required. Course credits vary according to the nature of the fieldwork, to be determined by the faculty sponsor. Prereq: seniors in high standing; permission. May be repeated up to a maximum of 12 credits. Cr/F.

**ACFI 751 - Internships in Finance****Credits:** 1.00 to 4.00

Finance fieldwork in a business or other type of organization. Supervision provided by the organization, and consultation provided by the faculty sponsor. Written report required. Course credits vary according to the nature of the fieldwork, to be determined by the faculty sponsor. Prereq: seniors in high standing; permission. May be repeated up to a maximum of 12 credits. Cr/F.

**ACFI 752 - Independent Studies in Accounting****Credits:** 1.00 to 4.00

Student-designed individual research projects, approved by a faculty sponsor. Paper required. Course credits vary according to the nature of the project, to be determined by the faculty sponsor. Prereq: seniors in high standing; permission. May be repeated up to a maximum of 12 credits.

**ACFI 753 - Independent Studies in Finance****Credits:** 1.00 to 4.00

Student-designed individual research projects, approved by a faculty sponsor. Paper required. Course credits vary according to the nature of the project, to be determined by the faculty sponsor. Prereq: seniors in high standing; permission. May be repeated up to a maximum of 12 credits.

**ACFI 754 - Honors Seminar in Accounting and Finance****Credits:** 4.00

Seminar discussions of advanced readings in accounting and finance. For seniors with standing in the honors program.

## **Aerospace Studies**

### **AERO 301 - Leadership Laboratory**

**Credits:**

Taken by all AFROTC cadets throughout enrollment in AFROTC. Command and staff leadership experiences in cadet corps. Air Force customs and courtesies, drill and ceremonies, career opportunities, and life and work of the junior officer. Student leadership potential developed in a practical, supervised laboratory. Cr/F.

### **AERO 415 - Foundations of the United States Air Force I**

**Credits:** 1.00

Mission and organization of today's Air Force as an instrument of the U.S. national defense policy. Customs and courtesies, officer-ship, and communication foundations are discussed.

### **AERO 416 - Foundations of the United States Air Force II**

**Credits:** 1.00

Air Force installations, fundamentals of Air Force written and verbal communication, and current events of interest to Air Force Officers are discussed.

### **AERO 541 - Evolution of United States Air Force Air and Space Power I**

**Credits:** 1.00

The nature of warfare; development of air power from balloons and dirigibles through World War II.

### **AERO 542 - Evolution of United States Air Force Air and Space Power II**

**Credits:** 1.00

Development of air power from post-World War II through the peaceful use of air power humanitarian efforts; and research and development of present and future aerospace vehicles.

### **AERO 671 - Air Force Leadership Studies I**

**Credits:** 4.00

An integrated management course emphasizing the individual as an officer/leader in the Air Force. Motivation and behavior, leadership, communication, group dynamics, and decision making in a changing environment. Air Force cases studied.

### **AERO 672 - Air Force Leadership Studies II**

**Credits:** 4.00

Organizational and personal values; management of forces in change; organizational power, politics, managerial strategy, quality, and tactics; Air Force cases studied.

### **AERO 681 - National Security Affairs I**

**Credits:** 4.00

Focus on the armed forces as part of American society, emphasizing civil-military relations in context of U.S. policy formulation and implementation. Requirements for adequate national security forces; political, economic, and social constraints on the national defense structure; impact of technological and international developments on strategic preparedness; the variables involved in the formulation and implementation of national security policy.

### **AERO 682 - National Security Affairs II**

**Credits:** 4.00

Focus on attitudes toward the military, socialization processes, role of the professional military leader-

manager, and military justice and administrative law.

**AERO 695 - Officer Internship (Air Force)**

**Credits:** 4.00

Experiential learning through class and field work in a military environment. Written analysis required. Prereq: AERO 671 (maybe taken concurrently). Permission of department chair required. For AFROTC cadets only. Cr/F.

**AERO 796 - AFROTC Internship**

**Credits:** 1.00 to 4.00

This internship is an Air and Space Studies program which prepares students for careers as Air Force Officers by providing experiential learning in an AFROTC detachment. History or Political Science majors are preferred. The internship is supervised by an Air Force Officer. By permission only. Prereq: AERO 415/416, AERO 541/542, and AERO 671/672.

## Africana & American Studies

### **AFAM 690 - Study Abroad in Ghana**

**Credits:** 4.00 to 16.00

Spring semester at the University of Ghana (Legon, Ghana) for juniors and seniors, with coursework available in a wide range of disciplines. Students must be matriculated in a four-year degree program, have a GPA of at least 3.0 have a declared major, and have completed at least 32 hours of credit. Students must attend fall orientation sessions. Consult the Ghana Program Advisor in the Center for the Humanities, Huddleston Hall. Course fee required. Cr/F.

### **AFAM 695 - Independent Study in Ghana**

**Credits:** 1.00 to 4.00

Independent study for students in the UNH program in Ghana.

### **AFAM 795 - Independent Study**

**Credits:** 1.00 to 8.00

Open to qualified sophomores, juniors, and seniors. May include research project, fieldwork or a relevant internship. To be elected only with permission of the coordinator and with qualified supervision. May be repeated up to a maximum of 8 credits.

### **AFAM XXX - Special message place holder**

**Credits:**

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## **Agricultural Mechanization**

### **AM 270 - Residential Electricity**

**Credits:** 2.00

Electrical principles, laws, and installation with emphasis on the "National Electrical Code." While modeled at the residential level, concepts and terminology will be applicable to the commercial and light industrial sectors as well. Concepts and methodologies will be supported with design and when appropriate, hands on application to enhance the learning environment. 2 lec/2-hr rec. (half semester course.)

### **AM 275 - Building Science/Residential Construction**

**Credits:** 4.00

The study of inter-relationship of physical principles that affect the functionality and life span of a building. The materials and methodologies of residential construction. 3 lec/2-hr lab. Special fee.

### **AM 280 - Technical Computer Literacy/Internet Applications**

**Credits:** 4.00

An introduction to the concepts, common hardware components, and operating practices of microcomputers. Emphasis on a networked Windows environment, the Internet, hard disk management, Paint Shop Pro, Microsoft Word, PowerPoint, Excel, and Access. 2 lec/2-hr rec.

### **AM 291 - Studies in Agricultural Mechanization**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member; credit varies depending on the proposed project/research. Areas may include welding, engines, building construction, electricity, or computers.

### **AM 292 - Studies in Agricultural Mechanization**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member; credit varies depending on the proposed project/research. Areas may include welding, engines, building construction, electricity, or computers.

### **AM 451 - Welding/Fabrication Technology**

**Credits:** 4.00

Processes and procedures of welding including: Shielded Metal Arc Welding (SMAW), Shielded Metal Arc Cutting (SMAC), Oxyacetylene Welding (OAW), Oxy-Fuel Gas Cutting (OFC-A), Gas Metal Arc Welding (GMAW), Plasma Arc Cutting (PAC), and Gas Tungsten Arc Welding (GTAW). Welding metallurgy and control of distortion. Special fee. Prereq: permission. 2 lec/2-hr rec.

### **AM 461 - Internal Combustion Engines I**

**Credits:** 4.00

Internal combustion engines (spark-ignited and diesel) and their subsystems with emphasis on their design, how they function, preventive maintenance, and troubleshooting. 2 lec/2-hr rec.

**AM 462 - Internal Combustion Engines II****Credits:** 4.00

Advanced engine principles and theory. Detailed major failure analysis and overhaul techniques. Prereq: permission, AM 461 or EDUC 461. 2 lec/2-hr rec.

**AM 470 - Residential Electricity****Credits:** 2.00

Electrical principles, laws, and installation with emphasis on the "National Electrical Code." While modeled at the residential level, concepts and terminology will be applicable to the commercial and light industrial sectors as well. Concepts and methodologies will be supported with design and when appropriate, hands on application to enhance the learning environment. 2 lec/2-hr rec. (half semester course.)

**AM 475 - Building Science/Residential Construction****Credits:** 4.00

The study of inter-relationship of physical principles that affect the functionality and life span of a building. The materials and methodologies of residential construction. 3 lec/2-hr lab. Special fee.

## American Sign Language

### **ASL 435 - American Sign Language I**

**Credits:** 4.00

Introduction to American Sign Language with emphasis on visual receptive and expressive use of language, as well as providing opportunities for other forms for visual communication such as facial expression, mime, and gesture. Participants develop their skills through videotapes, classroom participation, and readings that cover issues important to the Deaf community. A weekly, one-hour language laboratory is required as part of this course. Limited to 15 students. Special fee. No credit if credit has been received for COMM 533.

### **ASL 436 - American Sign Language II**

**Credits:** 4.00

Continuation of ASL 435 and expansion on concepts and principles. Focus on more advanced vocabulary and patterns of grammar; use of space and modulation of signs to denote aspects of time and location; and additional information on Deaf culture. A weekly one-hour language laboratory is required as part of this course. Prereq: ASL 435 or program evaluation. Limited to 15 students. No credit if credit has been received for COMM 733.

### **ASL 531 - American Sign Language III**

**Credits:** 4.00

Continuation of ASL 436. Expands on groundwork and grammatical principles established in ASL I and II. Introduces the sociolinguistics aspects of ASL as it functions within the deaf cultural context. Limited to 15 students. Prereq: ASL 436 or program evaluation.

### **ASL 532 - American Sign Language IV**

**Credits:** 4.00

Continuation of ASL 531. Expands on the groundwork and grammatical principles established in ASL I, II, and III. Introduces the sociolinguistic aspects of ASL as it functions within the deaf cultural context. Areas of investigation include use of formal versus informal sign register; sign variation by region, age, and gender; social factors that give rise to code switching; and political and cultural evolution of the U.S. deaf community. Taught in the target language using the direct experience method. Prereq: ASL 531 or program evaluation. Limited to 15 students.

### **ASL 599 - Special Topics in American Sign Language/Deaf Studies**

**Credits:** 1.00 to 4.00

Selected topics related to American Sign Language and deaf studies that vary by semester. Description available in departmental office during preregistration. May be repeated for credit (maximum of 8 credits) if topics differ.

### **ASL 621 - Advanced American Sign Language Discourse I**

**Credits:** 4.00

Focuses on the use of ASL discourse in formal as well as informal settings. Students explore the genres of public speaking, artistic expression, formal discussion, interview, and narrative. Development of ASL vocabulary in specialized areas not covered in previous courses. Prereq: ASL 532.

### **ASL 622 - American Sign Language Discourse II**

**Credits:** 4.00

In this advanced ASL course, students will advance their ASL proficiency by focusing on vocabulary,



syntax, and discourse related to the following topics: 1) biological/medical, 2) financial, 3) technical/mechanical, and 4) cross-cultural comparisons and issues. The cross-cultural topic, in particular, will be a focus throughout the semester. Students work in small assigned groups, on a rotating basis, in which they research and develop speeches on the four topics mentioned above. The class requires both in-class feedback and out-of-class work. Prereq: INTR 438 and ASL 621.

## American Studies

### **AMST 444B - New Orleans: Place, Meaning, and Context**

**Credits:** 4.00

Course uses literature, essays, film, music, debate, and discussion, to explore the topics of place, history, people, politics, art and literature, and music. Lectures, discussion, assignments, and group projects will touch on issues regarding race, poverty, power, social mobility, gender roles, crime, corruption, energy, and the environment. Writing intensive.

### **AMST 444D - History Behind Everyday Life**

**Credits:** 4.00

This interdisciplinary course focuses on the history and culture of the United States at the turn into the twentieth century: the period from 1885-1915. Emphasis is as much on the methods of historical studies as on the material itself: we'll approach culture from a variety of different disciplines: history, sociology, literature, art, architecture, music, film. Writing intensive.

### **AMST 444E - Fly Fishing and the American Experience**

**Credits:** 4.00

The practice of fly fishing may seem like a rather specialized topic for a semester-long course, but it is truly an interdisciplinary pursuit that is based upon a rich literary heritage. The class will begin with readings, while using film, demonstrations, field trips, and service learning, to help define the extent to which fly fishing in America has become intertwined with literature, art, popular culture, biology, environmentalism, and business/technology. On one level, students will learn about fly fishing techniques, stream ecology, and local rivers. And on another level, they will see how the American landscape and ways of thinking have created something quite distinct from its European antecedents. Writing intensive.

### **AMST 501 - Introduction to American Studies**

**Credits:** 4.00

An introduction to the basic methods used in the interdisciplinary study of history, literature, arts, and other aspects of the life and culture in the United States, with a special focus on a local New England sub-region: the Piscataqua river, Manchester, Boston, Portland, and the White Mountains, with an emphasis on the multiracial, multilingual, and multiethnic nature of New England culture. Disciplinary approaches drawn from literature, history, environmental studies, folklore, material culture, art history, architecture, film, anthropology, and sociology. May include guest lectures, field work, trips. Required for students minoring in American studies. Writing intensive.

### **AMST 502 - Introduction to African American Literature and Culture**

**Credits:** 4.00

An introduction to African-American literature in the context of a variety of cultural perspectives. Course topics may include: major writers, literary genres, historical periods, Harlem Renaissance, Black Arts Movement, fine and folk arts, religion, music, and film. (Also offered as ENGL 517.) Writing intensive.

### **AMST 503 - Introduction to Native American Studies**

**Credits:** 4.00

An introduction to the methods used in the interdisciplinary study of the history, literature, material culture, and other aspects of life and culture among Native American peoples. Specific tribes and nations covered may vary, but concepts emphasized include contact, colonialism, and sovereignty. (Also offered as ENGL 540.)

### **AMST 603 - Photography and American Culture**

**Credits:** 4.00

Interdisciplinary study of the relationship between photography and the literature, art, politics, and history of the nineteenth and twentieth centuries. Introduces theories of photography as well as works of individual artists. Topics vary from year to year. Writing intensive.

### **AMST #604 - Landscape and American Culture**

**Credits:** 4.00

Interdisciplinary study of the perception, representation, and/or construction of nature. Topics vary from year to year and may include: landscapes in nineteenth-century literature and art, colonial mapping of the Americas (traditions of writing and cartography), Native American traditions of land perception, and the twentieth-century emergence of eco-criticism. Writing intensive.

### **AMST #608 - Women Artists and Writers 1850-Present**

**Credits:** 4.00

Studies the impact of gender on the lives and works of selected American artists. Considers lesser known figures such as Fannie Fern, Lily Martin Spencer, and Mary Hallock Foote as well as better known artists such as Willa Cather and Georgia O'Keefe. Prereq: permission, or one of the following: WS 401, HIST 566, ENGL 585, 586, 685, 785, or a 600-level art history course. (Also offered as ARTS 608, ENGL 608, HIST 608, and HUMA 608.) Not offered every year. Writing intensive.

### **AMST 609 - African American Experience in the 20th Century**

**Credits:** 4.00

Investigates the music, literature, and social history of African American America in the period of the Harlem Renaissance, in the Great Depression, World War II, and in the 1960's. Special attention to the theme of accommodation with and rejection of dominant white culture. (Also offered as ENGL 609, HUMA 609.) Writing intensive.

### **AMST 610 - New England Culture**

**Credits:** 4.00

An interdisciplinary course investigating some of the major contributions New England has made to American life. Focuses on periods such as the Puritan era (1620-90), the Transcendentalist period (1830-1860), late nineteenth-century industrialism, and the contemporary era. New England places are also featured, such as Boston, Newport, Salem, the Connecticut River Valley, and rural northern New England. Course materials are drawn from the literature, history, art history, and material culture. (Also listed as ARTS 610, ENGL 610, HIST 610, HUMA 610.) Writing intensive.

### **AMST 611 - Indigenous New England**

**Credits:** 4.00

An interdisciplinary introduction to the literatures, histories, and cultures of indigenous people located in what is now New England. Course topics may include U.S. American Indian policy, tribal government structures and resistance, history and forms of Native literacy, contemporary sovereignty struggles, popular culture, and film. Curricular activity with regional Native people required such as a visit to a Native community, work with tribal guest speakers, participation in a lecture or film series. (Also offered as ENGL 740.) Writing intensive.

### **AMST #612 - Periods in American Culture**

**Credits:** 4.00

Intensive multidisciplinary study of the art, literature, material culture, and the social, political, and cultural movements of a specific period in the American past. Periods vary from year to year. Examples: the 1890's, the 1690's, the 1770's, the 1950's. May be repeated for credit if subject matter is different.

### **AMST 614 - Native American Studies Topics**

**Credits:** 4.00

The multidisciplinary study of the histories, cultures, and representations of indigenous peoples. Topics vary and may include Native American/Euro-American interactions under colonialism, the so-called "Era of Assimilation," and contemporary issues of sovereignty. May be repeated for a maximum of 8 credits if the subject matter is different.

### **AMST 615 - Asian American Studies Topics**

**Credits:** 4.00

The multidisciplinary study of Asian American literature, culture, theory, and history. Perspectives may be drawn from gender studies, anthropology, cultural studies, film studies, and medicine. Topics vary and may include the study of contemporary fiction and film, representations of gender, of race and cultural pathologies, and of the ethnic body. May be repeated for a maximum of 8 credits if the subject matter is different.

### **AMST 620 - Internship**

**Credits:** 1.00 to 8.00

Supervised internship with a governmental agency, private corporation, philanthropic institution, library, archives, museum, historical society, publishing company, or other institution seeking individuals interested in historical research, community development, or careers in education. Repeatable for a maximum of 8 credits. Permission required. Cr/F.

### **AMST 696 - Special Topics**

**Credits:** 4.00

Focused study of an issue, problem, or theme in American Studies. Topics vary. For example: Black Protest in the 1960's, the rise of consumer culture, domestic art, architecture and suburban planning. Barring duplication of subject, course may be repeated for credit. For details see the coordinator. Prereq: AMST 501, and another AMST course, or permission. Writing intensive.

### **AMST 697 - Seminar in American Studies**

**Credits:** 4.00

Open to qualified juniors and seniors, with permission of the coordinator and the instructor. Intensive study of a specialized topic that varies from year to year. Enrollment in the seminar is limited to 15 so that all students can take an active part in the discussion and work closely with the instructor on their papers. Barring duplication of subject, course may be repeated for credit. For details see the coordinator. Prereq: a grade of B or better in AMST 501, completion of at least two other courses in the minor, permission. Not offered every year.

### **AMST 795 - Independent Study**

**Credits:** 1.00 to 8.00

Open to qualified juniors and seniors. May include fieldwork or an internship at a museum, library, historical society, etc. To be elected only with permission of the coordinator and with qualified supervision. May be repeated up to 8 cr.

### **AMST XXX - Special message place holder**

**Credits:**

## Animal Sciences

### **ANSC 401 - Animals and Society**

**Credits:** 4.00

Through an interdisciplinary and historical lens, students delve into the interaction and interdependence of animals and people, the changes and patterns over time, and the resulting implications for the animal industry and the quality of life for animals, people, and the planet. Topics covered include agricultural production, organic farming, sustainability, global agriculture, Community Supported Agriculture (CSAs), research, nutrition, food safety, genetics, animal health, aquaculture, animal welfare, breeding, recreation, companionship, and the reproduction of domestic animals. What are the major changes in meat consumption by humans? What is the effect of these changes on the environment and large and small farm operations? What are the affects of biotechnological research performed on animals for human benefits? What is the difference between animal welfare and animal rights? Why should we care? In what ways does this affect us?

### **ANSC 402 - Horsemanship**

**Credits:** 3.00

For beginning, intermediate, and advanced riders. Basics of balance seat, specializing in basic dressage and combined training. Limited number of students may stable their horses at the University. Special fee. May be repeated for a maximum of 15 credits. Lab. Prereq: permission.

### **ANSC 403 - Summer Horsemanship**

**Credits:** 1.00

For beginning and intermediate riders. Basics of balance seat, specializing in basic dressage and combined training. There is no lecture with this summer course. Limited number of students may stable their horses at the University. Special fee. May be repeated for a maximum of 18 credits. Prereq: permission.

### **ANSC 406 - Careers in Animal Science**

**Credits:** 1.00

Survey of various areas of animal and veterinary science and opportunities available. Cr/F.

### **ANSC 411 - Freshman Seminar in Equine Science**

**Credits:** 1.00

Seminar format class. This introductory level class provides students with an overview of the equine industry, its economic impact and pressures and the job opportunities available. Class also includes investigation of the requirements and options within the UNH Equine Program and exploration of the opportunities and resources available for students. Cr/F.

### **ANSC 444 - Women and Science**

**Credits:** 4.00

Are men really better than women at science? Were so few scientific achievements attributed to women because so few women participated in science? Were there so few women identified because they produced so little to be significant? Or had women simply not been recognized for their accomplishments in the sciences? This course focuses on the history of women, beginning with the first women scientists to women scientists in the 21st century. In addition this course will explore a variety of topics in multiple disciplines to acquire a better understanding of the issues, including: culture, society, politics, economics, and gender, as well as race, class and sexuality, which have affected the advancement of women in science through the centuries. These issues will be examined to determine where women scientists are at

this point in time and what the future holds for women in the sciences. Writing intensive.

### **ANSC 444A - Animal Ethics: Your Child or Your Pet**

**Credits:** 4.00

Human attitudes toward other animals are generally divided into five categories: animal exploitation, animal use, animal welfare, animal rights, and animal liberation. While all five categories are examined, this course concentrates on the differences between animal welfare and animal rights. These two categories differ fundamentally on the basis of the ethical or moral status they give animals. Past human societies have justified both the worship of animals and the torture and sacrifice of animals to the gods. Animal rights believers rely on a rights-based philosophy, while animal welfare advocates concentrate on a utilitarian based set of values. Course concentrates on the application of these two ethical philosophies to current uses of animals such as the use of animals in research, the use of animals as food (factory farming), the production and use of transgenic animals, and the use of animals as organ donors for humans (xenotransplantation). Since animal rights is, in itself, not a discipline, students depend on information from other disciplines ranging from moral philosophy and ethics to history to genetics, production agriculture, and ethology. Writing intensive.

### **ANSC 444B - Horse Power: Transforming and Reflecting Civilization**

**Credits:** 4.00

Students explore the enduring bond between the horse and man and the effect of that bond on civilization by considering: How has the horse and man's use of the horse shaped civilization and contributed to societal change? How has the progress of civilization and societal change affected the horse and how its role in society? What does our use of the horse say about us as individuals and as a society? Writing intensive. Special fee.

### **ANSC 500 - Methods of Therapeutic Riding**

**Credits:** 4.00

Comprehensive examination of therapeutic riding including types of therapeutic riding and its physical, cognitive, and emotional benefits for clients with a variety of disabilities. Topics include hippotherapy, therapeutic riding, equine-facilitated mental health, youth at risk, therapeutic vaulting, carriage driving, equipment needs/modifications, special considerations for selecting and training the therapy horse, and the role of the volunteer therapist and instructor. Students have the opportunity to work with horses and riders in the UNH Therapeutic Riding Program during labs, as well as view other programs on mandatory field trips. Special fee.

### **ANSC 504 - Equine Science**

**Credits:** 4.00

A fundamental equine science course including anatomy, sports medicine, nutrition and preventative care. Students present oral and written journal reviews on equine science topics pertinent to lecture. Prereq: BIOL 412.

### **ANSC 507 - Scientific Approach to Equine Discipline**

**Credits:** 3.00

Physiological development, control, and education; biting, lunging, driving, and equine gymnastics. Special fee. Lab.

### **ANSC 510 - Integration of Culture and Agriculture in Ireland: Past, Present, and Future**

**Credits:** 2.00 or 4.00

What was the worst natural disaster in 19th century Europe? What characterizes Ireland's agriculture in the 21st century? In this interdisciplinary course, students examine the cultural, historical, political, economical, and religious influences on Ireland's agriculture, fisheries, and forestry. The crowning experience of the course, a 10-day study abroad in late May, provides students with a window to the world as they

experience the culture, agriculture, and topography of Ireland. Students will immerse themselves in local history and culture as they tour working agricultural farms, university research facilities, and cultural landmarks. Permission required. Not open to freshmen. Special fee. Writing intensive. 2 or 4 credits.

### **ANSC 511 - Anatomy and Physiology**

**Credits:** 4.00

Discussion/comparison of the principles of mammalian form and function. Includes molecular and cellular mechanisms of major processes (such as muscle contraction, neural transmission, and signal transduction) and systematic aspects of the nervous, endocrine, cardiovascular, respiratory, gastrointestinal, and renal systems. Prereq: BIOL 411-412. Special fee. Lab. No credit if credit earned for BMS 507-508; ZOOL 518, ZOOL 625 and ZOOL 626. Not open to freshmen.

### **ANSC 512 - Anatomy and Physiology**

**Credits:** 4.00

Discussion/comparison of the principles of mammalian form and function. Includes molecular and cellular mechanisms of major processes (such as muscle contraction, neural transmission, and signal transduction) and systematic aspects of the nervous, endocrine, cardiovascular, respiratory, gastrointestinal, and renal systems. Prereq: BIOL 411-412. Special fee. Lab. No credit if credit earned for BMS 507-508; ZOOL 518, ZOOL 625 and ZOOL 626. Not open to freshmen.

### **ANSC 520 - Classical Dressage Experience in Portugal**

**Credits:** 2.00

Concentrated study of the Portuguese method of classical dressage at L'Escola De Equitaco De Alcinca 'N Alcinca, Portugal. Affords students the opportunity to ride at a premiere center for equestrian art with a master of classical dressage and to experience the culture of Portugal. Offers full immersion in dressage riding, teaching, and training. Trip takes place over Spring Break. Weekly seminar held prior to departure. Special fee. Prereq: ANSC 402: Horsemanship at I-2 level or above. Permission required. May be repeated up to a maximum of 6 credits.

### **ANSC 530 - Dairy Cattle Diseases**

**Credits:** 2.00

Covers the principles of immune response, disease development, immunological basis for disease control, management practices to maintain animal health, and dairy cattle disease identification and prevention.

### **ANSC 543 - Technical Writing in Animal Sciences**

**Credits:** 2.00

Emphasis on writing scientific articles and articles for the end user on subjects pertaining to the animal science industry. Students are expected to make several oral presentations. Resume preparation is also included. Prereq: ENGL 401 or equivalent; permission. Writing intensive.

### **ANSC 565 - Principles of Horse Trials Management**

**Credits:** 2.00

Theory and hands-on involvement in the organizational process of managing an eventing competition. Topics will include budgeting, logistical needs, working with entries, sponsorship, awards, publicity, facilities management, course design and committee management. Students will actively participate in the management and preparation of the UNH Horse Trials, overseeing the committees working in the phases of the event and also performing other responsibilities. 1-credit, half semester course. (During the fall semester, the class will meet for the first half of the semester; during the spring semester, the class will meet for the second half of the semester)

### **ANSC 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Permission of supervising faculty member required. Cr/F.

### **ANSC 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Permission of supervising faculty member required. Cr/F. Writing intensive.

### **ANSC 602 - Animal Rights and Societal Issues**

**Credits:** 4.00

To explore all aspects of human-animal interaction and welfare, emphasizing social, ethical, biological, historical and economic aspects of animal care and use. (Juniors and seniors only.) Special fee. Writing intensive.

### **ANSC 607 - Small Animal Diseases**

**Credits:** 2.00

Common diseases in companion animals; emphasis on canine and feline medicine.

### **ANSC 609 - Principles of Nutrition**

**Credits:** 4.00

Applied animal nutrition and nutrient metabolism. Prereq: one year of chemistry; one semester of physiology.

### **ANSC 612 - Genetics of Domestic Animals**

**Credits:** 4.00

Application of basic and molecular genetics to the diagnosis and control of inherited diseases of domestic animals and application of quantitative genetics for the improvement of economically important traits of farm animals. Prereq: BIOL 411 or permission.

### **ANSC 615 - Dairy Farm Internship**

**Credits:** 14.00

An internship on a commercial dairy farm allowing the student day-to-day management of a herd of Holstein cows health and management (animal and financial) are studied. Homework and monthly exams. Dairy Management majors only. Permission required.

### **ANSC 620 - Equine Diseases**

**Credits:** 4.00

Provides an understanding of the normal versus the abnormal equine including recognition of clinical signs of the abnormal equine., diagnosis and treatment options. Knowledge of when to call a veterinarian and how to administer follow up care. Emphasis on preventative health care. Prereq: ANSC 504. Special fee. (Juniors and seniors only.)

**Co-requisites:**

### **ANSC 640 - Principles of Riding Instruction**

**Credits:** 4.00

Introduction to the principles, theory and practice of Riding Instruction. Includes discussion of styles of learning and instruction as applied to a riding environment, student assessment, skill acquisition, lesson planning, horse selection and principles of group and private riding instruction. Students will use lab time to



observe, assist and practice teaching in sections of ANSC 402, which will be matched according to their abilities and interests. Students will prepare for ARIA licensing examinations as part of class. Fall semester only. Lab. Prereq: ANSC 402 at Intermediate 1 or above, or permission.

### **ANSC 641 - Principles of Dressage Instruction**

**Credits:** 2.00

Advanced principles and theory of dressage and advanced concepts in teaching and coaching dressage. Students will use lab time to observe, assist and practice teaching in dressage-only sections of ANSC 402. Students will prepare for ARIA licensing examinations as part of class. Spring semester only. Lab. Prereq: ANSC 640.

### **ANSC 642 - Principles of Jumping Instruction**

**Credits:** 2.00

Advanced principles and theory of jumping and advanced concepts in teaching and coaching over fences in the arena and cross-country. Students will use lab time to observe, assist and practice teaching in dressage-only sections of ANSC 402. Students will prepare for ARIA licensing examinations as part of class. Spring semester only. Lab. Prereq: ANSC 640.

### **ANSC 643 - Principles of Therapeutic Riding Instruction**

**Credits:** 4.00

Principles and theory of teaching therapeutic riding, including special considerations of teaching in a therapeutic environment and methods of instruction for individuals with a variety of disabilities. Lab consists of observing, assisting and practice-teaching in UNH Therapeutic Riding Program as preparation for NARHA instructor certification process. Spring semester only. Prereq: ANSC 640 and ANSC 500.

### **ANSC 650 - Dairy Industry Travel Course**

**Credits:** 1.00

Extended field trip to a variety of dairy farms and dairy related businesses in the Northeast with students and faculty from other New England land grants. Includes discussion sessions, case study, problem solving, and journal report. Prereq: permission. May be repeated to a maximum of 2 credits.

### **ANSC 694 - Summer Cooperative for Real Education in Agricultural Management**

**Credits:** 4.00

SCREAM (Summer Cooperative for Real Education in Agricultural Management) is a course in which students perform the work and make financial and management decisions associated with the CREAM dairy herd. Students assume complete responsibility for the management and care of the 25-cow herd for the entire summer. SCREAM provides students with a unique experiential learning model that will help them understand how to work together to manage and operate a small business, the decision-making skills required in production agriculture, and the application of science to the management of a dairy herd. Prereq: upper-class standing, permission.

### **ANSC 695 - Supervised Teaching Experience**

**Credits:** 1.00 to 2.00

Participants are expected to perform such functions as leading discussion sections, directing and assisting in laboratories, and assisting students with their problems in courses that participants have completed successfully. Enrollment is limited to juniors and seniors who have a minimum 3.00 cumulative average. Prereq: permission of instructor and department chairperson. May be repeated up to a maximum of 4 credits. Cr/F.

### **ANSC 697 - Equine Seminar**

**Credits:** 1.00

Current equine industry issues, recent literature and research, and professional preparation. Offered to

sophomores and juniors only. Cr/F.

### **ANSC 698 - Cooperative for Real Education in Agricultural Management (CREAM)**

**Credits:** 4.00

CREAM (Cooperative for Real Education in Agricultural Management) is a 2-semester course in which students perform the work and make the financial management decisions associated with the CREAM dairy herd. Students assume complete responsibility for the management and care of the 25-cow herd for the entire academic year. CREAM provides students with a unique experiential learning model that will help them understand how to work together to manage and operate a small business, the decision-making skills required in production agriculture and the application of science to the management of a dairy herd. Two semesters of 4 cr. each are required. Prereq: AAS 244 or ANSC 409/410, or permission.

### **ANSC 701 - Physiology of Reproduction**

**Credits:** 4.00

Comparative aspects of embryology, anatomy, endocrinology, and physiology of reproduction. Lab.

### **ANSC 708 - Ruminology**

**Credits:** 2.00

Anatomy of the ruminant gastrointestinal tract, physiological factors related to rumen function, and microbial metabolism of carbohydrates, protein, and lipids. Prereq: BMS 503 or equivalent.

**Co-requisites:**

### **ANSC 710 - Dairy Nutrition**

**Credits:** 4.00

Feeding management of dairy cattle. Emphasis on feedstuffs, nutritional requirements, and diet formulation for efficient production and optimum health. Prereq: ANSC 609 or NUTR 750; permission.

**Co-requisites:**

### **ANSC 715 - Physiology of Lactation**

**Credits:** 4.00

Examines the biological and biochemical influences of the lactation process. Emphasis on the physiological effects of environments, hormones, and nutrition on milk synthesis and secretion, mammary physiology, and maternal response. Prereq: ANSC 701, permission.

### **ANSC 724 - Reproductive Management and Artificial Insemination**

**Credits:** 4.00

Focus on goals and fundamentals of reproductive management of horses, dairy and livestock animals, and through actual experience, development of competency in performing modern breeding techniques for equine and bovine reproduction. Prereq: ANSC 701; permission. Special fee. Lab.

### **ANSC 725 - Equine Sports Medicine**

**Credits:** 4.00

Course focuses on equine anatomy and physiology in relation to athletic performance and injury. Students write an independent paper assessing the use of an equine heart rate monitor on either a UNH or private horse during the semester. (Juniors and seniors only.) Prereq: ANSC 504, 512, 620. Special fee.

### **ANSC 727 - Advanced Dairy Management I**

**Credits:** 4.00

Advanced management evaluation of milking procedures, reproduction, genetics, herd health, feeding, housing, and milking systems. Prereq: junior or senior standing; permission.

**Co-requisites:**

## **ANSC 728 - Advanced Dairy Management II**

**Credits:** 4.00

Advanced management evaluation of record keeping, financial and business management, personnel management, waste management, and marketing. Prereq: junior or senior standing; permission. Writing intensive.

**Co-requisites:**

## **ANSC 795 - Investigations**

**Credits:** 1.00 to 4.00

Investigations in genetics, nutrition, management, diseases, histology, equestrian management/agribusiness, physiology, cell biology, microbiology, dairy management, or teaching experience. May be repeated up to a maximum of 4 credits. Prereq: permission.

## **ANSC 795W - Investigations**

**Credits:** 1.00 to 4.00

Investigations in genetics, nutrition, management, diseases, histology, equestrian management/agribusiness, physiology, cell biology, microbiology, dairy management, or teaching experience. May be repeated up to a maximum of 4 credits. Prereq: permission. Writing intensive.

## **ANSC 797 - Equine Capstone Experience**

**Credits:** 4.00

This course allows students to review critical professional skills, concepts and theories necessary for success within the equine industry and then to demonstrate competence in these areas, to a panel of equine program faculty. Students also coordinate logistics and content of an outreach Equine Education Day. Successful completion allows students to showcase professional skills and abilities to the non academic equestrian community.

## **ANSC 799 - Honors Senior Thesis**

**Credits:** 1.00 to 4.00

Independent research culminating with a written honors thesis in A) Genetics; B) Nutrition; C) Management; D) Diseases; E) Histology; F) Light Horsemanship; G) Physiology; H) Cell Biology; I) Microbiology; J) Dairy Management. May be repeated up to a maximum of 8 credits. Prereq: permission. IA. Writing intensive.

## **Anthropology**

### **ANTH 411 - Global Perspectives on the Human Condition: An Introduction to Anthropology**

**Credits:** 4.00

By providing a global perspective on the human experience, this course helps us think about the issues that confront students as citizens of the world. Gleaning lessons from cultures past and present this course examines what it means to be human. Whether humans are violent or peace-loving, egalitarian or hierarchical is linked to specific ways of life, rather than reflecting a fixed human nature. The course examines the economic, political, and social forces that shape human behavior and the global forces that people around the world currently confront. From an anthropological perspective it addresses pressing social issues such as sustainable development, hunger and poverty, population growth, religion and changing world views, racism, urbanization, co modification, and movements for social co modification, and movements for social justice

### **ANTH 411H - Honors/Global Perspectives on the Human Condition: An Introduction to Anthropology**

**Credits:** 4.00

By providing a global perspective on the human experience, this course helps us think about the issues that confront students as citizens of the world. Gleaning lessons from cultures past and present this course examines what it means to be human. Whether humans are violent or peace-loving, egalitarian or hierarchical is linked to specific ways of life, rather than reflecting a fixed human nature. The course examines the economic, political, and social forces that shape human behavior and the global forces that people around the world currently confront. From an anthropological perspective it addresses pressing social issues such as sustainable development, hunger and poverty, population growth, religion and changing world views, racism, urbanization, co modification, and movements for social co modification, and movements for social justice. Writing intensive.

### **ANTH 411W - Global Perspectives on the Human Condition: An Introduction to Anthropology**

**Credits:** 4.00

By providing a global perspective on the human experience, this course helps us think about the issues that confront students as citizens of the world. Gleaning lessons from cultures past and present this course examines what it means to be human. Whether humans are violent or peace-loving, egalitarian or hierarchical is linked to specific ways of life, rather than reflecting a fixed human nature. The course examines the economic, political, and social forces that shape human behavior and the global forces that people around the world currently confront. From an anthropological perspective it addresses pressing social issues such as sustainable development, hunger and poverty, population growth, religion and changing world views, racism, urbanization, co modification, and movements for social co modification, and movements for social justice. Writing intensive.

### **ANTH 412 - Broken Pots and Buried Cities: Adventures in Archaeology**

**Credits:** 4.00

Traces the history of archaeology's most spectacular finds and how those moments of adventure and glory developed into a scientific discipline. Provides an introduction to the methods used by archaeologists to recover, analyze, and interpret data in their ongoing effort to understand humanity through the analysis of those small things left behind.

### **ANTH 415 - The Human Story: Evolution, Fossils and DNA**

**Credits:** 4.00

This course uses an evolutionary approach to investigate human biological and bio-cultural variation in time

and space. Through a study of the basics of population genetics, an evaluation of our closest living relatives, nonhuman primates, and an exploration of the biological and cultural pathways traversed by our ancestors to become modern *Homo sapiens*, students learn the depth and complexity of the human story. Laboratory exercises dealing with human genetics, hominin fossils, and evolution are integrated with lectures to give students hands-on learning experience. No credit earned if credit received for ANTH 413

### **ANTH 444 - The Lost Campus: The Archaeology of UNH**

**Credits:** 4.00

In this course, students are active participants in the systematic documentation and examination of the University of New Hampshire's cultural heritage resources. Students are introduced to the practice and process of archaeology through lectures, readings, assignments and hands-on archival research and archaeological fieldwork. Students learn the foundational methods of archaeology including survey, mapping, documentation, excavation, artifact identification, artifact interpretation, and presenting results to the public.

### **ANTH 500 - Peoples and Cultures of the World**

**Credits:** 4.00

A) North America; B) South America; C) Middle East and North Africa; D) Sub-Saharan Africa; E) South Asia; F) Southeast Asia; G) Oceania; I) Caribbean; Z) Other. Characteristic ecological, historical, and socio-cultural factors in the major ethnographic regions of the globe. Analysis of selected societies and institutions. Offered in the following sections as staff is available and student needs dictate. North America: Study of the economy, society, religion, art, and ideas of North American Indians from pre-colonial times to the present. South America: A survey of the indigenous cultures and selected studies of the relationship between environment and culture. Changes in culture and social organizations since the 16th century will be considered where historical data permit. Middle East and North Africa: The role of ecological, social, cultural, and historical factors in shaping Middle Eastern and North African culture today. Special attention will be paid to family, values, and religion; to nomadic, village, and urban ways of life; and to issues of unity, diversity, colonialism, and culture change. Sub-Saharan Africa: Study of Sub-Saharan economy, society, and culture from pre-colonial times to the present. South Asia: Emphasis on India, Sri Lanka, and Nepal. Traditional and changing South Asian cultures, including caste, family, economy, and religious traditions of Hinduism and Buddhism. Southeast Asia: Geographical, historical, ethnic, and socio-cultural factors characteristic of the region. Impact of Indian, Chinese, Islamic, and European civilizations. Analysis of selected indigenous social, political, economic, and religious institutions. Oceania: Study of the economy, society, religion, art, and ideology of Pacific Island cultures from pre-colonial times to the present. Caribbean: The history and contemporary situation of diverse cultures of the Caribbean are examined using ethnography, music, and film. The mixture of cultural roots from Africa, Europe, and Asia are investigated and the dynamic and fluid nature of these cultures is stressed. Race as an experience of oppression and resistance is discussed.

### **ANTH 500W - Peoples and Cultures of the World**

**Credits:** 4.00

A) North America; B) South America; C) Middle East and North Africa; D) Sub-Saharan Africa; E) South Asia; F) Southeast Asia; G) Oceania; I) Caribbean; Z) Other. Characteristic ecological, historical, and socio-cultural factors in the major ethnographic regions of the globe. Analysis of selected societies and institutions. Offered in the following sections as staff is available and student needs dictate. North America: Study of the economy, society, religion, art, and ideas of North American Indians from pre-colonial times to the present. South America: A survey of the indigenous cultures and selected studies of the relationship between environment and culture. Changes in culture and social organizations since the 16th century will be considered where historical data permit. Middle East and North Africa: The role of ecological, social, cultural, and historical factors in shaping Middle Eastern and North African culture today. Special attention will be paid to family, values, and religion; to nomadic, village, and urban ways of life; and to issues of

unity, diversity, colonialism, and culture change. Sub-Saharan Africa: Study of Sub-Saharan economy, society, and culture from pre-colonial times to the present. South Asia: Emphasis on India, Sri Lanka, and Nepal. Traditional and changing South Asian cultures, including caste, family, economy, and religious traditions of Hinduism and Buddhism. Southeast Asia: Geographical, historical, ethnic, and socio-cultural factors characteristic of the region. Impact of Indian, Chinese, Islamic, and European civilizations. Analysis of selected indigenous social, political, economic, and religious institutions. Oceania: Study of the economy, society, religion, art, and ideology of Pacific Island cultures from pre-colonial times to the present. Caribbean: The history and contemporary situation of diverse cultures of the Caribbean are examined using ethnography, music, and film. The mixture of cultural roots from Africa, Europe, and Asia are investigated and the dynamic and fluid nature of these cultures is stressed. Race as an experience of oppression and resistance is discussed. Writing intensive.

### **ANTH 501 - World Archaeological Cultures**

**Credits:** 4.00

The development of prehistoric cultures worldwide offered in the following sections: A) North America; B) Mesoamerica; C) South America; D) Near East; E) Other. North America: from earliest settlement to European contact, includes Eastern Woodlands, The Plains, and the Southwest. Mesoamerica: from earliest cultures through Spanish conquest, includes the Olmec, Maya, and Aztec civilizations. South America: Cultural development from earliest migrations to the Inca Empire. Near East: from earliest agricultural villages to the world's first civilizations.

### **ANTH 511 - Core Concepts in Anthropology**

**Credits:** 4.00

This course introduces students to the core concepts and paradigms of contemporary anthropology. Students will learn how anthropology approaches the study of family, kinship, community, gender, economic relationships, political systems, religion, social change and globalization. Ethnographic material from a variety of cultures will illustrate the concepts of social structure and the cultural construction of categories such as race and ethnicity. Foundation course required of anthropology majors in first year of declaring their major. Writing intensive.

### **ANTH 513 - Ethnographic Methods**

**Credits:** 4.00

This class introduces students to a number of ethnographic methods both as technology of conducting ethnographic research and as theory of ethnographic practice. This is an experience-based course; the students are expected to rigorously engage in learning about ethnographic methods not only through reading and discussion, but mainly through their practice. All cultural anthropologists and some representatives of other disciplines participate in ethnographic research throughout their careers. The course provides students with information and experience that informs and guides their future knowledgeable and reflexive ethnographic research.

### **ANTH 514 - Method and Theory in Archaeology**

**Credits:** 4.00

Basic method and theory; techniques in recovering and interpreting data; laboratory exercises in ceramic and lithic analysis. Critical evaluation of archaeological literature. Prereq: ANTH 412 or permission.

### **ANTH 515 - Anthropology and Contemporary Issues**

**Credits:** 4.00

Anthropological approaches to current world issues such as racism, poverty, religious movements, revolution, and environmental stress. Selected topics examined in the context of both western and nonwestern societies.

### **ANTH 520 - Anthropology of Migration**

**Credits: 4.00**

The question of immigration, an issue of great concern throughout the world, is addressed along with the movement of people as a historical, economic, and cultural process. Life experiences of people in motion are examined. Using case studies, past and present migrations are compared. The racial, ethnic, and national identities of migrants are explored. Distinctions between immigrants, refugees, sojourners, internal and international migration, and legal and undocumented migrants, as well as the history and current status of attacks on immigrants are critiqued. While most of the course material is drawn from the U.S. experience, the perspective on migration is global.

**ANTH 597 - Special Topics****Credits: 4.00**

Occasional and experimental offerings on an entry level. May be repeated for different topics.

**ANTH 601 - Topics in Popular Culture****Credits: 4.00**

This course explores the anthropology of popular culture using film, novels, and other media as well as widely disseminated texts. The course focuses on myths about culture and human behavior which become part of the global cultural mainstream, and counterposes popular stereotypes with data from cultural anthropology and archaeology. A) Native Americans and Popular Culture B) Archaeology and Popular Culture C) Popular Culture and Physical Anthropology D) Poverty and Popular Culture E) Gender and Popular Culture F) Other. May be repeated but not in duplicate areas.

**ANTH #610 - Medical Anthropology: Illness and Healing****Credits: 4.00**

How we as humans define sickness and health, our theories of who or what made us ill, our approach to biological processes from birth to death and our search for cures have varied through history and from culture to culture. This course provides an overview of illness and healing beliefs and practices in different cultures both around the world and in the United States. The course examines the practices and belief systems of healers, voodoo priestesses, midwives, Taoist priests, psychiatrists and medical doctors through the same analytical lens. Operates on a seminar format.

**ANTH #610W - Medical Anthropology: Illness and Healing****Credits: 4.00**

How we as humans define sickness and health, our theories of who or what made us ill, our approach to biological processes from birth to death and our search for cures have varied through history and from culture to culture. This course provides an overview of illness and healing beliefs and practices in different cultures both around the world and in the United States. The course examines the practices and belief systems of healers, voodoo priestesses, midwives, Taoist priests, psychiatrists and medical doctors through the same analytical lens. Operates on a seminar format. Writing intensive.

**ANTH 611 - History of Anthropological Theory****Credits: 4.00**

Provides a grounding in the history of social thought in cultural anthropology and sister disciplines from 19th century evolutionism to the present. Course reading is based on primary sources - original essays written by theorists central to the discipline. Assessment is partly based on students' ability to apply theoretical concepts to novel contexts, as well as the ability to evaluate and compare theories on the basis of logic and evidence.

**ANTH 616 - Religion, Culture, and Society****Credits: 4.00**

Major anthropological theories of religion; analysis of religious beliefs as symbolic systems and their interrelations with ritual and other social institutions. Detailed study of specific religions. Operates on a

seminar format. Writing intensive.

### **ANTH 618 - Political Anthropology**

**Credits:** 4.00

Political processes and structures in nonindustrial societies. Major topics: centralization of power and authority, legal systems, and warfare. Prereq: ANTH 411 or permission.

### **ANTH 625 - Sexuality in Cross-Cultural Perspectives**

**Credits:** 4.00

This course examines the ideologies and practices associated with sexuality from a broad perspective that incorporates diverse case studies from the ethnographic record. Working from the argument that much of human sexual behavior is culturally constructed rather than biologically determined, the course invites students to expand their notion of the "normal" and to consider the human condition from a cross-cultural perspective. Topics discussed include cross-cultural varieties of transgendered experience, same-sex sexualities, and heteronormative identities.

### **ANTH #627 - Urbanization in Africa**

**Credits:** 4.00

Explores the process of urbanization and describes the creation of urban culture in sub-Saharan Africa by investigating the effects of urbanization on socio-economic and cultural conditions. An attempt is made throughout the course to study urbanization and urban life within the context of broader societal, economic, cultural, and political relations in order to understand the dynamics inherent in these processes. Urbanization is discussed in the context of colonialism, post-colonialism, and other social relations of dependency that continue to shape urban life and urban-rural relations.

### **ANTH 670 - Language and Culture**

**Credits:** 4.00

Investigates the relationship between language and culture and how their interpenetration produces meaning. Special attention to the issues of class, gender, and ethnicity and the ways in which inequality is maintained through culturally patterned speech styles and associated prejudices. Speech communities in the United States are emphasized.

### **ANTH 674 - Archaeological Survey and Mapping in Belize**

**Credits:** 4.00

Involves hands-on training in field reconnaissance, survey and mapping of archaeological sites, and the use of ARCGIS mapping software. This field course takes place in Belize (Central America) and will be of interest to students studying anthropology, geography and geospatial technologies, among others. Special fee.

### **ANTH 675 - Archaeol Field School Belize**

**Credits:** 8.00

The Archaeological Field School in Belize is an intensive, four-week summer program focused on the ancient Maya civilization in the eastern Belize River valley in Central America. Project participants will map and excavate archaeological sites and receive hands-on training in field and lab methods. Students will be graded on their participation, their submission of a field notebook, an exam based on readings and nightly lectures, and a final written report based on original field research. Special fee

### **ANTH 680 - Globalization, Development, and Poverty**

**Credits:** 4.00

This course considers the phenomenon of globalization, a term that has come into use since the 1980s to describe the ever-intensifying networks of cross-border human interaction which increasingly tie the world together. Tracing the relationship between the increasing interconnectedness of the world, the processes



of economic development and change, and world poverty, the course demonstrates that the consequences of globalization are neither the same nor positive in every country. Through the use of case studies of different development processes, students gain an understanding of why and how globalization is creating differential effects in different parts of the world. This course is the first course of a suggested two course sequence, ANTH 680 and ANTH 780. Writing intensive.

### **ANTH 685 - Gender, Sexuality and HIV/AIDS in Sub-Saharan Africa**

**Credits:** 4.00

AIDS is spreading rapidly in sub-Saharan Africa. Course explores the factors that are behind this rapid transmission, including poverty, gender inequality, culture and sexuality. Operates on a seminar format. Writing intensive.

### **ANTH 690 - Ethnographic Field Research**

**Credits:** 4.00

Explores history, theory, and practice of ethnographic research. Students read and practice such techniques as mapping, taking life histories, compiling genealogies, and analyzing use of space, language, and rituals. Each student also carries out, writes up, and presents an independent research project. Prereq: ANTH 411 or SOC 400; one 500-level or higher anthropology or sociology course; or permission. No credit for students who have completed ANTH 630. Operates on a seminar format. Writing intensive.

### **ANTH 695 - Globalization and Global Population Health**

**Credits:** 4.00

This course considers the phenomenon of globalization and its impact on health of populations across cultures and nations. The term globalization has come into use since the late 1980's to describe the over-intensifying network of cross border human interaction that increasingly ties the world together. At most abstract level, globalization is characterized by vast constant movement of capital goods and jobs across borders usually under decisions made by multinational corporations and global financial lending institutions. Studies show that this process of social change tends to increase economic opportunities but without distributing them equally with deleterious consequences on people's health. Writing intensive.

### **ANTH 697 - Special Topics**

**Credits:** 4.00

Occasional or experimental offerings. May be repeated for different topics. Prereq: ANTH 411 or permission. Operates on a seminar format. Writing intensive.

### **ANTH 698 - Folklore and Folklife**

**Credits:** 4.00

Examines the materials and methods used to study folklore and folklife, emphasizing the historical context and development of folklore studies in North America and Europe, field research, performance theory, and other topics. (Also offered as ENGL 732.) Operates on a seminar format. Writing intensive.

### **ANTH 699 - Senior Thesis**

**Credits:** 4.00 or 8.00

Independent work in the library or field; recommended for, but not confined to, majors intending to pursue graduate studies; required for honors candidates. Contact staff to obtain approval and arrange supervision prior to senior year. 4 or 8 credit 2 semesters, 8 credits required for honors; an IA grade (continuous course) given at end of first semester. Writing intensive.

### **ANTH 699H - Honors Senior Thesis**

**Credits:** 4.00 or 8.00

Independent work in the library or field; recommended for, but not confined to, majors intending to pursue graduate studies; required for honors candidates. Contact staff to obtain approval and arrange supervision

prior to senior year. 4 or 8 credit 2 semesters, 8 credits required for honors; an IA grade (continuous course) given at end of first semester. Writing intensive.

### **ANTH 700 - Internship**

**Credits:** 1.00 to 4.00

Provides student with supervised practical experience in anthropology in one of the following areas: A) professional or community support work within an academic or applied anthropology setting; B) teaching; C) museum work; D) archaeological laboratory or fieldwork; E) research on a faculty research project; F) editorial work on a journal or faculty book project. May be repeated up to 8 credits. Prereq: permission.

### **ANTH 705 - Topics in Mesoamerican Anthropology**

**Credits:** 4.00

Examines the very origins of civilization in the New World by first focusing on the domestication of staple food crops and the development of inequality and carefully tracing the ever increasing socio-political complexity displayed by early Mesoamerican peoples. Includes the successive rises of the Olmec, the Zapotec, the Preclassic Maya and Teotihuacan in an effort to understand the mechanisms driving the development of agricultural intensification, economic specialization, long-distance trade networks, and the institution of divine kingship. Operates on a seminar format, open only to juniors and seniors.

### **ANTH #720 - Roots and Routes: Migration and Globalization**

**Credits:** 4.00

Migrations are changing the nature of national identities, cultures, and concepts of citizenship. Many migrants live their lives across borders, keeping their homeland identities while becoming significant actors in their new lands. At the same time, people who are the descendants of immigrants are exploring their family genealogies and discovering their roots. In this course we ask why migration is a global phenomenon, who is moving, and why. The course compares the new migrations and life experiences of migrants to the migration of the previous few centuries as a way of highlighting the nature of contemporary migration and globalization. We link migration to disparities of wealth and power within and between states. Prereq: sophomore level, ANTH 411 or an introductory-level course in social science or history. Operates on a seminar format, open only to juniors and seniors.

### **ANTH 730 - Anthropological Thinking on Education**

**Credits:** 4.00

Course introduces the students to key anthropological concepts that, taken together, underpin anthropological thinking on education. The concepts are Culture (Geertz, White), Evolution (Morgan Steward), Function (Malinowski, Radcliffe-Brown), Interpretation (Geertz, Turner), Feminism and Postmodernism (Leacock, Rosaldo) and Process (Bailey, Vincent). The course analyzes and synthesizes them into a conceptual framework by which to understand human behavior, activity, production and reproduction in formal education.

### **ANTH 740 - Teaching Race**

**Credits:** 4.00

How do we teach about race? What are schools and universities communicating about the meanings of racial ascription, of color and whiteness? How can we best use the power of educational institutions to further the struggles for equality and racial justice? And how can we do this in ways that constructively educate all our students? This course brings together prospective teachers and other students interested in human relations to discuss ways of combining the insights of new scholarship on race with personal experiences and challenges in the classroom to address these questions.

### **ANTH #770 - Anthropology of the Sinister**

**Credits:** 4.00

Examines narratives of the sinister--stories about witches, demons, vampires, extraterrestrials, and so on--

that are told as if true, and the cultural, political, and economic contexts of their production. Variants of the sinister are compared cross-culturally and trans-historically. Links between a recent worldwide upsurge in narratives of the sinister and the processes of globalization and modernity are emphasized. Operates on a seminar format; open only to juniors and seniors. (Also listed as RS 770).

### **ANTH 785 - The Anthropology of Dreams and Dreaming**

**Credits:** 4.00

This course emphasizes the "dream theories" of indigenous societies and how beliefs and practices associated with dreaming are integrated into cultural, ontological, political, economic, and religious systems. Western theories are also examined from within a comparative perspective--from basic Freudian models to contemporary scientific debates about the neurological origin and significance of dreaming.

### **ANTH 795 - Reading and Research**

**Credits:** 1.00 to 8.00

A) Cultural/Social Anthropology; B) Anthropological Linguistics; C) Archaeology; D) Physical Anthropology. Prereq: 12 credits of anthropology; permission.

### **ANTH 796 - Reading and Research**

**Credits:** 1.00 to 8.00

A) Cultural/Social Anthropology; B) Anthropological Linguistics; C) Archaeology; D) Physical Anthropology. Prereq: 12 credits of anthropology; permission.

### **ANTH 797 - Advanced Topics**

**Credits:** 4.00

Advanced or specialized courses presenting material not normally covered in regular course offerings. May be repeated, but not in duplicate areas. Course descriptions on file in the department office during registration. A) Social Organization; B) Economic Anthropology; C) Anthropology of Religion; D) Political Anthropology; E) Social Impact Analysis; F) Cultural Ecology; G) Prehistoric Archaeology; H) Historic Archaeology; I) Cultural Resources Conservation; J) Lithic Analysis; K) Ceramic Analysis; L) Faunal Analysis; M) Human Evolution; N) Human Variations; O) Anthropological Theory. Prereq: ANTH 411 or 412 (as appropriate)/ or permission. Operates on a seminar format, open only to juniors and seniors.

## Applied Animal Science

### **AAS 200 - Logging with Oxen and Draft Horses**

**Credits:** 2.00

This hybrid course combines on-line readings and lectures with an off-campus intensive experience at a NH working farm. It provides training for students in small woodlot harvesting for firewood and lumber. Forestry skills are combined with a unique hands-on logging experience with oxen and draft horses. Students study the history of logging, harvesting techniques and also learn to harness, feed and care for draft animals during the intense farm-forest experience. Special fee.

### **AAS 218 - Formulating Career Paths in Small Animal Care**

**Credits:** 1.00

Students develop, explore, and plan a variable career path in a specific small animal care career obtainable with their applied animal science degree.

### **AAS 219 - Animal Cruelty: NH Laws, Investigations, and Prosecution**

**Credits:** 1.00

An Internet class delivered through Blackboard Course Management System. Explains and discusses all aspects of animal cruelty, NH cruelty laws, and presents the importance and implications of recognizing animal cruelty and its link to human violence. Cruelty investigation procedures, prosecution protocol and officer field safety will also be presented. Designed as a 14-week class with a "presentation" of one hour per week accessed by the student at their convenience within a specific 3-day time frame during the week. Permission required.

### **AAS 222 - Small Animal Grooming I**

**Credits:** 2.00

Introduction to pet grooming. Course covers the techniques and styles of brushing, grooming, clipping, trimming, and bathing common breeds of dogs and cats. Students perform basic grooming in lab period. Special fee for non-TSAS students. May be repeated to a maximum of 4 credits. 1 lec/1 lab.

### **AAS 224 - Small Animal Management**

**Credits:** 3.00

Organization, care, facilities design, and general management of small businesses dealing with companion animals and their owners. 3 lec/1 lab.

### **AAS 225 - Canine Learning Theory and Application**

**Credits:** 3.00

Canine behavior problems are a major cause of abandonment and euthanasia in dogs. Effective application of canine learning theory can prevent and solve behavior problems and save lives. Student gain a working knowledge of animal learning theory with a focus on training basic obedience commands, prevention and modification of common canine behaviors, effective human communication within a practical canine training session, canine ethology, the business and ethics of dog training, and more.

### **AAS 227 - Small Animal Diseases**

**Credits:** 2.00

Common diseases in companion animals discussed system by system; emphasis on canine and feline medicine. Prereq: AAS 227, 228, 239, 249. 2 1-hr lec.

### **AAS 228 - Anatomy and Physiology of Domestic Animals**

**Credits:** 4.00

Structure of the body and functions of the tissues, organs, and systems in the living animal. 3 lec/1 lab.

### **AAS 230 - Small Animal Breeds and Behavior**

**Credits:** 4.00

Overview of the development, selection, genetics, and function of specific breeds of companion animals. General dog and cat, as well as breed-specific, behavior is included. 2 lec/1 lab.

### **AAS 231 - Introduction to Animal Science**

**Credits:** 4.00

Survey of the dairy, equine, livestock, and small animal industries; current issues and related occupational opportunities are presented. Included is assistance in gaining or improving the skills needed to be successful in college. Lecture/Lab or Recitation.

### **AAS 233 - Small Animal Grooming II**

**Credits:** 2.00

Continuation of AAS 222 Small Animal Grooming I. Student is assigned more complex breeds to groom and develops more proficiency in scissoring, hand stripping and clipping. Must have taken AAS 222. Special fee for non-TSAS students. 2 lab.

### **AAS 236 - Equine Show Preparation and Competition**

**Credits:** 1.00

Course addresses the safe handling and appropriate grooming and clipping of horses as they are prepared for competition. Students will demonstrate horse-handling proficiency while showing their assigned horse in hand. May be repeated to a maximum of 4 credits. Lec/Lab.

### **AAS 238 - Equine Handling/Longeing**

**Credits:** 1.00

This seven-week intensive course provides students with the opportunity to learn to longe a variety of University horses in an enclosed arena under private instruction that stresses the safety and welfare of the horse and handler. Proper equipment and fit are addressed along with different training techniques used to improve the horse's quality of movement. Prereq: AAS 236.

### **AAS 242 - Introduction to Business: Applied Animal Science**

**Credits:** 2.00

Basic course covering business structure, philosophy, and terminology. Foundation for AAS 246, Animal Business Applications. 2 lec.

### **AAS 244 - Introduction to Dairy Herd Management**

**Credits:** 4.00

The course explores economic, scientific and practical aspects of dairy herd management. The topics covered include history, cattle selection, nutrition, housing, milking, and disease prevention strategies. There are a number of field trips and weekly labs emphasizing management and hands-on experience. (Also offered as ANSC 409/410.)

### **AAS 249 - Clinical Animal Nursing Techniques I**

**Credits:** 3.00

Essential skills and basic background knowledge for the care of small animals, focusing on dogs and cats. Animal handling and restraint, basic nursing skills including physical examination, medicating, bandaging and wellness protocols. 1 lec/1 lab.

### **AAS 250 - Clinical Animal Nursing Techniques II**

**Credits: 3.00**

Builds on materials presented in AAS 429, Clinical Animal Nursing Techniques I. Covers veterinary surgical nursing including patient preparation, monitoring and recovery, and surgical equipment and instrument care, imaging modalities including radiographic and ultrasonographic techniques and safety, nursing care of hospitalized patients, and ethical and professional issues.

**AAS 251 - Human/Animal Bond****Credits: 2.00**

Explores the many aspects of the human/animal bond through required reading, writing, and discussions. Requires an 8 hour volunteer practicum.

**AAS #254 - Animal Assisted Activities and Therapy****Credits: 2.00**

Course explores the human/animal bond in specifically goal directed activities and therapeutic interventions. Covers human/pet volunteer training; animal selection; animal assisted therapeutic applications; and animals in institutions, residential facilities, and classrooms. The text for the class is provided and covered by the special fee of \$25.00.

**AAS 258 - Animal Population Medicine and Management****Credits: 2.00**

This course applies material from animal health and disease classes to populations of animals rather than individual animals. Topics include stress and disease management, behavior and ethical problems in animal populations, evaluation of scientific research, and decision analysis. Concepts in epidemiology and statistics are covered. Students design and carry out a statistical analysis on data from a chosen animal population. Prereq: AAS 228, AAS 439, MTH 202.

**AAS 263 - Small Animal Grooming III****Credits: 1.00**

Individual supervised grooming experience for students who wish to obtain more technical grooming skills. Must have taken AAS 222 twice or AAS 222 and 233. Cr/F.

**AAS 264 - Dairy Nutrition Practicum****Credits: 1.00**

Practical instruction in feeding dairy cattle, formulating rations and using dairy nutrition software. Major emphasis on ruminant digestion, health and metabolism in the high producing dairy cow. Prereq: Introduction to Dairy Management AAS 244 or permission.

**AAS 272 - Comparative Equine Operations****Credits: 1.00**

Exploration of regional equine farms and related businesses. Using field trips and journals, students will experience and study different farm and business operations. Prereq: AAS 226. 1 lab. May be repeated to a maximum of 2 credits. Cr/F.

**AAS 275 - Cooperative for Real Education in Agriculture Management (CREAM)****Credits: 4.00**

CREAM (Cooperative for Real Education in Agricultural Management) is a 2-semester course in which students perform the work and make the financial and management decisions associated with the CREAM dairy herd. Assumption of complete responsibility for the management and care of this 25-cow herd for the entire academic year. CREAM provides students with a unique experiential learning model that will help them understand how to work together to manage and operate a small business, the decision making skills required in production agriculture, and the application of science to the management of a dairy herd. Two semesters of 4 credits each are required. Prereq: AAS 244 or ANSC 409/410 or permission.

### **AAS 276 - Introduction to Laboratory Animal Science**

**Credits:** 2.00

Basic introduction to laboratory animal science for second year small animal care students interested in exploring or working in the field. Includes the husbandry, health, and science of common laboratory animal species and environmental, sanitation, hygiene, and safety topics. Prereq: AAS 228, 230, 239, and 249. 2 lec.

**Co-requisites:** AAS 277

### **AAS 277 - Laboratory Animal Science Practicum**

**Credits:** 1.00

Hands-on experience working in the UNH laboratory animal facilities. Coreq/Prereq: AAS 276. May be taken twice. 3 to 4 hours per week.

### **AAS 279 - Small Animal Care Practicum**

**Credits:** 2.00

Provides supervised, hands-on experience at the N.H.S.P.C.A. 4 hours/week. Responsibilities include cleaning, feeding, treatment, grooming, socializing and training of shelter animals. Student must receive or show proof of pre-exposure rabies prophylaxis to take the class. Prereq: AAS 222, AAS 228, AAS 230, AAS 239, AAS 249. Special fee required only for first time the course is taken

### **AAS 291 - Studies**

**Credits:** 1.00 to 3.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include dairy, light horses, livestock, poultry, meats, forages, management, small animals, or general animal science. Permission required. Course may be repeated up to a maximum of 6 credits.

### **AAS 292 - Studies**

**Credits:** 1.00 to 3.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include dairy, light horses, livestock, poultry, meats, forages, management, small animals, or general animal science. Permission required. Course may be repeated up to a maximum of 6 credits.

### **AAS 293 - Equine Field Operations**

**Credits:** 1.00 to 3.00

Field experience in selected areas of equine care and handling, under supervision of appropriate faculty/staff and outside facilities supervisor. A) Veterinary Clinic; B) Breeding and Foaling; C) areas of student interest. All field operations done on an individual basis. Four or more hours per week. Students must provide their own transportation. Prereq: AAS 225, 226, 247, and/or permission of instructor and adviser.

### **AAS 297 - Applied Animal Science Work Experience**

**Credits:**

Employment (12 weeks, generally in the summer following the first year) in an approved animal-related

position. Cr/F.

### **AAS 402 - Introduction to Livestock and Poultry Management**

**Credits:** 2.00

Students are introduced to the management of livestock and poultry in small-to-medium sized operations. Students learn basic animal feeding, selection, handling, housing, management and health practices necessary to manage livestock and poultry. Through readings, multi-media presentations, writing and field assignments, students gain insight into the work, commitment and skills necessary to raise domestic farm animals for food and profit.

### **AAS 421 - Large Animal Behavior and Handling Techniques**

**Credits:** 2.00

Introduction to domestic large animal behavior and handling techniques. Cattle, horses, swine, and sheep are used in this course. Students perform routine health-related procedures and gain valuable hands-on skills and techniques which can be applied to the fields of veterinary medicine, animal research, commercial agriculture, and animal control. 1 lec/1 lab.

### **AAS 423 - Dairy Selection**

**Credits:** 2.00

Selection techniques used in cattle for purchase, breeding, and genetic improvement through the use of visual evaluation, pedigrees, production, and progeny information. 1 lec/1 lab.

### **AAS 425 - Introduction to Dairy Herd Management**

**Credits:** 4.00

The course explores economic, scientific and practical aspects of dairy herd management. The topics covered include history, cattle selection, nutrition, housing, milking, and disease prevention strategies. There are a number of field trips and weekly labs emphasizing management and hands-on experience.

### **AAS 426 - Equine Conformation and Lameness**

**Credits:** 4.00

The study of conformation as it relates to soundness and performance. Topics include basic unsoundness related to faulty conformation and type evaluation. Special fee. 2 lec/1 lab.

### **AAS 432 - Introduction to Forage and Grassland Management**

**Credits:** 3.00

Introduction to grasslands of the world and their management. Special emphasis on the identification, production, and utilization of New England forage crops for feeding domestic farm animals. The course includes the selection of local plant species and varieties, including their management and recommended harvesting practices. The course also includes a basic introduction to soils, as well as nutrient and fertility management.

### **AAS 434 - Equipment and Facilities Management**

**Credits:** 3.00

Operation of agricultural equipment and maintenance of agricultural facilities as found in New England. Development of the essential skills and technical information needed to manage and supervise agricultural facilities and equipment. 2 lec/1 lab.

### **AAS 435 - Animal Nutrition**

**Credits:** 3.00

The food nutrients, their digestion and absorption, factors affecting value of feeds, feed additives, and nutrient requirements for maintenance and productive functions. 3 lec.



### **AAS 437 - Equine Handling and Care Techniques**

**Credits:** 4.00

Course familiarizes students with different aspects of equine management through a practical and hands-on approach. Topics include selection, fit and care of English tack, bits, grooming, clipping, wound care, safe bandaging techniques, equine behavior, farm layout, basic health care and monitoring, parasite control, and equine transportation. Students will have hands-on experience in the UNH stable. Responsibilities include feeding, cleaning, turnout, and basic care of the University herd. 4 lec/lab or rec.

### **AAS 439 - Fundamentals of Animal Health**

**Credits:** 3.00

Principles of disease mechanisms: causes, body reactions, and preventive medicine. Prerequisite for other AAS disease courses. Prereq: AAS 228. 2 lec/1 lab.

### **AAS 440 - Animal Breeding**

**Credits:** 3.00

Principles and practices, including the physiology of reproduction, fertility and sterility, artificial insemination, breeding systems, and selection. 2 lec/1 lab.

### **AAS 546 - Animal Business Applications**

**Credits:** 4.00

Survey of the various elements of managing an animal and/or agricultural operation regardless of commodity. Topics include: financial statements, credit and interest, insurance considerations, labor management, marketing, promotions, advertising, and sales. 4 lec. Prereq: AAS 242 or ECON 401.

### **AAS 547 - Applied Equine Management**

**Credits:** 3.00

The application of farm and horse management techniques, including stable routine, planning, and design; nutrition; business considerations; and legal responsibilities. 2 lec/1 lab. Pre- or Coreq: AAS 246 or AAS 546.

### **AAS 552 - Equine Health Management**

**Credits:** 4.00

Systems of the horse as they relate to common diseases and lameness. Applied approach to conditioning, care of the sick or lame horse, and preventive care. 2 lec/1 lab. Prereq: AAS 426 or AAS 437.

### **AAS 553 - Equine Competition Management**

**Credits:** 2.00

Students organize and run a combined test competition to be held in April. The class is responsible for mailing entries, handling publicity and ad sales, compiling the program, setting the course and dressage ring, and dealing with the public. Proceeds fund seminars available to students and class field trips. May be repeated once. 1 lab. Prereq: AAS 426 or AAS 546.

### **AAS 574 - Dairy Cattle Disease Seminar**

**Credits:** 2.00

Covers principles of the immune response, immunological basis for disease control, and emphasizes management practices to prevent disease and maintain optimal animal health. Numerous guest lecturers, field and case studies, and emphasis on current topics of interest to the industry. (Also offered as ANSC 530.)

## Applied Business Management

### **ABM 202 - Professional Writing**

**Credits:** 3.00

The major focus is on strategies in writing and speaking as related to day-to-day business operations. Applications relate to employees, suppliers, customers, creditors, public officials, and others. 3-hr lec-discussion.

### **ABM 205 - Applied Financial Accounting**

**Credits:** 4.00

Learn the basics of sound bookkeeping practices as they apply to any retail, service, or manufacturing entity. Topics include: debiting and crediting, trial balance, worksheets, ledgers and journals, and checkbook reconciliation. Students perform all of the necessary bookkeeping transactions for an actual business. 3-hr lec/2-hr lab.

### **ABM 208 - Managerial Accounting**

**Credits:** 4.00

Upon successful completion of Applied Financial Accounting (ABM 205), students now focus on the decision-making aspects of financial management, primarily for internal use by managers. Topics include: both short- and long-term considerations in areas such as budgeting, inventory control, capital investments and depreciation, tax strategies, interpretation of financial statements, profitability analysis, cash flow management, standard cost accounting, manufacturing accounting, and other cost accounting techniques. 3-hr lec. 2-hr lab.

### **ABM 210 - Operations Management**

**Credits:** 4.00

This business elective for second year students focuses on the location and layout of service, retail and manufacturing enterprises with an emphasis on efficiency, safety, cost control and customer satisfaction/profit maximization. Lecture.

### **ABM 211 - Business Policy**

**Credits:** 4.00

Through use of case studies from existing businesses, the organization and execution of a student-run business, students now bring together and apply all they have learned throughout the program. This course also features an Executive Speaker Series and a community service component. This unique and experiential final-semester course allows the individual to see how all of the parts make up the whole and to achieve a higher level of self-confidence, self-esteem, and hands-on abilities. 2 2-hr lec-discussion.

### **ABM 212 - Business and Industry Internship**

**Credits:** 1.00 to 4.00

Students work and/or complete research projects with business and industry partners under the supervision of faculty; an excellent experiential opportunity. The specific content of each internship will vary tremendously and is unique to each project. Sample focus areas include, but are not limited to, marketing and sales, financial management, personnel management, international trade and operations. Course may be repeated up to a maximum of 8 credits. Cr/F.

### **ABM 214 - Applied Sales**

**Credits:** 4.00

Focuses on the process of personal selling and persuasion skills. Students spend considerable time

practicing their techniques and working with (and observing) professional sales associates in the workplace. Selling involves the pre-approach, approach, demonstration, handling of objections, and closing the sales and follow-up. Also presents and discusses the roles of the sales manager and related financial elements. 2 2-hr lec-discussion.

### **ABM 215 - Business and the Community**

**Credits:** 4.00

Successful business people must understand the relationship between business and community. The course will explore the role of business and entrepreneurs within the community and the role of the community in developing a successful business environment. An overview of the regulatory environment will be investigated; such as zoning regulations and other constraints on private decisions. This will be accomplished through lectures, guest lecturers, site visits and a group project. The group project will be a substantial part of the course. This will enable students to apply the principles as well as to experience working in a team environment. 2 2-hr lec.

### **ABM 221 - Seminar in Marketing and Sales**

**Credits:** 1.00

Marketing and sales techniques for the small business manager, salesperson, or entry-level marketing department employee. Topics include market segmentation; product pricing and differentiation; prospecting, approaching, presenting, and closing of a sale. No credit for students taking ABM 214 or FSM 240. 1st quarter module.

### **ABM 223 - Seminar in Human Resource Management**

**Credits:** 1.00

Human resource management for small business managers and middle managers in larger firms. Topics include motivation, recruiting, training, and conflict management. No credit for students taking ABM 206. 3rd quarter module.

### **ABM 224 - Seminar in Financial Management**

**Credits:** 1.00

Financial statement preparation and analysis for merchandising and service firms. Tailored to small-business managers and middle managers of larger businesses. No credit for students taking ABM 205. 4th quarter module.

### **ABM 225 - Senior Project**

**Credits:** 4.00

Independent study project and research paper relating to a specific management problem. Topic selected by student and adviser. Student must complete 15 weeks of work experience either prior to or during the senior project.

### **ABM 226 - Business Computer Applications**

**Credits:** 4.00

Trains students to use common software as an effective tool to answer business questions and solve complicated problems. Microsoft Office programs including Excel, Access, and Powerpoint are used. Microsoft Office is the standard for almost all business operations and will be helpful in other TSAS courses like Managerial Accounting and Business Policy. Each student creates more than twenty business related spreadsheets, creates and manages multiple databases, and creates several presentations.

### **ABM 232 - Business Law**

**Credits:** 4.00

Background and understanding of the legal aspects of management, including: contracts, liability and insurance, business law and regulation, employee laws and rights, forms of ownership, tax implications,

and other legal matters relevant to successful management.

### **ABM 240 - Ethics in Business and Society**

**Credits:** 4.00

A new look at the interface of managerial and ethical issues as they relate to workers, the workplace and the interface between business and society. Brings together concepts such as profit, values, community and, responsibility to consider a paradigm that meets the needs of an organization and the social environment in which it must exist. Helps students identify methodologies for sustaining business in its function as a responsible force for the betterment of wealth and well being in society.

### **ABM 242 - International Trade Applications**

**Credits:** 4.00

Through textbook readings and classroom discussions, students will learn about the 3 major aspects of foreign trade - the "Market Connection" which revolves around locating, qualifying, and establishing relationships with overseas customers; the "Financial Plan" which ensures that adequate financing is available for start-up, production, and working capital needs; and the "Distribution Process" which involves packaging, customs requirements, shipping, storing and delivery to final destination. Students will establish contacts with individuals and agencies involved in foreign trade, and will develop an "Export Plan" for their selected product(s) or service(s). The traditional classroom/textbook course is enhanced through an intensive field research/industry focused semester project. Prereq: permission of instructor. 2 lec. May repeat once for credit.

### **ABM 291 - Studies**

**Credits:** 1.00 to 4.00

Students who have exhibited the ability and willingness to work independently may design and contract a research project on a topic not available through existing course offerings. Each project is facilitated by faculty/staff member. Credit varies from one to four, depending on depth and breadth of the project. Areas may include, but are not limited to: retail, service or manufacturing, international trade, real estate, hospitality, health and fitness, computer technology, commerce, finance, or philanthropy.

### **ABM 292 - Studies**

**Credits:** 1.00 to 4.00

Students who have exhibited the ability and willingness to work independently may design and contract a research project on a topic not available through existing course offerings. Each project is facilitated by faculty/staff member. Credit varies from one to four, depending on depth and breadth of the project. Areas may include, but are not limited to: retail, service or manufacturing, international trade, real estate, hospitality, health and fitness, computer technology, commerce, finance, or philanthropy.

### **ABM 404 - Principles of Management**

**Credits:** 4.00

This first-semester course introduces students to the principles and applications of the full spectrum of management. Topics include: marketing and sales, finance, supervision, production/operations, law, social responsibility and ethics, and international business. Students may develop a long-term career plan and/or business plan as a beginning to their career path. 2 1-hr, 1 2-hr lec-discussion.

### **ABM 406 - Human Resources Management**

**Credits:** 4.00

The biggest problem most managers face is getting their employees motivated to work at peak performance. This course is designed to teach managers how to motivate employees through proper hiring techniques, performance reviews, training, administering change, working with problem employees, working with unions, and administering pay and fringe benefits. 2 2-hr discussion.

### **ABM 407 - Applied Marketing**

**Credits:** 4.00

Marketing processes presented through text readings, discussions, and semester-long projects. Topics include market research, target marketing, demographics and psychographics, promotion, advertising and publicity, distribution, and pricing. Focuses on the non-personal aspects of marketing and selling.

### **ABM 508 - Managerial Accounting**

**Credits:** 4.00

Students focus on the decision-making aspects of financial management, primarily for internal use by managers. Topics include: both short- and long-term considerations in areas such as budgeting, inventory control, capital investments and depreciation, tax strategies, interpretation of financial statements, profitability analysis, cash flow management, standard cost accounting, manufacturing, accounting and other cost accounting techniques.

## Arts/History & Studio

### **ARTS 444 - Mona Lisa to Romeo and Juliet: An Introduction to Renaissance Culture**

**Credits:** 4.00

What made Renaissance culture tick: who were the pivotal personalities (writers and politicians as well as artists); which are the most typical and which the least typical works produced in Italy and elsewhere throughout Europe? How did viewers think about the art of their time, and in particular how did they respond to the new mass medium of printed images? How connected is our present artistic culture to that of five hundred years ago? When did the Renaissance acquire its fame? Students consider connections between the English and the Italian Renaissances, comparing, for instance, Michelangelo and Shakespeare. Readings include sixteenth-century historical and literary sources as well as art historical essays. Writing intensive.

### **ARTS 455 - Introduction to Architecture**

**Credits:** 4.00

Study of architectural graphics, design theories, form determinants, and the architect in society. Includes case study projects. Lab.

### **ARTS 480 - Introduction to Art History**

**Credits:** 4.00

Analysis of the central forms and meanings of art history through intensive study of selected artists and monuments. Includes works of architecture, sculpture, painting, and the graphic arts. Topics will vary but might include the Parthenon, Chartres Cathedral, Michelangelo's Sistine Chapel ceiling, Rembrandt's self-portraits, Monet's landscapes, Picasso's Guernica, Frank Lloyd Wright's Falling water, Georgia O'Keeffe's abstractions, ukiyo-e prints, and Benin sculpture.

### **ARTS 480W - Introduction to Art History**

**Credits:** 4.00

Analysis of the central forms and meanings of art history through intensive study of selected artists and monuments. Includes works of architecture, sculpture, painting, and the graphic arts. Topics will vary but might include the Parthenon, Chartres Cathedral, Michelangelo's Sistine Chapel ceiling, Rembrandt's self-portraits, Monet's landscapes, Picasso's Guernica, Frank Lloyd Wright's Falling water, Georgia O'Keeffe's abstractions, ukiyo-e prints, and Benin sculpture. Writing intensive.

### **ARTS 487 - Twentieth Century Europe**

**Credits:** 4.00

This course examines the extraordinary transformations that have swept across Europe in the past century in relation to their impact on art, architecture, photography, film, theatre, and literature. The course structure reflects the interdisciplinary quality of the field of cultural studies in that we examine a range of issues that challenge traditional departmental boundaries. Readings, films viewings, and class discussions focus on specific historical events, such as World War I, World War II, the Holocaust, the Cold War, and Post colonialism, in relation to specific cultural movements, such as expressionism, futurism, surrealism, and existentialism, that have contributed to Europe's identity formation.

### **ARTS 487H - Honors/Twentieth Century Europe**

**Credits:** 4.00

This course examines the extraordinary transformations that have swept across Europe in the past century in relation to their impact on art, architecture, photography, film, theatre, and literature. The course structure reflects the interdisciplinary quality of the field of cultural studies in that we examine a range of

issues that challenge traditional departmental boundaries. Readings, films viewings, and class discussions focus on specific historical events, such as World War I, World War II, the Holocaust, the Cold War, and Post colonialism, in relation to specific cultural movements, such as expressionism, futurism, surrealism, and existentialism, that have contributed to Europe's identity formation. Writing intensive.

### **ARTS 501 - Ceramics**

**Credits:** 4.00

Theory and practice of basic ceramics; includes all methods of basic construction, decoration, glazing, and kiln firing. Emphasis on each individual's perceptual development. Special fee. Lab.

### **ARTS 525 - Woodworking**

**Credits:** 4.00

Theory and application of basic woodworking principles; design concepts, primarily utilitarian, applied to shaping a mass, constructing volumetric and line/plane forms; use of a complete range of hand, portable powered, and stationary powered tools. Special fee. Lab.

### **ARTS 532 - Introductory Drawing**

**Credits:** 4.00

Students deal primarily with observational perspective problems (still life, architectural interiors, landscape, etc.), utilizing a full range of drawing materials. Lab.

### **ARTS 532H - Honors/Introductory Drawing**

**Credits:** 4.00

Students deal primarily with observational perspective problems (still life, architectural interiors, landscape, etc.), utilizing a full range of drawing materials. Lab.

### **ARTS 536 - Introduction to Printmaking: Intaglio**

**Credits:** 4.00

Study of intaglio printmaking techniques, including etching, dry point, and engraving. Prereq: ARTS 532 or permission. Special fee. Lab.

### **ARTS 537 - Introduction to Printmaking: Lithography**

**Credits:** 4.00

Study of lithographic processes on stone and aluminum plate. Prereq: ARTS 532 or permission. Special fee. Lab.

### **ARTS 544 - Water Media I**

**Credits:** 4.00

Transparent and opaque water color. Prereq: ARTS 546. Lab.

### **ARTS 546 - Introductory Painting**

**Credits:** 4.00

Use of the still life and the figure. Color, value, composition, and some art history. Slide lectures. Prereq: ARTS 532. Lab.

### **ARTS 551 - Photography**

**Credits:** 4.00

Introduction to theory and practice of black and white photography as an expressive medium. Students provide their own cameras. Prereq: any studio art course or permission. Lab. Special fee.

### **ARTS 552 - Digital Photography**

**Credits:** 4.00

Students are introduced to the basic principles and applications of digital photography as a medium, and a skill-set. Students work in color becoming acquainted with the concepts of camera hardware, computer hardware and software related to digital image acquisition, manipulation, and output, including scanning, masking, layering, retouching, and archival printing. Students are required to have a digital camera (point and shoot or DSLR). Special fee.

### **ARTS 567 - Introductory Sculpture**

**Credits:** 4.00

Theory and practice of designing three-dimensional compositions using a series of progressive assignments to develop a practical understanding of visual elements, including line, form, space, mass, and plane. Special fee. Lab.

### **ARTS 570 - Art of the Ancient World**

**Credits:** 4.00

Architecture, sculpture, and painting in the ancient Mediterranean world. Following an analysis of Paleolithic cave painting, the course surveys the beginnings of Western art and civilization in Egypt, Mesopotamia, and Minoan Crete. Detailed examination of archaic and classical forms and ideas in Greek art; the course ends with the transformation and decline of classical ideas in imperial Rome.

### **ARTS 571 - Art of the Middle Ages**

**Credits:** 4.00

Architecture, sculpture, and painting in medieval Europe. Beginning with Early Christian art, the course examines the interplay between classical traditions and the more abstract forms and ideas that emerged at the end of the Roman Empire and then flourished in Byzantine and early medieval art. Special attention to the development of the Romanesque and Gothic forms and meanings in the high medieval civilization of the 12th and 13th centuries.

### **ARTS 572 - Art of the Age of Humanism**

**Credits:** 4.00

European painting, sculpture, and architecture from the 15th to the 17th centuries. The course focuses on the revolutionary character of early Renaissance art in Italy and the Netherlands and the heroic age of High Renaissance classicism that followed around 1500. Examines the subsequent crisis of 16th-century Mannerism and realism, and the ruptures and continuities underlying the diverse forms and meanings of Baroque art in the following century.

### **ARTS 573 - Art of the Modern World**

**Credits:** 4.00

Painting, sculpture, and architecture in Europe and America from the French Revolution to the present. Surveys the rapidly changing currents and countercurrents in modern art, including Neo-classicism and Romanticism, Realism and Impressionism, the Cubist revolution, and various forms of 20th century abstraction. In addition to the individual artists and movements, discussion of the cultural upheavals that have driven modernism's pervasive sense of crisis and pursuit of the "new."

### **ARTS 574 - Architectural History**

**Credits:** 4.00

A survey of the chief and representative buildings from the entire history of architecture. Analysis of buildings with regard to structure, form, and symbolic content, concentrating on major works such as the pyramids, the Roman Pantheon, the Gothic cathedral, the Renaissance palace, the Baroque church, and the modern skyscraper.

### **ARTS 574W - Architectural History**

**Credits:** 4.00



A survey of the chief and representative buildings from the entire history of architecture. Analysis of buildings with regard to structure, form, and symbolic content, concentrating on major works such as the pyramids, the Roman Pantheon, the Gothic cathedral, the Renaissance palace, the Baroque church, and the modern skyscraper. Writing intensive.

### **ARTS 585 - History of Islamic Art**

**Credits:** 4.00

This course examines the main monuments and issues in the history of Islamic art. It is intended as a general introduction to the field and no prior knowledge is required. Although the course focuses on the period between the rise of Islam and the Mongol invasions, students will be encouraged to explore later periods of Islamic art in their papers. Particular attention will be paid to patronage, form, and legislation of pilgrimage sites, and other forms of sacred architecture. (Also offered as HIST 600.)

### **ARTS 598 - Sophomore Seminar**

**Credits:** 4.00

Encourages experimentation by integrating verbal and plastic understandings through readings, discussions, studio work. Field trips. Prereq: two art history courses and two studio arts courses.

### **ARTS 600 - Internship**

**Credits:** 1.00 to 4.00

Election to take an internship in the following areas within the Department of Art and Art History: (600A) Painting, Drawing, Printmaking, Photography, Sculpture, Woodworking, Ceramics, and Graphic Design; (600B) Art History; (600C) Architecture; and (600D) Museum Work. Cannot be used to satisfy one of three electives in the Studio B.F.A. Program and one of the two electives in the Studio B.A. Program. In art history, it can be taken as an elective above the 11-course major requirement. May be repeated up to 8 credits. Prereq: permission.

### **ARTS 601 - Ceramics Workshop**

**Credits:** 4.00

Application of new ceramic materials and techniques, with emphasis on ideas and their expression through form and content. Experimentation encouraged. May be repeated for a maximum of 12 credits. Prereq: ARTS 501. Special fee. Lab.

### **ARTS #608 - Arts and American Society: Women Writers and Artists, 1850-Present**

**Credits:** 4.00

Team-taught course studying the impact of gender definitions on the lives and works of selected American artists. Considers lesser-known figures such as Fannie Fern, Lilly Martin Spencer, and Mary Hallock Foote, as well as better-known artists such as Willa Cather and Georgia O'Keeffe. Prereq: permission or one of the following: WS 401, HIST 566, ENGL 585, 586, 685, 785, or a 600-level art history course. (Also offered as AMST 608, ENGL 608, HIST 608, and HUMA 608.) Studio art majors who take this course for major credit will not receive major credit for ARTS 610. Writing intensive.

### **ARTS 625 - Wood/Furniture Design Workshop**

**Credits:** 4.00

Design and construction of the major furniture forms, using a broad range of techniques (including lamination, bending, and molding) to execute a series of concept areas relevant to furniture. May be repeated for a maximum of 12 credits. Prereq: ARTS 525. Special fee. Lab.

### **ARTS 632 - Intermediate Drawing**

**Credits:** 4.00

Focuses on three major topics: 1) linear perspective, 2) anatomical and/or structural aspects of the human figure, and 3) special materials (painterly and/or mixed media). Outside assignments encourage original

thinking about image making. Prereq: ARTS 532. Lab.

### **ARTS 633 - Life Drawing**

**Credits:** 4.00

A continuation of the more formal aesthetic issues introduced in introductory and intermediate drawing with an emphasis on drawing the human figure from life. Prereq: ARTS 632. Lab.

### **ARTS 636 - Printmaking Workshop**

**Credits:** 4.00

Emphasis on development of the individual's imagery in lithography and/or intaglio, including an introduction to multicolor printmaking. May be repeated for a maximum of 12 credits. Prereq: ARTS 536 and/or ARTS 537. Lab.

### **ARTS 645 - Water Media II**

**Credits:** 4.00

Continuation of ARTS 544; introduction to other water-based media. Prereq: ARTS 544. Lab.

### **ARTS 646 - Intermediate Painting**

**Credits:** 4.00

More complex issues of the visual language. Still life and the figure continue as dominant subject matter. Slide lectures. May be repeated for a maximum of 8 credits. Prereq: ARTS 546. Lab.

### **ARTS 651 - Photography Workshop**

**Credits:** 4.00

Individualized projects involving creative methods, including color, manipulative, and documentary techniques. Students provide their own cameras. Prereq: ARTS 552 Digital Photography. May be repeated for a maximum of 12 credits. Lab. Special fee.

### **ARTS #654 - 17th and 18th Century American Architecture**

**Credits:** 4.00

Chief architectural styles and significant buildings from the European colonization to the birth of the American republic. A study of religious, public, and domestic architecture and of the settlement patterns of the Spanish, French, Dutch, and English colonies, culminating in the revolutionary classicism of the new republic. Typical works include the California mission church, the New Orleans raised cottage, the Dutch farm house of the Hudson Valley, the plantations of Virginia, and the Boston State House. Field trips. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 655 - Early Modern Architecture: Revolution to World War I**

**Credits:** 4.00

Chief architectural styles and significant buildings in Europe and America from the visionary Neoclassicists of the late eighteenth century and the revival styles of the Victorian era to the birth and proliferation of the skyscraper. A study of the religious, public, commercial, and domestic architecture and of town planning during the rise of the modern nation-state and market capitalism. Typical works include the University of Virginia campus, the Houses of Parliament, the Eiffel Tower, the Chicago skyscraper, and Prairie House of Frank Lloyd Wright. Field trips. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 656 - Contemporary Architecture: The Buildings of Our Times**

**Credits:** 4.00

Chief architectural styles and significant buildings in Europe and America from the International Style and Frank Lloyd Wright to the rise of postmodernism. A study of 20th century religious, public, commercial, and domestic architecture and of town planning that emphasizes the important formal, technological, and theoretical developments of high modernism and its aftermath. Typical works include the Bauhaus, Wright's

Fallingwater, Le Corbusier's visionary town plans, the Air Force Academy, and Frank Gehry's Guggenheim Museum in Bilbao. Field trips. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 667 - Sculpture Workshop**

**Credits:** 4.00

Design and production of sculpture focusing on various materials and techniques and how they relate to composition and content. Emphasis on understanding visual language while developing an individual style. May be repeated for a maximum of 12 credits. Prereq: ARTS 567. Special fee. Lab.

### **ARTS 674 - Greek Art**

**Credits:** 4.00

Greek art and architecture from the Bronze Age civilizations of Minoan Crete and Mycenaean Greece to the late classical period of the 4th century B.C. Emphasis on the interplay of narrative and abstraction in the development of a distinctively Greek aesthetic consciousness, on the forms of art and thought in the Archaic Period, and on the flowering of the classical style in the 5th century B.C. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 675 - Roman Art**

**Credits:** 4.00

Art and architecture in the ancient Mediterranean world from Alexander the Great to the fall of the Roman Empire. Emphasis on the interplay between the Greek and Etruscan traditions between public and private in Roman life and art, and the breakdown of classical ideals in the late empire. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 677 - Early Medieval Art**

**Credits:** 4.00

Development of Christian art from 300 to 1000 A.D. Study of the formulation of a new visual language via the intersection of Mediterranean and northern European traditions. Major focus on early Christian catacombs, Byzantine mosaics, insular manuscripts, and Carolingian imperial art. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 678 - Romanesque and Gothic Art**

**Credits:** 4.00

The culmination of medieval artistic development through examination of major architectural monuments and their sculptural programs, as well as important centers of manuscript illumination. The period from the year 1000 A.D. through the beginnings of the Renaissance in the early 15th century will be stressed. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 679 - Northern Renaissance Art I**

**Credits:** 4.00

Painting, sculpture, graphic arts, and manuscript illumination in France, Germany, and the Netherlands in the 14th and 15th centuries. Emphasis on the development of the traditions of Northern naturalism and the emergence in 15th-century Flanders of a distinct Renaissance consciousness, which runs parallel to contemporary trends in Italy. Major figures include the Limbourg brothers, Claus Sluter, Jan van Eyck, and Hugo van der Goes. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 680 - Northern Renaissance Art II**

**Credits:** 4.00

Painting, sculpture, and graphic arts in Germany and the Netherlands in the 16th century. Emphasis on the encounter of the Northern tradition with the classical and humanistic culture of the Italian Renaissance and on the impact of the Protestant Reformation. Major figures include Bosch, Durer, Holbein, and Bruegel. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 681 - Early Renaissance Art in Italy**

**Credits:** 4.00

Painting, sculpture, and architecture in Italy during the 14th and 15th centuries. The emergence of Renaissance style in the art of such masters as Giotto, Masaccio, Donatello, Bellini, and Piero della Francesca. Attention is also given to the broad cultural developments to which they belong. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 682 - High Renaissance and Mannerist Art in Italy**

**Credits:** 4.00

Continuation of ARTS 681. Primary focus on the formation of High Renaissance classicism in the art of Leonardo, Michelangelo, Raphael, Bramante, and Titian. Attention is also given to the subsequent crisis of the classical ideal in 16th-century mannerism. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 683 - Baroque Art in Southern Europe**

**Credits:** 4.00

Painting, sculpture, and architecture in Italy, France, and Spain during the 17th century. Emphasis on the diverse and innovative character of art in this period of crisis between the Renaissance and the modern era. Intensive analysis of the works of such major masters as Bernini, Caravaggio, Poussin, and Velazquez. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 684 - Baroque Art in Northern Europe**

**Credits:** 4.00

Dutch and Flemish painting in the 17th century. Examination of such major figures as Rubens, Rembrandt, Van Dyck, and Vermeer. Attention is also given to the development of the genres and to the many little masters who practiced them. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 685 - Graphic Art of the Renaissance and Baroque Periods**

**Credits:** 4.00

The availability of paper and the invention of the printing press made it possible for drawings and prints to become fundamental elements in the western artistic tradition. Prints have been called major instigators of the production of secular art and of overtly experimental art. They were the first art made with an elite but relatively broad class of collectors in mind, and--in different examples--the first art that could be owned even by the poor. Examination of anonymous works, works by artists famous only as printmakers, and the printed work by or after Mantegna, Durer, Lucas van Leyden, Raphael, Michaelangelo, Bruegel, and Rembrandt, as well as drawings of the period. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 686 - Neo-Classicism to Romanticism**

**Credits:** 4.00

European painting and sculpture in its socio-political context, with emphasis on the relation of idea to image, from David and the French Revolution to the romantic landscapes of Friedrich and Runge, and the romantic-classic debate involving Delacroix and Ingres. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 687 - Realism and Impressionism**

**Credits:** 4.00

Focus on the political, cultural, and physical changes in Paris in the second half of the 19th century and their relation to Impressionism. Work of Courbet, Millet, Monet, Manet, Degas, Cassatt, Morisot, Renior, Cezanne, van Gogh, Seurat, and others examined in the context of the rise of landscape painting and the establishment of the avant-garde in the visual arts. Concentration on the great collections of the Harvard

University Art Museums and the Boston Museum Fine Arts. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 688 - 20th Century Art I**

**Credits:** 4.00

An examination of European and American art from symbolism to surrealism. Focuses on art and theory from the 1890s to World War II in relation to the political, social, and scientific upheavals of the era. Particular emphasis will be placed on Gauguin in the South Seas, Rodin and modernist sculpture, Matisse and expressionism, Picasso and cubism, Kandinsky and the Russian constructivists, Hoch and dada photomontage, O'Keefe and American modernism, and Dali and Freud. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 689 - 20th Century Art II**

**Credits:** 4.00

Examines abstract expressionism as a framework for analyzing art since World War II. Focus on "Action Painting" and Color Field Painting, minimalism and conceptual art, pop art, earthworks and sited sculpture, new image painting, post-modernism, and related critical theory. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 690 - Women Artists of the 19th and 20th Centuries**

**Credits:** 4.00

Examination of the works of women artists of the past two centuries. After considering current scholarship related to some of the theoretical issues involved in studying art by women, the works of women artists from the Middle Ages through the early 19th century will be surveyed briefly. Focus will then shift to works by women artists of the past 150 years and their relationship to and impact on major movements in modern art. Prereq: one art history and another appropriate course. Writing intensive.

### **ARTS #691 - A History of Venetian Art**

**Credits:** 4.00

The artistic culture of Venice from Byzantine times through Tiepolo and Canaletto. Course emphasis will be on Renaissance Venice, including topics such as the reclining female nude, the courtesan portrait, and the origins of landscape painting. Artists to be studied include Bellini, Giorgione, Titian, and Palladio. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 692 - History of Photography**

**Credits:** 4.00

History of the photograph from its origins in the aesthetic and technological context of the early 19th century to the present. Lectures and discussions on such topics as the impact of early photography on painting, 19th-century landscape and travel photography, pictorialism, abstract photography, the photograph as metaphor, photojournalism and the interpretation of war, and postmodernism and photography. Critical reading of texts by Beaudelaire, Benjamin, Barthes, Sontag, and Sekula. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 693 - American Art**

**Credits:** 4.00

A chronological survey of American painting and sculpture from the European colonization to the New York Armory Show of 1913, with emphasis on portraiture, narrative, still-life, and landscape painting. Examination of stylistic and thematic developments from the Puritan and Georgian New England portrait, the heroic narrative of the Revolutionary era, the romantic landscape to the realism of the post-Civil War era and the birth of modernism. Typical works include Copley's Portrait of Paul Revere, Cole's Course of Empire, Homer's Fog Warning, Cassatt's At the Opera, and Eakin's Max Schmitt in a Single Scull. Prereq: one 400- or 500-level art history course. Writing intensive.

### **ARTS 695 - Special Problems in the Visual Arts**

**Credits:** 4.00

Topics and prerequisites to be announced before registration. May be repeated with permission of the instructor. Lab.

### **ARTS 695I - Problems in Visual Arts/Italy**

**Credits:** 4.00

Part of the ITAL 685/686 study abroad program held in Italy.

**Co-requisites:**

### **ARTS 697 - Topics in Asian Art**

**Credits:** 4.00

A thematic study of the major artistic achievements in India, China, and/or Japan from pre-history to the twentieth century. Works of art in various media, including painting, sculpture, ceramics, calligraphy, prints, architecture, and gardens, will be examined in relation to philosophical concepts and to their cultural/historical contexts. May be repeated up to a maximum of 8 credits. Prereq: one 400- or 500-level art history course or permission of the instructor. Writing intensive.

### **ARTS #699 - Museum Studies**

**Credits:** 4.00

Introduction to the history and practices of American museums, including their purposes, organization, interpretation, policies and practices. Use of the Art Gallery, with occasional visits to other museums and art conservators. This course may not be used by studio art majors and B.F.A. candidates to fulfill the art history requirement. Prereq: two courses in art history or permission. Writing intensive.

### **ARTS 700H - Honors Seminar**

**Credits:** 4.00 or 8.00

Requires successful completion of a written thesis supervised by two faculty advisers (one each from studio and art history faculty) to be reviewed by members of the department honors committee. The art history thesis will involve an original problem in art history and the studio art thesis will examine the student's own work. Honors students only.

### **ARTS 725 - Wood Multiples**

**Credits:** 4.00

Development and construction of prototype furniture designs intended for more than one-of-a-kind production; jig and production strategies. (Offered concurrent to I.W.F.-sponsored biennial National Student Furniture Design Competition.) Prereq: ARTS 625 (4 credits.). Lab. Special fee.

### **ARTS 732 - Advanced Drawing**

**Credits:** 4.00

Treatment of more complex compositional problems; application of a broader range of solutions to pictorial problems to reinforce and expand individual concepts of image and technique. May be repeated for a maximum of 12 credits. Prereq: ARTS 633. Lab.

### **ARTS 746 - Advanced Painting**

**Credits:** 4.00

Development of a higher degree of technical skill to handle more advanced conceptual problems. Class assignments may be more individually directed. May be repeated for a maximum of 12 credits. Prereq: ARTS 646 (8 credits).

### **ARTS 791 - Art Education (Elementary)**

**Credits:** 4.00

Children's creative growth as revealed through their visual expression. Development of elementary art education programs with emphasis on objectives, methods, materials and techniques to foster creativity. Suggested prereq: EDUC 500.

**ARTS 792 - Art Education (Secondary)****Credits:** 4.00

The creative process in the visual arts in relation to the development and skills of middle and high school students in the public schools; mechanics of beginning and maintaining a secondary art program; exploring resources for art education programs on the secondary level. Suggested prereq: EDUC 500.

**ARTS 795 - Methods of Art History****Credits:** 4.00

Essential bibliography and the methodology of research; the variety of approaches to art historical scholarship. Readings, discussion, and projects in connoisseurship, iconography, and other art historical methods. Open to advanced students with a strong art history background. Required for art history majors. It is strongly recommended that students take this course in their junior year. Prereq (for non-art history majors): permission. (Usually offered fall semester only.) Writing intensive.

**ARTS 796 - Independent Study in the Visual Arts****Credits:** 1.00 to 8.00

A) Photography; B) Sculpture; C) Drawing; D) Painting; E) Printmaking; F) Water Media; G) Architectural Design; H) Curatorial Assistant; I) Painting in Italy; J) Ceramics; K) Wood Design; L) Art History. Open to highly qualified juniors and seniors who have completed the advanced level courses in the chosen medium. May be repeated to a total of 8 credits. Prereq: permission of department chairperson and supervising faculty member or members. Special fee on some sections.

**ARTS 798 - Seminar/Senior Thesis****Credits:** 4.00 to 8.00

Readings and discussions oriented toward the intellectual premises of art. Culminates in mounting an exhibition of the student's work. Required of all students in the B.F.A program. Other advanced students may elect with instructor's permission. A year-long course; an IA grade (continuous course) will be given at the end of the first semester. Lab. Variable credit; may be repeated to a total of 8 credits. B.F.A. majors must take 8 credits total.

**ARTS 799 - Seminar in Art History****Credits:** 4.00

Topics and prerequisites to be announced before registration May be repeated with permission of instructor. Writing intensive.

## **Bchm, Molecular&Cellular Biol**

### **BMCB 401 - Opportunities in Biochemistry and Molecular and Cellular Biology**

**Credits:** 1.00

Views scope of biochemistry, molecular and cellular biology and explores professional opportunities for BMCB majors. Guest speakers from on and off campus present seminars and lead discussions on contemporary issues in subject area. Departmental and interdepartmental majors and options programs and strategies for achieving professional goals are discussed. Cr/F.

### **BMCB 501 - Biological Chemistry**

**Credits:** 5.00

Survey of the molecular basis of life with a focus on the mechanisms of biochemical reactions in metabolic pathways, beginning with an overview of functional groups and organic reactions relevant for living organisms. The bioenergetics of carbohydrate, lipid, and nitrogen metabolic pathways will be analyzed. Prereq: CHEM 403 & 404, or one semester equivalent. No credit earned if credit received for BMCB 658, or BMCB 751 and BMCB 752.

### **BMCB 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F.

### **BMCB 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F. Writing intensive.

### **BMCB 605 - Eukaryotic Cell and Developmental Biology**

**Credits:** 4.00

Cell and developmental biology of eukaryotic animals and plants. General topics include the structure and function of major cellular compartments, an analysis of intracellular dynamics, mechanisms of intercellular communication, and mechanisms for elaborating and integrating multicellular animals and plants. Special topics include mitogenesis, cell motility, oncogenesis, control of gene expression, and pattern formation. Prereq: BIOL 411 and 412; CHEM 403 and 404. Special fee. Lab.

### **BMCB 658 - General Biochemistry**

**Credits:** 3.00

A comprehensive, introductory course emphasizing the cellular metabolism and the structure and function of proteins, nucleic acids, carbohydrates, and lipids. Prereq: BIOL 411, CHEM 545-546, CHEM 547-548, or CHEM 651-652. Coreq: BMCB 659 (except BCHM majors who are encouraged to take BMCB 755).

**Co-requisites:** BMCB 659

### **BMCB 659 - General Biochemistry Lab**

**Credits:** 2.00

Structured laboratory experiments that provide training in analytical and preparative techniques



fundamental to modern biochemistry and molecular biology. Coreq: BMCB 658 (except for BCHM majors who are encouraged to take BMCB 755 instead of BMCB 659). Special fee.

**Co-requisites:** BMCB 658

### **BMCB 714 - Electron Microscopy**

**Credits:** 2.00

Theory and principles involved in preparing plant and animal tissue for observation with the transmission (TEM) and scanning (SEM) electron microscopes; shadow casting; photographic techniques; stereology; and presentation of micrographs for publication. Prereq: permission.

### **BMCB 715 - Electron Microscopy Lab**

**Credits:** 3.00

Practical application of theoretical principles and practices used in preparing and observing plant and animal tissues with the transmission and electron microscopes. Student project assigned. Prereq: permission. Special fee.

**Co-requisites:** BMCB 714

### **BMCB 750 - Physical Biochemistry**

**Credits:** 3.00

Structure, interactions, and physical-chemical properties of bio-molecules. Thermodynamic, kinetic, and spectroscopic methods for the study of proteins and nucleic acids. Prereq: 2 semesters organic chemistry, 1 semester of calculus;/ or permission.

### **BMCB 751 - Principles of Biochemistry**

**Credits:** 4.00

In-depth survey of biochemistry: macromolecular structure; structure and function of proteins, nucleic acids, carbohydrates, and lipids. Prereq: CHEM 657-658 or CHEM 651-652 or CHEM 545 and 546 and BMCB 658-659;/ or permission

### **BMCB 752 - Principles of Biochemistry**

**Credits:** 4.00

Continuation of in-depth survey of biochemistry: metabolism of amino acids, nucleotides, carbohydrates and lipids; macromolecules synthesis and regulation; molecular biology of the eukaryotic cell. Prereq: BMCB 751 or permission.

### **BMCB 753 - Cell Culture**

**Credits:** 5.00

Principles and technical skills fundamental to the culture of animal and plant cells, tissues, and organs. Introduction to the techniques of sub-culturing, establishing primary cultures, karyotyping, serum testing, cloning, growth curves, cryopreservation, hybridoma formation and monoclonal antibody production, and organ cultures. An interdisciplinary course with emphasis on the application of cell culture to contemporary research in the biological sciences. Prereq: BMS 503; permission. Special fee. Lab.

### **BMCB 754 - Laboratory in Biochemistry and Molecular Biology of Nucleic Acids**

**Credits:** 5.00

Application of modern techniques to the analysis of bio-molecules, with an emphasis on nucleic acids; includes DNA isolation and analysis, cloning, sequencing, and analysis of gene products. Prereq: BMCB 658/659; 751; and permission. Special fee. Writing intensive.

### **BMCB 755 - Laboratory in Biochemistry and Molecular Biology**

**Credits:** 5.00

Application of modern techniques to the characterization and purification of biomolecules, with an

emphasis on proteins and nucleic acids; analysis of enzyme kinetics; and basic techniques used in molecular biology. (Majors anticipating taking BMCB 799 should take this course in their junior year.) Prereq: BMCB 751-752;/ or permission. BMCB 752 may be taken concurrently with BMCB 755. Special fee. Writing intensive.

### **BMCB 763 - Biochemistry of Cancer**

**Credits:** 3.00

Molecular mechanisms of viral and chemical carcinogenesis; role of oncogenes in normal cell growth, development, and differentiation. Biochemical basis of cancer chemotherapy. Prereq: BMCB 658 or 751.

### **BMCB 783 - Proteomics for Biological Discoveries**

**Credits:** 4.00

Proteomics is a cutting edge area of molecular biology that undertakes a systematic characterization of the entire set of proteins (proteome). This course develops an understanding on key technologies to study the expression levels, posttranslational modifications, cellular localization, three-dimensional structure, protein interactions, and dynamic changes of these properties during cellular processes. Topics to be covered include goals in proteomic analysis, major technology platforms, and pharmaceutical and biomedical applications. Prereq: BMCB 658 or BMCB 751/851 or by permission.

### **BMCB 790 - Undergraduate Teaching Experience**

**Credits:** 1.00 to 4.00

Students assist Graduate Teaching Assistants in preparing, presenting, and executing BMCB laboratory. May be repeated up to a maximum of 4 credits.

### **BMCB 794 - Protein Structure and Function**

**Credits:** 4.00

Analysis of how the three-dimensional architecture of soluble and membrane proteins contributes to their biochemical function. Topics include methods for determining the structure of proteins, protein folding, protein targeting, and mechanisms of enzyme catalysis. Computer resources will be used for protein modeling and structural prediction. Prereq: BMCB 658 or 751.

### **BMCB 795 - Investigations**

**Credits:** 1.00 to 4.00

Independent study in various areas including but not limited to: genetics, signal transduction, gene regulation, molecular evolution, biochemistry of cancer, biophysics of macromolecules, endocrinology, and glycobiology. May include readings, laboratory work, organized seminars and conferences. Prereq: permission. Not more than 4 total credit hours can be applied to BMCB or major electives.

### **BMCB 795W - Investigations**

**Credits:** 1.00 to 4.00

Independent study in various areas including but not limited to: genetics, signal transduction, gene regulation, molecular evolution, biochemistry of cancer, biophysics of macromolecules, endocrinology, and glycobiology. May include readings, laboratory work, organized seminars and conferences. Prereq: permission. Not more than 4 total credit hours can be applied to BMCB or major electives. Writing intensive.

### **BMCB 799 - Senior Thesis**

**Credits:** 1.00 to 4.00

Research in biochemistry and molecular biology for senior majors. Topics may include: developmental genetics; signal transduction; gene regulation; molecular evolution; biochemistry of cancer; biophysics of macromolecules; endocrinology; glycobiology. May be repeated to a maximum of 4 credits. Prereq: BMCB 659 or BCHM 755; permission. Writing intensive.

## **BMCB 799H - Honors Senior Thesis**

**Credits:** 1.00 to 4.00

Research in biochemistry and molecular biology for senior majors. Topics may include: developmental genetics; signal transduction; gene regulation; molecular evolution; biochemistry of cancer; biophysics of macromolecules; endocrinology; glycobiology. May be repeated to a maximum of 4 credits. Prereq: BMCB 659 or BCHM 755; permission. Writing intensive.

## Biological Science

### **BSCI 405 - Diversity of Life**

**Credits:** 4.00

Survey of ecology, evolution, genetics, and the diversity of life. Emphasis on basic biological principles. For non-biological science majors. Lecture and lab. Cannot be taken for credit after completion of BIOL 411, 413, or equivalent. No credit for students who have completed BIOL 405. Special fee. Lab.

### **BSCI 406 - Human Organism**

**Credits:** 4.00

Survey of biological chemistry, molecular and cell biology, and major plant and animal systems. Emphasis on basic biological principles. For non-biological science majors. Lecture and Lab. Cannot be taken for credit after completion of BIOL 412, 414, or equivalent. No credit for students who have completed BIOL 406. Special fee. Lab.

### **BSCI 421 - Diseases of the 21st Century**

**Credits:** 4.00

Provides a basic understanding of several different diseases that may be prevalent over the next century. Treatment and prevention of the disease are also discussed. Students will acquire a basic understanding of the research methodologies underlying several fields within the biological sciences, such as microbiology, immunology, and molecular biology. Agents of biological warfare are also discussed. Prereq: ENGL 401.

### **BSCI 422 - Biotechnology and Society**

**Credits:** 4.00

Provides a basic understanding of genetic engineering. Techniques discussed include cloning, gene transfer, the Polymerase chain reaction (PCR), in vitro fertilization, organ transplants, and paternity testing. Ethical issues involved with each technological advance are examined.

### **BSCI 432 - Medical Terminology**

**Credits:** 2.00

This course is an introduction to medical terminology. The origin, roots, prefixes and suffixes of common scientific and medical terms are examined. Course is totally online and includes assigned online interactive material. Appropriate for biology majors, prePA, premed, and other interested majors.

### **BSCI 701 - Senior Seminar I**

**Credits:** 1.00

To be taken during the last two semesters of the senior year as students complete their Capstone project. Course emphasizes written and oral communication, discussion of current topics in biology, and career guidance. Fall and spring semester. Cr/F.

### **BSCI 702 - Senior Seminar II**

**Credits:** 1.00

To be taken during the last two semesters of the senior year as students complete their Capstone project. Course emphasizes written and oral communication, discussion of current topics in biology, and career guidance. Fall and spring semester. Cr/F.

### **BSCI 792 - Research**

**Credits:** 1.00 to 4.00

Advanced independent research under the direction of a faculty mentor. Content area to be determined in

consultation with faculty member. Prereq: permission. May be repeated for up to 8 credits. Up to 4 credits may be applied to self-designed concentration. Up to 4 credits may be applied to the Capstone requirement. Fall and spring semester. Prereq: Permission of Faculty mentor. Cr/F.

### **BSCI 793 - Internship**

**Credits:** 1.00 to 4.00

Field-based learning opportunities in the biological sciences through placement in the appropriate outside agency, under the direction of a faculty mentor and representative of outside agency. Content area to be determined in consultation with faculty mentor. Prereq: Permission. May be repeated for up to 8 credits. Up to 4 credits may be applied to self-designed concentration. Up to 4 credits may be applied to the Capstone requirement. Fall and spring semester. Cr/F.

### **BSCI 795 - Independent Study**

**Credits:** 1.00 to 4.00

Advanced individual study under the direction of a faculty mentor. Content area to be determined in consultation with faculty mentor. Prereq: permission. May be repeated for up to 8 credits. Up to 4 credits may be applied to self-designed concentration. Up to 4 credits may be applied to the Capstone requirement. Fall and spring semester. Cr/F.

## Biology

### **BIOL 400 - Professional Perspectives on Biology**

**Credits:** 1.00

Views scope of biology and explores professional opportunities for biological sciences majors. Guest speakers from on and off campus present seminars and lead discussions on contemporary issues in biology. Departmental and interdepartmental major and option programs and strategies for achieving professional goals are discussed. Required for all first-semester biology majors. Cr/F.

### **BIOL 411 - Introductory Biology: Molecular and Cellular**

**Credits:** 4.00

Introduction to structure and function of cells; tissues and organs; physiological processes; genes and heredity. Required for majors in the biological sciences. Special fee. Lab. Students not permitted to enroll in BIOL 411 and BIOI 412 in the same semester.

### **BIOL 411H - Honors/Principles of Biology I**

**Credits:** 4.00

Introduction to structure and function of cells; tissues and organs; physiological processes; genes and heredity. Required for majors in the biological sciences. Special fee. Lab.

### **BIOL 412 - Introductory Biology: Evolution, Biodiversity and Ecology**

**Credits:** 4.00

The biology of organisms, including survey of kingdoms, behavior, evolution, and ecology. Required for majors in the biological sciences. Students are not permitted to enroll in BIOL 411 and BIOL 412 in the same semester. Special fee. Lab.

### **BIOL 412H - Honors/Principles of Biology II**

**Credits:** 4.00

The biology of organisms, including survey of kingdoms, behavior, evolution, and ecology. Required for majors in the biological sciences. Special fee. Lab.

### **BIOL 413 - Principles of Biology I**

**Credits:** 4.00

Lecture and Laboratory introduction to biological principles; cell structure, function, replication, energetics and transport mechanisms; physiological processes; Mendelian, molecular genetics and gene technology. Required for students majoring in the life sciences. Cannot be taken for credit after BIOL 411 or equivalent. Special fee. Lab.

### **BIOL 414 - Principles of Biology II**

**Credits:** 4.00

Lecture and laboratory survey of the five kingdoms of life; physiology of cells, tissues, organs, and organ systems; evolution; human impact on the biosphere. Required for students majoring in the life sciences. Cannot be taken for credit after BIOL 412 or equivalent. Special fee. Lab.

### **BIOL 415 - Watershed Watch**

**Credits:** 2.00

Project Watershed Watch brings together several highly successful areas of excellence at UNH: capabilities in satellite remote sensing and geographic information systems, forest ecology, limnology and microbial ecology. Watershed Watch will recruit up to 40 sophomores whose majors are currently

undeclared to study watershed interactions and relate them to established methods of monitoring the quality of forest, lakes, and streams. Students will work along side faculty in an authentic, experience-based, and hands-on learning environment. Prereq: instructor approval.

### **BIOL 416 - Watershed Watch - Research Experience**

**Credits:** 2.00

This course builds upon the experiences gained while conducting the field and laboratory research from BIOL 415 (Watershed Watch Summer Institute). Students will be expected to integrate the conceptual and hands-on components learned in BIOL 415 into their own independent scientific research projects conducted under the mentoring of a faculty advisor from their college or university campus. Using a seminar format, students will receive additional lecture and reading materials (via distance-learning tools), compare their research progress (e.g., problems and accomplishments) with the progress of other students on other campuses, and will integrate their findings into the larger studies of the Merrimack and Pasquotank River watersheds. Ultimately, students will present their results at the UNH Undergraduate Research Conference at the end of April. (IA grading). Prereq: BIOL 415 and instructor approval. May be repeated.

### **BIOL 420 - Introduction to Forensic Sciences**

**Credits:** 4.00

This course is an introductory survey course in Forensic Sciences. The focus will be on the recognition, collection, preservation and analysis of physical evidence related to crime scene investigations. Students will be presented with various state of the art techniques utilized in the analysis of physical evidence with the presumption that students do not necessarily have in depth scientific or technical backgrounds (e.g., chemistry, biology and/or physics). The goal of this class will be to provide students with an understanding of what criminalistics entails and to prepare them for additional, more in-depth classes in criminalistics or forensic science. Special fee.

### **BIOL 444A - Biotechnology and Society**

**Credits:** 4.00

The history and science of biotechnology and genetic engineering of bacteria, plants, and animals including humans. Applications of DNA technology, cloning and genetic engineering to agriculture, biomedicine, industrial products and environmental problems. Discussion of economic, social, environmental, legal, and ethical issues related to the applications of biotechnology and genetic engineering. No credit for students who have completed BSCI 422 (UNHM).

### **BIOL 520 - Our Changing Planet**

**Credits:** 4.00

Ecosystem interrelations and factors critical to maintain sustainability will be addressed in this course. Environmental issues such as water usage, pollution, and treatment; air and soil quality; fossil fuels and alternative energy sources will be presented. Not for credit if credit earned for ENE 520.

### **BIOL 525 - Marine Estuarine Freshwater Botany**

**Credits:** 4.00

This team-taught course introduces students to microalgae, seaweeds, and vascular aquatic plants with an emphasis on unique habitats and plant adaptations to the aquatic environment. Students survey the diversity of algae and aquatic plants spanning fresh, estuarine, and marine habitats through a combination of lecture, field, and laboratory exercises. Special fee.

### **BIOL 528 - Applied Biostatistics I**

**Credits:** 4.00

Development of elementary statistical techniques through the analysis of prepared biological data. Continuous and discrete probability distributions, distributions of sample statistics, small-sample theory,

regression, correlation, and analysis of variance. No credit for students who have completed ADM 430; ADMN 420; EREC 525; HHS 540; MATH 439; MATH 539; MATH 644; PSYC 402; SOC 502.

### **BIOL 541 - General Ecology**

**Credits:** 4.00

Physical and biological factors affecting distribution, abundance, and adaptations of organisms. Population, community, and ecosystem structure and function. Prereq: BIOL 411-412 or equivalent. Special fee. Lab. Writing intensive.

### **BIOL 544 - Your Genes, Your Life**

**Credits:** 4.00

This course explores societal, ethical, and legal issues surrounding the human genomics revolution, with a particular focus on biomedical questions. What will it mean to know your complete DNA sequence? If everyone's genome were included in a public database, how should that information be controlled and used? What, ultimately, do our genes encode? We will examine the basis of genetic inheritance, the interaction between genes and environment, and the types of genetic variation that occur between individuals and populations. In the medical realm, we will look at genetic and evolutionary processes underlying diseases such as cancer, and at the role of genomic technology in the drive toward personalized medicine. No credit for students who have completed Biology 404 or 444A. Writing intensive.

### **BIOL 555 - Experimental Design and Analysis Laboratory (EDAL)**

**Credits:** 4.00

Using hands-on laboratory based inquiry, the course explores the concepts that form the basis of statistical analysis and experimental design. Working in small teams, students examine variability in different types of measurement data and empirically derive probability distributions including Poisson, Chi-square, Normal, Student's t, and F distributions. An intuitive approach to data analysis and hypothesis testing provides students with a conceptual understanding of the basic and advanced statistical analyses including ANOVA, Linear, and Non-Linear Regression, Correlation, Goodness-of-fit, ANCOVA, and MANOVA. Students have an opportunity to become familiar with how these tests are implemented in several popular statistical software packages. The approach used in the course emphasizes development of analytical thinking skills and the application of conceptual understanding to solve new problems. Grading is based on participation in team projects, presentations, mastery of concepts and skills, and written reports.

### **BIOL 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F.

### **BIOL 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F. Writing intensive.

### **BIOL 601 - Biology of Plants**

**Credits:** 4.00

Structural and functional biology of the plant organism, with emphasis on land plants. Evolution of vegetative processes and sexual reproduction/breeding systems. Plant adaptations to environmental challenges. Prereq: BIOL 411, 412 or ZOOL 412.



### **BIOL 695 - Biology Teaching Practices**

**Credits:** 1.00 to 4.00

Students assist in teaching labs in undergraduate biology courses supervised by the lab coordinator/instructor. Responsibilities include facilitating lab endeavors, giving a presentation, and writing a report. Prereq: permission. May be repeated to 4 credits maximum.

### **BIOL 702 - Techniques in Plant Physiology and Biochemistry**

**Credits:** 4.00

The course provides hands-on experience with instrumentation and experimental procedures for analysis of plant growth and metabolism. Experiments demonstrate the regulation of plant growth and development in response to environmental and chemical factors, analysis of cellular contents and processes, and use of modern instrumentation for physiological and biochemical studies. The experiments deal with plant water relations, photosynthesis, plant hormones, enzyme kinetics, using spectrophotometry, aseptic procedures, and liquid and thin-layer chromatography. Prereq: BIOL 411, 412 or permission of instructor. Special fee.

### **BIOL 711 - Applied Biostatistics II**

**Credits:** 4.00

Design and analysis of biological and ecological research experiments. "Real world" studies used to discuss the identification of hypotheses, appropriate experimental design, and the application of statistical analyses including ANOVA, ANCOVA, correlation and regression, cluster analysis, classification and ordination techniques. Theoretical statistical concepts tailored to consider student's own thesis and dissertation research, allowing statistical problems to be addressed at various stages of the research process. Common computer packages used for analyses. Prereq: BIOL 528; permission.

### **BIOL 795 - Independent Investigations**

**Credits:** 1.00 to 4.00

Topics may include teaching practicum in a biological science supervised by a biology faculty member (permission required); research practicum in a biological science supervised by a biology faculty member (permission required); or special topics of current interest in biology. Lecture-discussion format. Prereq: 12 credits of biology or permission. May be repeated to 4 credits.

### **BIOL 795W - Independent Investigations**

**Credits:** 1.00 to 4.00

Topics may include teaching practicum in a biological science supervised by a biology faculty member (permission required); research practicum in a biological science supervised by a biology faculty member (permission required); or special topics of current interest in biology. Lecture-discussion format. Prereq: 12 credits of biology or permission. May be repeated to 4 credits. Writing intensive.

### **BIOL 799 - Honors Senior Thesis**

**Credits:** 2.00 to 8.00

Independent research requiring a written proposal, a thesis, and a presentation of research results to an audience of faculty and/or students. Intended for biology majors completing biology honors-in-major requirements. Contact biology program coordinator prior to senior year to arrange supervision and obtain permission. 2 consecutive semesters. (4 credit minimum total; 8 credits maximum.) Writing intensive.

## Biomedical Science

### **BMS 401 - Professional Perspectives in Biomedical Sciences**

**Credits:** 1.00

Designed for students interested in the study of medical laboratory science. Program and career options, certification requirements, and medical ethics and professionalism. Cr/F.

### **BMS 402 - Special Topics**

**Credits:** 1.00

Introduction to specific areas of study within biological sciences. Provides an avenue to explore recent excitements in biological sciences, and fundamental questions about how living organisms function and adapt to different environments; introduction to contemporary research in various biological sciences. Several concurrent sections organized around themes; lecture/discussion. Cr/F.

### **BMS 407 - Germs 101**

**Credits:** 4.00

Expands on the increasing public awareness of the societal and technological impact of the invisible microbial world on our lives and on the planet. Students participate in weekly extra-class activities, acting as life scientists by using the scientific method of inquiry. One experience focuses on bacteria that use sunlight to make a living, another on using bacteria in genetic engineering. Students come to view germs in diverse lights: microbes as organisms, microbes as enemies, microbes as friends, and microbes in the press. Especially useful for people with microphobia. Not for BMS or Biology major credit. Special fee.

### **BMS 408 - Germs 101**

**Credits:** 4.00

Expands on the increasing public awareness of the societal and technological impact of the invisible microbial world on our lives and on the planet. Students participate in weekly extra-class activities, acting as life scientists by using the scientific method of inquiry. One experience focuses on bacteria that use sunlight to make a living, another on using bacteria in genetic engineering. Students come to view germs in diverse lights: microbes as organisms, microbes as enemies, microbes as friends, and microbes in the press. Especially useful for people with microphobia. Not for BMS or Biology major credit. This is the online version of BMS 407 - Germs 101, and does not fulfill GenEd 3B requirements.

### **BMS 444A - Seven Deadly Diseases**

**Credits:** 4.00

This course will analyze seven major disease processes and associated biological concepts. The student will evaluate each major disease process covered as to historical perspective, lore/misconceptions, disease etiology, physical impact of symptoms, diagnostic criteria, prevention and treatment. Emphasis will be placed upon clinical significance of race, class, gender, and global cultural traditions in the study of the selected diseases. The laboratory section will include hands on performance of pertinent diagnostic testing for disease identification. Lab fee. Writing Intensive.

### **BMS 444B - The Unseen Menace: The Impact of Microbial Disease on Human History**

**Credits:** 4.00

Course explores and analyzes the significant, and at times catastrophic, effects of viral, bacterial, fungal and parasitic infections on human societies, cultures, economies, and religions world-wide from some of the earliest recorded events (ca. 350 BCE) to the present. The latter portion of the course focuses on the impact of microbial diseases on the colonization, exploration, territorial expansion, and growth of the United States, including its impact on Native American populations, and the known and potential threats of current,

emerging, and re-emerging microbial diseases to our American society. Writing intensive.

### **BMS 501 - Microbes in Human Disease**

**Credits:** 4.00

Microorganisms have a profound effect on our everyday lives. This effect can often be dramatic enough to capture many of today's news headlines. Did you ever wonder why people died from eating hamburgers contaminated with E. coli? How do "flesh-eating bacteria" function? Will there be an AIDS vaccine? Explores the answers to these and many other fascinating questions by examining the role of microorganisms in human disease. The fundamental structure, metabolism, genetics, and ecology of clinically relevant bacteria, viruses, fungi, and parasites and presented in relationship to the human host and its immune system. The foundation, incidence, and control of microbial diseases are presented through case studies. Emphasizes active learning in which students participate in classroom discussions, experiments, and demonstrations. Laboratory exercises designed to introduce techniques for the identification of important pathogenic microorganisms and disease diagnosis. Special fee. Lab.

### **BMS 501H - Honors/Microbes in Human Disease**

**Credits:** 4.00

Microorganisms have a profound effect on our everyday lives. This effect can often be dramatic enough to capture many of today's news headlines. Did you ever wonder why people died from eating hamburgers contaminated with E. coli? How do "flesh-eating bacteria" function? Will there be an AIDS vaccine? Explores the answers to these and many other fascinating questions by examining the role of microorganisms in human disease. The fundamental structure, metabolism, genetics, and ecology of clinically relevant bacteria, viruses, fungi, and parasites and presented in relationship to the human host and its immune system. The foundation, incidence, and control of microbial diseases are presented through case studies. Emphasizes active learning in which students participate in classroom discussions, experiments, and demonstrations. Laboratory exercises designed to introduce techniques for the identification of important pathogenic microorganisms and disease diagnosis. Special fee. Lab.

### **BMS 503 - General Microbiology**

**Credits:** 5.00

Principles of microbiology; morphology, physiology, genetics, culture, and classification of bacteria and other microorganisms; and their relationships to agriculture, environment, industry, sanitation, and infectious diseases. Prereq: BIOL 411-412 or equivalent; CHEM 403-404 or equivalent. Special fee. Lab.

### **BMS 507 - Human Anatomy and Physiology**

**Credits:** 4.00

Cellular and systematic aspects of the human body. Laboratory exercises utilize preserved specimens, dissectible models, living tissue and computer-aided instruction. No credit if credit earned for ANSC 511-512 or ZOOL 625. Not offered for credit to zoology majors. Lab. Special fee.

### **BMS 508 - Human Anatomy and Physiology**

**Credits:** 4.00

Cellular and systematic aspects of the human body. Laboratory exercises utilize preserved specimens, dissectible models, living tissue and computer-aided instruction. No credit if credit earned for ANSC 511-512 or ZOOL 625. Prereq: BMS 507. Not offered for credit to zoology majors. Lab. Special fee.

### **BMS 560 - Body Fluids**

**Credits:** 3.00

The study of diseases and disorders through the analysis of extra-vascular body fluids. Emphasizes renal anatomy and physiology, and diseases and metabolic disorders affecting renal function.

### **BMS 561 - Body Fluids Laboratory**

**Credits:** 1.00

Practical experience in the performance and clinical correlation of urinalysis and selected body fluid procedures. Permission required. Special fee.

**Co-requisites:** BMS 560

**BMS 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. Prereq: permission. May be repeated to a maximum of 8 credit hours. Only 4 credit hours can be used toward the major. Cr/F.

**BMS 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. Prereq: permission. May be repeated to a maximum of 8 credit hours. Only 4 credit hours can be used toward the major. Cr/F. Writing intensive.

**BMS 601 - Bacteriology of Food**

**Credits:** 5.00

Lectures and laboratories address modern technical concepts of microbiology, physiology, and biochemistry related to food sanitation. Theoretical and practical approach serves as an integrative experience. Food sanitation is a serious public health issue in the meat, dairy, fish, and water industries. Benefits students seeking employment in public health or sanitary microbiology fields. Topics include food as a substrate for microorganisms, causes of food spoilage, food borne disease outbreaks, public health complications, isolation and identification of food spoiling microorganisms, and essentials for food safety and sanitation. Prereq: BMS 603 or equivalent. (Not offered every year.) Special fee.

**BMS 602 - Pathogenic Microbiology**

**Credits:** 5.00

Morphologic, cultural, biochemical, serologic, epidemiologic, and pathogenic characteristics of microorganisms causing human and animal diseases. Discussion of clinical presentation in host and laboratory diagnosis and treatment measures. Prereq: BMS 503. Lab. Special fee. By permission only.

**BMS 610 - Biomedical Lab Management**

**Credits:** 4.00

An overview of biomedical laboratory management, including financial operations, personnel management, marketing, information management, and instructional skills. Writing intensive.

**BMS 623 - Comparative Histology**

**Credits:** 4.00

Introduction to microscopic anatomy of domestic animals tissues and body systems with reference to human, avian, fish, and marine mammals. Structure and function briefly correlated. Prereq: BIOL 411-412 and ANSC 511-512 or permission. Recommended for all pre-med, pre-vet, and pre-dental students.

**BMS 640 - Phlebotomy Theory**

**Credits:** 2.00

The procedures involved in blood collection with emphasis on safety and professionalism. Students observe all techniques and have an opportunity to perform them. Recommended for students considering a health care profession. Special fee. Permission required.

### **BMS 641 - Phlebotomy Clinical Internship**

**Credits:** 1.00 to 2.00

Students obtain experience and proficiency in blood collection techniques at a health care facility (80 to 120 hours). Prereq: BMS 640. Permission required. Cr/F.

### **BMS 642 - Clinical Immunology and Serology**

**Credits:** 2.00

This course discusses the chemical and cellular response of the human immune system to microbial challenge and other foreign materials, and the immunologic basis and pathology of autoimmunity, immune proliferation, immune deficiency and hypersensitivity. Current clinical analytical methodologies and diagnostic criteria used to identify, differentiate and/or monitor these responses and conditions will be included. Prereq: BIOL 411/412 or BMS 507/508 or ANSC 511/512.

### **BMS 643 - Clinical Serology Laboratory**

**Credits:** 1.00

Practical experience testing for immune system disorders. Permission required. Special fee.

**Co-requisites:** BMS 642

### **BMS 644 - Hematology**

**Credits:** 3.00

Human blood cell physiology in both health and disease. Includes all benign and malignant conditions of red blood cells, white blood cells, platelets, and hemostasis factors.

### **BMS 645 - Clinical Hematology Laboratory**

**Credits:** 3.00

The analysis of whole blood for cellular components and plasma for hemostatic evaluation. Special emphasis on differentiating benign from malignant processes, and cellular identification by morphologic, cytochemical, and CD marker abnormalities. Permission required. Special fee.

### **BMS 650 - Molecular Diagnostics**

**Credits:** 4.00

Introduce students to the concepts and principles of infectious disease detection and human genetic screening used in clinical labs. This includes covering the major methods required to go from nucleic acid extraction to analysis (DNA extraction, PCR, hybridization, and sequencing). Course reviews what clinically relevant pathogens (bacteria, virus, and fungi) are ideal targets for molecular identification in the clinical lab and what methods are currently used in this application. It will also emphasize societal and ethical issues resulting from application of these technologies for human identity testing, cancer diagnosis, and screening for inherited diseases.

### **BMS 656 - Immunohematology**

**Credits:** 3.00

The immunology of blood, including blood group systems and the critical role they play in safe transfusion medicine. Additional topics include blood collection, component use, transfusion reactions, and transfusion-transmitted infections.

### **BMS 657 - Blood Banking Laboratory**

**Credits:** 1.00

Students obtain experience in blood banking practices including blood typing, antibody screening, cross matching, and confirmatory testing. Permission required. Special fee.

**Co-requisites:** BMS 656

### **BMS 658 - Medical Biochemistry**

**Credits: 3.00**

The assessment of disease states through the analytical assessment of amino acids, proteins, enzymes, tumor markers, non-protein nitrogen metabolites, carbohydrates, lipids, electrolytes, blood gases, hormones, vitamins, and trace elements. Prereq: BMCB 658/659, BIOL 528 or other statistics course.

**BMS 659 - Clinical Chemistry Laboratory****Credits: 2.00**

Utilizing analytical methodologies with an emphasis on quality control, students will analyze blood analytes such as glucose, BUN, creatine, electrolytes, enzymes, cholesterol, bilirubin and serum protein and evaluate their clinical significance. Special fee. Permission required.

**Co-requisites:** BMS 658

**BMS 696 - Independent Study****Credits: 1.00 to 6.00**

In-depth studies under faculty supervision. Prereq: approval of the faculty the area concerned. May be repeated up to a maximum of 16 credits. Cr/F.

**BMS 696W - Independent Study****Credits: 1.00 to 6.00**

In-depth studies under faculty supervision. Prereq: approval of the faculty the area concerned. May be repeated up to a maximum of 16 credits. Writing intensive. Cr/F.

**BMS 702 - Endocrinology****Credits: 4.00**

Biochemical and molecular structure and function of vertebrate endocrine systems. Influence of endocrine system on the physiology of vertebrates, with special reference to mammals. Current investigations of the endocrine system as a regulator and integrator of body functions including such systems as growth, reproduction, metabolism, differentiation, and behavior. Prereq: BMCB 658 or 751;/or permission. Special fee.

**BMS 703 - Infectious Disease and Health****Credits: 5.00**

Principles underlying the nature of infectious agents; the diseases they cause; pathogenic strategies; response of the host; intracellular parasitism; epidemiology; control measures including vaccines and chemotherapy; action of antimicrobial chemotherapeutic agents; pharmacokinetics and drug metabolism. Ethical issues in infectious disease covered. Well-established pathogens and newer, emerging human and animal disease agents covered. Prereq: BMS 602; permission. (Not offered every year.)

**BMS 704 - Pathologic Basis of Disease****Credits: 4.00**

Principles and mechanisms of disease at the cellular and tissue levels, including responses to cell injury, death and adaptation, inflammation, circulatory disturbances, disorders of the immune system, and neoplasia. Prereq: ANSC 511/512 or permission.

**BMS 705 - Immunology****Credits: 3.00**

Introduces the major cellular and molecular components of the immune system; examines their development and production, their interactions with each other and with other systems in the body, and their regulation; explores their role in beneficial and harmful immune responses in humans and animals. This course must be taken in conjunction with BMS 715 to receive major credit in BMS. Prereq: BMS 503.

**BMS 706 - Virology**

**Credits:** 3.00

Principles of animal and selected plant and bacterial virology in relation to infection and disease. Emphasizes the molecular biology of viruses, viral replication, isolation, propagation, assay, pathogenesis, diagnosis, detection, epidemiology, and control. Must be taken in conjunction with BMS 708 to receive major credit in BMS. Prereq: BMS 503.

**BMS 707 - Histological Techniques****Credits:** 4.00

Routine histologic techniques including tissue trimming, processing, sectioning, routine and specialized staining, lab safety, and troubleshooting skills are taught through small group discussions, demonstrations, and hands-on training. Prereq: ANSC 511 and 512 or BMS 507 and 508. Permission required. Special fee.

**BMS 708 - Virology Laboratory****Credits:** 2.00

Principles and practices of animal, selected plants, and bacterial virological methods for the propagation, detection and enumeration of viruses. Prereq: BMS 503. Coreq: BMS 706. Special fee.

**Co-requisites:** BMS 706

**BMS 709 - Special Histological Techniques and Stains****Credits:** 4.00

Special histological techniques will be taught as performed in a veterinary diagnostic lab setting. Special techniques that will be covered include: the principles and procedures used to stain the following tissues selectively: carbohydrates, connective tissue, nerve tissue, microorganism, pigments, minerals and cytoplasmic granules. Immuno-histochemistry and enzyme histochemistry technique will also be covered. Laboratory troubleshooting skills and bio-safety protocols will be discussed, including the use of protective equipment and proper handling and disposal of hazardous chemicals. Prereq: BMS 707. Special fee.

**BMS 710 - ProMED and Global Disease Events****Credits:** 2.00

Review and discussion of current world events and infectious diseases of humans and animals, including a global electronic recording system for outbreaks of emerging infectious diseases and toxins. Primary sources of information will also be reviewed (e.g., the Program for Monitoring in Emerging Infectious Diseases (ProMED), the Journal of Emerging Infectious Diseases, published by the Centers for Disease Control and Prevention (CDC)). May be repeated up to a maximum of 4 credits. Prereq: BIOL 411, 412, Group 3 Biological Science.

**BMS 711 - Toxicology****Credits:** 4.00

Toxicology is the study of mechanisms by which chemicals produce adverse effects in biological systems. This course includes consideration of toxicant exposure and risk assessment, mechanisms and effects of toxic action, major classes of toxicants, and applications of toxicology. Examples of current topics of toxicants affecting humans and other species in environmental and clinical contexts will be presented. Prereq: BMCB 658 or equivalent.

**BMS 714 - Research Methods/Endocrinology****Credits:** 5.00

Principles of biomedical, cellular, and molecular techniques and their applications to research in the endocrine system. Techniques include protein and nucleic acid assays, thin layer chromatography, radioimmunoassay, enzyme-linked immunosorbent assay, agarose and polyacrylamide gel electrophoresis, transfection, restriction analysis, plasmid amplification, RNA extraction, and dot-blot hybridization. Prereq: ANSC 701 or BCB 658 or BCB 702; permission. Special fee. Lab. Writing intensive.

### **BMS 715 - Immunology Laboratory**

**Credits:** 2.00

Introduction to major components of the immune system; principles and applications for cellular and antibody based immunological techniques. Prereq: BMS 503. Special fee

**Co-requisites:** BMS 705

### **BMS 716 - Public Health and Waterborne Diseases**

**Credits:** 4.00

Course has three sections: 1) government, 2) disease and epidemiology, and 3) sources of anthropogenic (of human origin) microbial pollution, control and disinfection. The overall theme of the class is to understand how and why waterborne (virus, protozoal, and bacterial) and some food-borne diseases are still prevalent within our society. The class usually goes on at least two field trips, to a wastewater plant and a drinking water plant; at times students may be asked to go to town meetings or public hearings concerning water and pollution. In lab, students do experiments and then analyze their data and share it with the rest of the class by posting it on the class Web site. Prereq: BMS 503. Special fee.

### **BMS 718 - Mammalian Physiology**

**Credits:** 4.00

Advanced study of the systems that control mammalian functions with emphasis on cellular and molecular mechanisms. Includes the nervous, muscular, cardiovascular, renal, gastrointestinal, and endocrine systems. Prereq: ANSC 511-512; ZOOL 627, and one semester of biochemistry or permission. Writing intensive.

### **BMS 720 - Mycology, Parasitology, and Virology**

**Credits:** 3.00

Covers human fungal, parasitic, and viral infections. The mechanism of infection, life cycles, and infectious stages of the organism as well as disease progression within the host. Prereq: BMS 602.

### **BMS 721 - Mycology, Parasitology, and Virology Laboratory**

**Credits:** 2.00

Practical experience in diagnosing and identifying specific organisms as well as correlating test results with the studied fungal, parasitic, or viral disease. Permission required. Special fee.

**Co-requisites:** BMS 720

### **BMS 725 - Veterinary Microbiology and Zoonotic Disease**

**Credits:** 2.00

Clinical microbiological techniques using veterinary medical specimens. Along with the isolation and identification of bacterial, fungal and parasitic pathogens, the zoonotic potential of a variety of organisms is discussed. Prereq: permission of instructor.

### **BMS 730 - Ethical Issues in Biomedical Science**

**Credits:** 4.00

Advances in the biological sciences impact the need for scientific integrity. From guiding students in the laboratory to scientific record keeping, from authorship and peer review to potential conflicts of interest, from use of animals and humans in research to genetic technology, scientists need to understand the ethical issues that underlie their work. These and related issues are presented and discussed in a format that encourages both an appreciation of established guidelines and an opportunity to critically examine them. Writing intensive. Prereq: BIOL 411, BMS 503.

### **BMS 750 - Case Studies**

**Credits:** 1.00 to 5.00



Capstone course in which patient case studies are analyzed in the areas of microbiology, hematology, clinical chemistry, or immunohematology. Case analysis includes correlation of patient history and current symptoms with laboratory results. Student interprets given information, recognizes abnormal results and their clinical significance, generates etiologic possibilities, and determines the "best" diagnosis for the patient condition (incorporating appropriate treatment and recommended follow-up testing). Writing intensive. Variable (1-5) credits: 2 cr. for Microbiology case studies (prereq: BMS 602 and BMS 720/721; 1 cr. for Hematology case studies (prereq: BMS 644/645); 1 cr. for Medical Biochemistry case studies (prereq: BMS 658/659); and 1 cr. for Immunohematology case studies (prereq: BMS 656/657).

### **BMS 751 - Advanced Clinical Microbiology Internship**

**Credits:** 5.00

Advanced clinical bacteriological procedures, fluorescent techniques, and special procedures. Mycology and parasitology identification and testing. Prereq: senior BMS majors only.

### **BMS 751W - Advanced Clinical Microbiology Internship**

**Credits:** 5.00

Advanced clinical bacteriological procedures, fluorescent techniques, and special procedures. Mycology and parasitology identification and testing. Prereq: senior BMS majors only. Writing intensive.

### **BMS 752 - Advanced Hematology Internship**

**Credits:** 5.00

Special hematology procedures including diagnostic staining, advanced hemostasis studies, and evaluation of blood cells in disease states. Prereq: senior BMS majors only.

### **BMS 752W - Advanced Hematology Internship**

**Credits:** 5.00

Special hematology procedures including diagnostic staining, advanced hemostasis studies, and evaluation of blood cells in disease states. Prereq: senior BMS majors only. Writing intensive.

### **BMS 753 - Advanced Immunohematology Internship**

**Credits:** 5.00

Advanced blood-banking procedures, including antibody identification, and component therapy. Principles and procedures for detecting disorders of cellular and humoral immunity. Prereq: senior BMS majors only.

### **BMS 753W - Advanced Immunohematology Internship**

**Credits:** 5.00

Advanced blood-banking procedures, including antibody identification, and component therapy. Principles and procedures for detecting disorders of cellular and humoral immunity. Prereq: senior BMS majors only. Writing intensive.

### **BMS 754 - Advanced Clinical Chemistry Internship**

**Credits:** 5.00

Theory, operation, evaluation, and maintenance of automated chemistry systems. Advanced laboratory analysis of body fluid chemistries including enzymology, isotopes, hormones, blood gases, and toxicology. Data analysis, computerization. Prereq: senior BMS majors only.

### **BMS 754W - Advanced Clinical Chemistry Internship**

**Credits:** 5.00

Theory, operation, evaluation, and maintenance of automated chemistry systems. Advanced laboratory analysis of body fluid chemistries including enzymology, isotopes, hormones, blood gases, and toxicology. Data analysis, computerization. Prereq: senior BMS majors only. Writing intensive.

### **BMS 755 - Molecular Diagnostics**

**Credits:** 4.00

Introduce students to the concepts and principles of infectious disease detection and human genetic screening used in clinical labs. This includes covering the major methods required to go from nucleic acid extraction to analysis (DNA extraction, PCR, hybridization, and sequencing). Course reviews what clinically relevant pathogens (bacteria, virus, and fungi) are ideal targets for molecular identification in the clinical lab and what methods are currently being used in this application. It will also highlight molecular methods applied in human health and disease, including identity testing, molecular oncology, chromosome analysis, and screening for inherited diseases.

### **BMS 761 - Clinical Microbiology Internship**

**Credits:** 20.00

Advanced instruction in clinical bacteriology, mycology, parasitology, and virology at local hospital or reference laboratory. Isolation, identification, and antibiotic sensitivities for common pathogens are emphasized. Prereq: BMS 602; senior BMS majors only.

### **BMS 761W - Clinical Microbiology Internship**

**Credits:** 20.00

Advanced instruction in clinical bacteriology, mycology, parasitology, and virology at local hospital or reference laboratory. Isolation, identification, and antibiotic sensitivities for common pathogens are emphasized. Prereq: BMS 602; senior BMS majors only. Writing intensive.

### **BMS 762 - Clinical Hematology Internship**

**Credits:** 20.00

Advanced instruction in hematology and hemostasis at a local hospital or reference laboratory. Specialized tests such as automated cell counts, cytochemical analyses, and specialized hemostasis are covered. Prereq: BMS 652; senior BMS majors only.

### **BMS 763 - Clinical Immunohematology Internship**

**Credits:** 20.00

Advanced instruction in clinical immunohematology at a local hospital or reference laboratory. Pre-transfusion testing, donor screening, phlebotomy and component therapy emphasized. Prereq: BMS 653; senior BMS majors only.

### **BMS 764 - Clinical Chemistry Internship**

**Credits:** 20.00

Advanced instruction in clinical chemistry at a local hospital or reference laboratory. Analysis of carbohydrates, proteins, enzymes, lipids, hormones, electrolytes, blood gases, and drugs. Prereq: BMS 654; senior BMS majors only.

### **BMS 790 - Undergraduate Teaching Experience**

**Credits:** 1.00 to 4.00

Students assist Graduate Teaching Assistants in preparing, presenting, and executing Microbiology laboratory. May be repeated up to a maximum of 4 credits.

### **BMS 795 - Investigations**

**Credits:** 1.00 to 8.00

Special projects in microbiology. Research topics in immunology; virology; microbial genetics; pathogenics; microbial ecology; microbial physiology; marine microbiology; detection of pathogens in shellfish. May be repeated up to 8 times for up to a maximum of 8 credits.

### **BMS 795W - Investigations**

**Credits:** 1.00 to 8.00

Special projects in microbiology. Research topics in immunology; virology; microbial genetics; pathogenics; microbial ecology; microbial physiology; marine microbiology; detection of pathogens in shellfish. May be repeated up to 8 times for up to a maximum of 8 credits. Writing intensive.

**BMS 796 - Biomedical Research Internship**

**Credits:** 4.00 to 16.00

Advanced instruction/participation in some aspect of biomedical research, either on or off campus. Student designs program of study with research supervisor and MLS faculty advisor. May be repeated up to a maximum of 40 credits.

**BMS 799 - Senior Thesis**

**Credits:** 1.00 to 4.00

A special project conducted under faculty supervision and resulting in a written thesis. Students must initiate discussion of the project with an appropriate faculty member and obtain permission.

**BMS 799H - Senior Honors Thesis**

**Credits:** 1.00 to 4.00

A special project conducted under faculty supervision and resulting in a written thesis. Students must initiate discussion of the project with an appropriate faculty member and obtain permission.

## **Administration-UNHM**

### **ADM 400 - Introduction to Business**

**Credits:** 4.00

Introduces the study of business: examines the origins and development of American business, its place in a global economy, and its legal and ethical roles in modern society. Includes an overview of the functional areas of business such as finance, marketing, and organizational behavior. Designed for business majors as well as for students considering a major in business.

### **ADM 430 - Introduction to Business Statistics**

**Credits:** 4.00

The use of statistical methods for managerial decision making. Emphasis is on understanding concepts, including inferences from sample data and model formulation, as aids in decision-making. Lab: Using class-focused statistics problems, designed to provide opportunity to develop course-specific problem solving strategies; to adapt from mathematical to statistical thinking; to analyze and communicate significance and meaning of numerical outcomes; to develop course-specific test taking prowess. No credit for students who have received credit for BIOL 528; ADMN 420; EREC 525; HHS 540; MATH 439; MATH 539; MATH 644; PSYC 402; SOC 502.

### **ADM 453 - Leadership for Managers**

**Credits:** 4.00

This course provides the critical element of analytical and intellectual examination and reflection of certain core issues in the practice of leadership. These objectives are achieved through open discussion, honest self-assessment, experiential exercises, and observation of real-life leadership practice. What is valued in this course are honest relationships and dialogue, risk-taking, dedication to the topic of leadership, initiative, and exploring the confusion and gray areas involved in these topics. Prereq: ADM 400.

### **ADM 455 - Management of Human Resources Management**

**Credits:** 4.00

This course emphasizes the development of skills for dealing with selected aspects of human resource management. It aims to enhance the students' ability to apply theoretical concepts and alternative approaches for dealing with common issues concerning the human side of the enterprise. The course is geared to serve the needs of line and staff administrators in supervisory positions. Thus, it strives to train students and facilitate the development of better understanding of human resources issues as they relate to other managerial functions, organizational behavior, and the ability of managers and the organization to achieve prescribed goals. Prereq: ADMN 400 or permission of instructor.

### **ADM 520 - Training and Development**

**Credits:** 4.00

Students interested in career options in training and development of human resources development learn some of the theoretical bases, core practices, competencies, and issues of this professional field, as well as considerations for global training and development. They are exposed to research and discoveries on skills and knowledge related to training and adult learning, and models for effective training. They learn the most current trends and issues in international training and development, including the push for management and leadership training for intercultural understanding. Prereq: ADM 400, ADM 455, or permission from instructor.

### **ADM 532 - Introduction to Financial Accounting**

**Credits:** 4.00

Fundamental concepts of accounting and their impact on the business world and society as a whole. Emphasis on the recording of economic transactions, and preparation and analysis of financial statements. No credit for students who have had ACFI 501, 502, ADMN 502.

### **ADM 533 - Introduction to Managerial Accounting**

**Credits:** 4.00

Emphasizes how organizational managers use accounting information to support their functions of planning, control, and decision making. Examples taken from corporations, small business, and not-for-profit organizations. No credit for students who have received credit for ACFI 503, ADMN 503. Prereq: ADM 532.

### **ADM 550 - Business Law**

**Credits:** 4.00

This course explores the legal environment in which businesses operate and studies the interaction between business and the legal system. Students examine various areas of the law which are integral to operating a business enterprise. Topics include contracts, torts, agency, Uniform Commercial Code, ethical and criminal implications of business actions, property laws, and the legal aspects of different business entities. Business owners, managers, accountants, paralegals, and all those seeking to gain or broaden their general understanding of the legal system should benefit from this course. Prereq: ADM 400.

### **ADM 565 - Selling and Sales Management**

**Credits:** 4.00

The sales and selling management (SSM) course covers both the strategies, and the tactics, of selling, from the wide-ranging perspectives of sales people and customers. Management topics include: motivation and behavior, sales methodologies, channel optimization, recruiting and selecting representatives, training, compensation, and evaluation. Class also covers in-depth through the class practice sales tactics such as: prospecting and sales call planning, communicating the sales message, negotiating for win-win situations, overcoming objections, closing the sale, and follow-up management. Reflecting the nature of practice selling, the SSM course is offered in a short series of longer days. Prereq: none, but ADM 400 or 610 is encouraged. No credit earned if credit earned for ADM 675 if listed as Selling and Sales Management.

### **ADM 601 - Financial Management**

**Credits:** 4.00

Study of investment, finance, and dividend decisions of the business firm. Topics include capital budgeting, designing and issuing securities, management of working capital and evaluating manager performance. Prereq: completion of Introductory Business Core or permission.

### **ADM 610 - Marketing Principles and Applications**

**Credits:** 4.00

Studies the process of planning and distributing goods and services to the marketplace. Topics include product planning, pricing, promotion, and distribution. Emphasis on the application of marketing principles to real world business cases. Prereq: ADM 400, ECN 412.

### **ADM 620 - Organizational Behavior**

**Credits:** 4.00

Applications of behavioral science concepts to work settings. Topics include worker incentives and perceptions toward work, group versus individual decision making, conflict resolution, interpersonal and leadership skills, and the study of other behaviors relevant to effective managing of a business organization. Prereq: Completion of Introductory Business Core or permission. Special fee. Writing intensive.

### **ADM 630 - International Management**

**Credits: 4.00**

This course introduces students to the world of international business and management by studying cultural influences, government, and business structures in our global economy. Students also learn about trade relations, international finance and legal and labor agreements. Also covered, are topics on information needs, production systems, marketing and promotion, and career planning. Prereq: an international business course.

**ADM 635 - Students in Free Enterprise****Credits: 2.00**

This is a two credit project driven course aimed at teaching students an understanding of free enterprise through the application of economic activities within the community. In addition, students will have special topic sessions on leadership, time management, public speaking, project management, and fundraising. Emphasis on teamwork. Course is open to all students who have junior or senior level standing, in and out of the business program. Prereq: junior or senior level standing. Special fee. Course may be repeated to a maximum of 12 credits.

**ADM 640 - Business Communication and Conflict****Credits: 4.00**

This course is designed to give students a comprehensive view of communication, its scope and importance in business, and the role of communication in establishing a favorable outside the firm environment as well as an affective internal communications program. The various types of business communication media are covered. This course also develops an awareness of the importance of succinct written expression to modern business communication. Prereq: Completion of Introduction to Business Core and ADM 455; or Approval by instructor.

**ADM 650 - Operations Management****Credits: 4.00**

Studies the operational issues and problems related to the design and implementation of an organization's production process. Topics include production planning and analysis, inventory and quality control, scheduling, and methods for evaluating production performance in both the goods and service sectors of the economy. Prereq: Completion of Introductory Business Core or permission.

**ADM 660 - Employment and Labor Law****Credits: 4.00**

This course includes a study of the organizational rights of employees and unions and the governance of the use of economic force by employers and unions. Also studied is the duty to bargain collectively, the manner in which collective bargaining is conducted, and the subjects to which it extends, as well as the manner in which collective bargaining agreements are administered and enforced. The relationship between a union and its members is also treated. Prereq: Completion of Introduction to Business Core and ADM 455.

**ADM 661 - Integrated Marketing Communication****Credits: 4.00**

Integrated Marketing Communications (IMC) is a fast evolving field in business and marketing. This course covers the full spectrum of planning, budgeting, data collection and analysis, creative tools and models, including perspectives on both Business to Consumer and Business to Business, IMC. Special emphasis for: cultural, lifestyle and ethnic sensitivity, global versus individual country tactics, and the fast evolving techniques of social and mobile marketing. All of the above are in the context of building brands and customer loyalty. Prereq: ADM 400 and ADM 610. No credit earned if credit earned for ADM 675 or 685 if listed as Marketing Communication.

**ADM 663 - Services Marketing and Operations Management**

**Credits: 4.00**

This course is designed to prepare students for NH business and marketing careers by understanding the issues, challenges, and terminology inherent in industries as diverse as health care, construction, education, professional and technical offices, transportation, information and publishing, tourism, retailing, etc. Case studies are used throughout the term. We study many of these sectors, both as academicians and as consumers, to build a portfolio of understanding across divergent sectors. Students learn about services marketing strategies and management models that: increase customer satisfaction, improve customer retention and create dominant service brands that can create a competitive advantage for firms in any given industry. Prereq: ADM 400; ADM 610. No credit if credit earned for ADM 675 or ADM 685 if listed as Services Marketing.

**ADM 665 - Int'l Marketing Strategy Mgt****Credits: 4.00**

The primary missions of the International Marketing Strategy Management (IMSM) course are to help students to: (1) develop understanding and knowledge of the important role International marketing plays in business (2) develop and improve global thinking, problem solving and integrative skills in a case based context (3) learn and apply the varying tools and models for evaluating when, where are how international marketing investments should be made. (4) understand and implement special approaches for cultural and ethnic differences in taste and attitudes, including trade legalities and regulations. Prereq: ADM 400 and ADM 610. No credit if credit earned for ADM 675 or 685 if listed as International Marketing.

**ADM 675 - Special Topics in Business Administration****Credits: 4.00**

Provides students with an opportunity to explore a topic in business administration such as marketing, management, finance, or accounting. Topics will vary. Barring duplication of subject, may be repeated for credit. Prereq: Completion of Introductory Business Core or permission.

**ADM 685 - Applications in Business Management****Credits: 4.00**

Selected topics. Topics will vary. Barring duplication of subject, may be repeated for credit.

**ADM 695 - Independent Study in Business****Credits: 1.00 to 4.00**

Independent study exploring a special topic emphasizing the managerial, organizational, strategic, political or economic context(s) within which business decisions are made. Prereq: ADM 400 and permission of instructor. May be repeated for a maximum of 8 credits.

**ADM 701 - Business, Government and Society****Credits: 4.00**

Examines relationships between business and its broader social, political and economic contexts. Topics include business ethics, social responsibilities, the impact of globalization, the impact of government policies, and how business influences government. Prereq: ADM 620 or permission. Writing intensive.

**ADM 750 - Business Internship Seminar****Credits: 4.00**

A seminar course in which students report on and discuss their business internship experiences. Selected group readings and written and oral student presentations. Prereq: ADM 620 and senior standing or permission. Special fee.

**ADM 755 - Co-op Program****Credits: 1.00**

This is a program that enables students to integrate classroom learning with practical, professional,

experience in their field of study. Students majoring in professional and liberal arts programs experience the working world through an educationally managed agreement between the employer, the student, and the institution. Students need to have a minimum 3.0 cumulative GPA and have junior or senior level status.

**ADM 760 - Applied Senior Project**

**Credits:** 4.00

An independent study research project involving an in-depth exploration into a business topic chosen in consultation with a faculty member. Designed for students with extensive prior work experience. Prereq: ADM 620 and senior standing or permission. Special fee.

**ADM 770 - Special Topics Senior Seminar**

**Credits:** 4.00

In-depth exploration into the theoretical and applied aspects of a special business topic. Topics vary according to instructor. Prereq: ADM 620 and senior standing or permission. Special fee.



## Chemical Engineering

### **CHE 400 - Chemical Engineering Lectures**

**Credits:** 1.00

Introduces the profession, the process engineer as designer and problem solver; and the goals of the chemical engineering/ENE-IP curriculum. Lectures by faculty and practitioners. Introduction to computer skills, engineering ethics, safety, and careers in chemical/environmental (IP) engineering. Field trips. Cr/F.

### **CHE 410 - Energy and Environment**

**Credits:** 4.00

Energy supply in this country and the world; conventional fuel reserves: coal, oil, natural gas; alternative sources: nuclear, solar, geothermal, et. Forecasts and strategies to meet needs. Environmental pollution, sources, and economic and environmental impacts. Methods for pollution control. Regulatory standards for environmental protection.

### **CHE 410H - Honors/Energy and Environment**

**Credits:** 4.00

Energy supply in this country and the world; conventional fuel reserves: coal, oil, natural gas; alternative sources: nuclear, solar, geothermal, et. Forecasts and strategies to meet needs. Environmental pollution, sources, and economic and environmental impacts. Methods for pollution control. Regulatory standards for environmental protection.

### **CHE 501 - Introduction to Chemical Engineering I**

**Credits:** 3.00

Systems of units; material balances and chemical reactions; gas laws; phase phenomena.

### **CHE 502 - Introduction to Chemical Engineering II**

**Credits:** 3.00

Energy and material balances for systems with and without chemical reactions; design case studies.

### **CHE 601 - Fluid Mechanics and Unit Operations**

**Credits:** 3.00

Continuity, momentum, and energy equations; laminar and turbulent flow in pipes; rheology. Applications to flow in porous media, filtration, and fluidization.

### **CHE 602 - Heat Transfer and Unit Operations**

**Credits:** 3.00

Thermal properties of materials, steady-state and transient conduction and convection; radiation; applications to heat exchangers and process equipment.

### **CHE 603 - Applied Mathematics for Chemical Engineers**

**Credits:** 4.00

Mathematical modeling and analysis of chemical engineering problems. Analytical methods for first- and second-order differential equations; numerical solutions; series solutions; Bessel functions; Laplace transforms; matrix algebra. Interpretation and solution of partial differential equations. Lab.

### **CHE 604 - Chemical Engineering Thermodynamics**

**Credits:** 3.00

Volumetric and phase behavior of ideal and real gases and liquids; cycles; steady-flow processes; chemical equilibrium.

### **CHE 612 - Chemical Engineering Laboratory I**

**Credits:** 3.00

Selected experiments in fluid mechanics, heat transfer, and unit operations. Writing intensive.

### **CHE 614 - Separation Processes**

**Credits:** 3.00

Adsorption, Chromatography, Membrane Separations, Liquid-liquid, Extraction and Crystallization, requires junior level studies in chemical engineering or permission.

### **CHE 651 - Biotech Experience/Biomanufacturing**

**Credits:** 4.00

Course begins by introducing students to the proteins and companies of biotechnology and to current good manufacturing practices. For remainder of the course, students use cell culture of bacteria, mammalian and yeast cells to produce human proteins using the tools and manufacturing standards, operating procedures of biotechnology, including upstream and downstream processing of proteins, and quality control of protein production. Permission required. Also listed as ANSC 651 and MICR 651.

### **CHE 695 - Chemical Engineering Project**

**Credits:** 1.00 to 4.00

Independent research problems carried out under faculty supervision.

### **CHE 696 - Independent Study**

**Credits:** 1.00 to 4.00

Prereq: permission of the adviser and department chairperson; granted only to students having superior scholastic achievement.

### **CHE 703 - Mass Transfer and Stagewise Operations**

**Credits:** 3.00

Diffusion in gases, liquids, and solids; design and analysis of distillation, absorption, and other stagewise equipment and operations.

### **CHE 705 - Fossil Fuels and Renewable Energy Sources**

**Credits:** 4.00

Processing and refining of coal, crude oil, natural gas, tar sands and shale oil. Biomass co-combustion, biofuel extraction, impediments to widespread utilization. Exploration of environmental issues with energy generation and consumption. Lab.

### **CHE 707 - Chemical Engineering Kinetics**

**Credits:** 3.00

Use of laboratory data to design commercial reactors. Continuous, batch, plug-flow, and stirred-tank reactors for homogeneous and catalytic multiphase reactions.

### **CHE 708 - Chemical Engineering Design**

**Credits:** 4.00

Introduction to cost engineering. Application of acquired skills to design of chemical processes. Individual major design project required. Safety for industrial processes. Lab. Writing intensive.

### **CHE 712 - Introduction to Nuclear Engineering**

**Credits:** 4.00

Development of nuclear reactors; binding-energy; radioactivity; elements of nuclear reactor theory; engineering problems of heat transfer, fluid flow, materials selection, and shielding; environmental impacts.

### **CHE 713 - Chemical Engineering Laboratory II**

**Credits:** 3.00

Selected experiments in mass transfer, stagewise operations, thermodynamics, and kinetics. Writing intensive

### **CHE 722 - Introduction to Microfluidics**

**Credits:** 4.00

Fundamentals and applications of microfluidics; scaling laws; microfabrication technology; hydrodynamics and electrofluidics; interfacial phenomena; capillary effects and diffusion; microvalves; micropumps; lab-on-a-chip systems; biochips. Prereq: fluids mechanics course or permission of instructor.

### **CHE 744 - Corrosion**

**Credits:** 4.00

Fundamentals of corrosion processes in industrial and environmental settings; thermodynamics, kinetics, and mass transport in local corrosion cells; protection by electrochemical, chemical, surface modification or barrier methods; instrumental methods in corrosion science. Lab.

### **CHE 752 - Process Dynamics and Control**

**Credits:** 4.00

Dynamic behavior of chemical engineering processes described by differential equations; feedback control concepts and techniques; stability analysis. Lab. (Also listed as ENE 752.)

### **CHE 761 - Biochemical Engineering**

**Credits:** 4.00

Immobilized enzyme technology, microbial biomass production, transport phenomena in microbial systems, biological reactor design, process instrumentation and control, applications in separation and purification processes. Lab.

### **CHE 762 - Biomedical Engineering**

**Credits:** 4.00

Transport phenomena and chemical reactions in physiological systems. Formulation and interactions of biomaterials. Artificial kidney, vascular prosthesis, drug delivery, protein and cell adhesion. Introduction to tissue engineering. Lab.

## Chemistry

### **CHEM 400 - Freshman Seminar**

**Credits:** 1.00

An introduction to the chemistry profession. Talks and workshops on the career of a chemist in academia, industry, medicine, law, teaching and government. Required for chemistry majors. May be repeated. Cr/F.

### **CHEM 401 - Chemistry Essentials**

**Credits:** 2.00

Preparatory chemistry course designed for students who wish to strengthen their chemistry background prior to taking CHEM 403 (General Chemistry I). Topics may include: basic math, pertinent to chemistry, stoichiometry, introduction to the periodic table, among others. Not a prerequisite for CHEM 403, but recommended for students with weak backgrounds

### **CHEM 403 - General Chemistry I**

**Credits:** 4.00

Fundamental laws and concepts applied to nonmetals, metals, and their compounds. For students who plan to take further chemistry courses. Previous chemistry recommended. Knowledge of algebra, exponentials, and logarithms required. Special fee. Lab. Cannot be taken for credit if credit received for CHEM 405. Required for chemistry majors.

### **CHEM 404 - General Chemistry II**

**Credits:** 4.00

Fundamental laws and concepts applied to nonmetals, metals, and their compounds. For students who plan to take further chemistry courses. Previous chemistry recommended. Knowledge of algebra, exponentials, and logarithms required. Required for chemistry majors. Special fee. Lab. Prereq: CHEM 403 and 403L.

### **CHEM 404H - Honors/General Chemistry II**

**Credits:** 4.00

Fundamental laws and concepts applied to nonmetals, metals, and their compounds. For students who plan to take further chemistry courses. Previous chemistry recommended. Knowledge of algebra, exponentials, and logarithms required. Required for chemistry majors. Special fee. Lab. Prereq: CHEM 403 and 403L. Honors course is designed for students who have enrolled in the honors degree program. Special fee. Lab. Cannot be taken for credit if credit received for CHEM 402. Prereq: CHEM 403.

### **CHEM 405 - Chemical Principles for Engineers**

**Credits:** 4.00

Basic principles; atomic structure, bonding, equilibria, and thermodynamics. Prereq: one year of high school chemistry, algebra, and knowledge of logarithms. Cannot be taken for credit if credit received for CHEM 403-404. Required for chemical engineering, mechanical engineering, electrical and computer engineering, environmental engineering; industrial majors. Not applicable for credit for majors in chemistry or biochemistry.

### **CHEM 409 - Chemistry and Society**

**Credits:** 4.00

Elementary survey of chemistry; integrates principles and applications. For students who do not intend to take any other chemistry courses and those interested in satisfying a general education science requirement. Not a prerequisite for any other chemistry courses. Includes lab like activities during class

time. (Not offered every year.) Chemistry majors are excluded from taking this course.

### **CHEM 413 - General Chemistry Lecture I**

**Credits:** 3.00

Fundamental laws and concepts applied to nonmetals, metals, and their compounds. For students who plan to take further chemistry courses. Previous chemistry recommended. Knowledge of algebra, exponentials, and logarithms required. Special permission required. Not offered every summer. Cannot be taken for credit if credit received for CHEM 401, 403, 405, or 409.

### **CHEM 414 - General Chemistry Lab I**

**Credits:** 1.00

Lab application of fundamental laws and concepts applied to nonmetals, metals and their compounds. Previous general chemistry lecture required. Special permission. Special fee. Not offered every summer. Cannot be taken for credit if credit received for CHEM 401, 403, 405, or 409.

### **CHEM 415 - General Chemistry Lecture II**

**Credits:** 3.00

Fundamental laws and concepts applied to nonmetals, metals, and their compounds. For students who plan to take further chemistry courses. Previous chemistry recommended. Knowledge of algebra, exponentials, and logarithms required. Cannot be taken for credit if credit received for CHEM 402 or 404. Prereq: CHEM 403 or 413.

### **CHEM 416 - General Chemistry Lab II**

**Credits:** 1.00

Lab application of fundamental laws and concepts applied to nonmetals, metals and their compounds. Previous general chemistry lecture required. Special permission. Special fee. Not offered every summer. Cannot be taken for credit if credit received for CHEM 402 or 404. Prereq: CHEM 403 or 414.

### **CHEM #444A - Fire and Ice**

**Credits:** 4.00

Embodies a focus on the perception, movement, creation, understanding, and everyday use of heat. Examines historical evolution and controversy regarding the concept of heat across physical and life sciences.

### **CHEM 444B - Symmetry in Nature, The Arts, and Daily Life**

**Credits:** 4.00

The elements of symmetry and its occurrence and role in nature (bilateral symmetry in butterflies and animals; cylindrical symmetry in trees and volcanoes; helical symmetry in shells, proteins, and DNA; the role of symmetry in design of medicines); its role in art and design (textiles, advertising); and in our lives (design of houses, chairs, scissors). The course is non-mathematical and is open to students having little background in science. Writing intensive.

### **CHEM 444G - Green Goggles**

**Credits:** 4.00

In this course, we investigate the principles and practice of Green Chemistry. Green Chemistry is the field of science that uses a principle-based approach to design (or redesign) chemical reactions and processes to make them more sustainable. In exploring green chemistry, many of the fundamental concepts of a general chemistry course are investigated in order to understand how chemists "green" chemical reactions. A service learning project is a major component of this course, where students reach out to the community at large and practice discovering the world through their new "green goggles". Online technology is incorporated in this course to further disseminate student projects and work.

### **CHEM 496 - Freshman Independent Study**

**Credits:** 1.00 to 8.00

Independent study for students who have not had organic chemistry. Designed for students who wish to pursue independent study topics, but do not have the experience to pursue lab research. Cannot be counted toward the major. (Not offered every year.)

### **CHEM 501 - Peer-led Team Learning in Chemistry**

**Credits:** 2.00

Initial experience as peer instructional leader. Practical application of theories of cognition, group dynamics, learning, and motivation to helping other students learn chemistry in general chemistry. Requires one weekly meeting with students. Permission required. Prereq: CHEM 403 or 404.

### **CHEM 502 - Advanced Peer-led Team Leadership in Chemistry**

**Credits:** 1.00

Development and assessment of leadership skills. Practical application of theories of cognition, group dynamics, learning, and motivation to helping other students learn chemistry in general chemistry. Requires one weekly meeting with students. Permission required. Prereq: CHEM 403 and CHEM 501.

### **CHEM 517 - Quantitative Analysis**

**Credits:** 4.00

Combines lecture, laboratory, and in-class problem solving to study solubility, acid-base, redox, and complexation reactions and their application for quantitative chemical measurements. Prereq: CHEM 404 or 405. Lab.

**Co-requisites:** CHEM 518

### **CHEM 518 - Quantitative Analysis Laboratory**

**Credits:** 1.00

Volumetric methods with an emphasis on technique; separations; and selected instrumental methods such as potentiometry, spectrophotometry, atomic absorption, and gas chromatography. Prereq: CHEM 404 or 405. Special fee.

**Co-requisites:** CHEM 517

### **CHEM 545 - Organic Chemistry**

**Credits:** 3.00

Introductory study of carbon compounds for those who desire a brief terminal course. Prereq: CHEM 404 or 405. Students receiving credit for CHEM 545 may not receive credit for CHEM 402, 547-548, or 651-652.

**Co-requisites:** CHEM 546

### **CHEM 546 - Organic Chemistry Laboratory**

**Credits:** 2.00

Introductory study of carbon compounds for those who desire a brief terminal course. Prereq: CHEM 404 or 405. Special fee. Lab.

**Co-requisites:** CHEM 545

### **CHEM 547 - Organic Chemistry I**

**Credits:** 3.00

Principal classes of organic compounds, aliphatic and aromatic; class reactions and structural theory. Intended primarily for chemistry and biochemistry majors. Prereq: CHEM 404; 405;/or permission. Students receiving credit for CHEM 547-548 may not receive credit for either CHEM 545 or 651-652.

**Co-requisites:** CHEM 549

**CHEM 548 - Organic Chemistry II****Credits:** 3.00

Principal classes of organic compounds, aliphatic and aromatic; class reactions and structural theory. Intended primarily for chemistry and biochemistry majors. Prereq: CHEM 404; 405; and 547/or permission. Students receiving credit for CHEM 547-548 may not receive credit for either CHEM 545 or CHEM 651-652.

**Co-requisites:** CHEM 550**CHEM 549 - Organic Chemistry Laboratory****Credits:** 2.00Special fee. Lab.**Co-requisites:** CHEM 547**CHEM 550 - Organic Chemistry Laboratory****Credits:** 2.00Special fee. Lab.**Co-requisites:** CHEM 548**CHEM 574 - Introduction to Inorganic Chemistry****Credits:** 3.00

Elementary concepts including periodicity, descriptive chemistry of metals and nonmetals, and coordination compounds. Prereq: CHEM 404; 405;/or permission.

**CHEM 651 - Organic Chemistry I****Credits:** 3.00

Principal classes of organic compounds, aliphatic and aromatic, class reactions and structural theory. Intended primarily for pre-healing arts, biological science, and health science students. Prereq: CHEM 404; 405;/or permission. Students receiving credit for CHEM 651-652 may not receive credit for either CHEM 545 or 547-548.

**Co-requisites:** CHEM 653**CHEM 652 - Organic Chemistry II****Credits:** 3.00

Principal classes of organic compounds, aliphatic and aromatic, class reactions and structural theory. Intended primarily for pre-healing arts, biological science, and health science students. Prereq: CHEM 404; 405;and 651/or permission. Students receiving credit for CHEM 651-652 may not receive credit for either CHEM 545 or 547-548.

**Co-requisites:** CHEM 654**CHEM 652A - Organic Chemistry****Credits:** 3.00

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**CHEM 653 - Organic Chemistry Laboratory****Credits:** 2.00Special fee. Lab.**Co-requisites:** CHEM 651**CHEM 654 - Organic Chemistry Laboratory****Credits:** 2.00Special fee. Lab.**Co-requisites:** CHEM 652**CHEM 683 - Physical Chemistry I****Credits:** 3.00

The properties of gases, liquids, and solids; thermochemistry and thermodynamics; solutions, chemical

equilibria, reaction rates, conductance, and electromotive force. Prereq: CHEM 404 or 405; MATH 426. Pre- or Coreq: PHYS 402 or 407. Coreq: CHEM 685-686.

**Co-requisites:** CHEM 685

### **CHEM 684 - Physical Chemistry II**

**Credits:** 3.00

The properties of gases, liquids, and solids; thermochemistry and thermodynamics; solutions, chemical equilibria, reaction rates, conductance, and electromotive force. Prereq: CHEM 404 or 405 and CHEM 683; MATH 426. Pre- or Coreq: PHYS 402 or 407.

**Co-requisites:** CHEM 686

### **CHEM 685 - Physical Chemistry Laboratory**

**Credits:** 2.00

Measurement of thermodynamic properties, chemical kinetics, and methods of determining the structure of matter. Prereq: CHEM 404 or 405; MATH 426. Pre- or Coreq: PHYS 407 or 402. Coreq: CHEM 683-684. Special fee.

**Co-requisites:** CHEM 683

### **CHEM 686 - Physical Chemistry Laboratory**

**Credits:** 2.00

Measurement of thermodynamic properties, chemical kinetics, and methods of determining the structure of matter. Prereq: CHEM 404 or 405; MATH 426. Pre- or Coreq: PHYS 407 or 402. Coreq: CHEM 683-684. Special fee.

**Co-requisites:** CHEM 684

### **CHEM 696 - Independent Study**

**Credits:** 1.00 to 4.00

For exceptional students. Individual reading, writing, or laboratory work carried out under the tutelage of a faculty member. May be used to replace specific required courses in chemistry. Prereq: approval of the adviser and department chairperson. Credits to be arranged.

### **CHEM 698 - Seminar**

**Credits:** 1.00

Student reports on topics of interest. Prereq: CHEM 548 or 652; CHEM 684. Writing intensive.

### **CHEM 699 - Thesis**

**Credits:** 4.00

Yearlong investigation in a selected topic, with background and experimental investigation. For chemistry majors who have completed CHEM 548, 684, and 762. Required for B.S. majors. Strongly recommended for B.A. chemistry majors. Prereq: 2.50 average and approval of department chairperson. Permission required. Lab. Two semesters of 4 credits each are required. Writing intensive.

### **CHEM 708 - Spectroscopic Investigations of Organic Molecules**

**Credits:** 3.00

Identification and structural analysis of chemical compounds by selected instrumental methods. Typical topics include proton and carbon-13 NMR spectroscopy, IR and UV spectroscopy, and mass spectrometry.

### **CHEM 755 - Advanced Organic Chemistry**

**Credits:** 3.00

Methods of synthesis and determination of structure, including stereochemistry of complex organic compounds. Prereq: CHEM 548 or 652 or equivalent. Coreq for CHEM majors: 756.

**Co-requisites:** CHEM 756



### **CHEM 756 - Advanced Organic Chemistry Laboratory**

**Credits:** 2.00 or 3.00

Synthesis and structural determination of complex organic compounds, techniques for the separation, determination of purity, and identification of compounds by spectroscopic and chemical means. Coreq for CHEM majors: 755. Special fee.

**Co-requisites:** CHEM 755

### **CHEM 762 - Instrumental Methods of Chemical Analysis**

**Credits:** 3.00

Theory, instrumentation, and application of methods such as atomic absorption, coulometry, emission spectrography, gas and liquid chromatography, polarography, potentiometry, IR and UV-VIS absorption spectrophotometry, and mass spectrometry to chemical analysis. Prereq: CHEM 406 or 517; CHEM 684 as a pre- or co requisite;/or permission.

**Co-requisites:** CHEM 763

### **CHEM 763 - Instrumental Methods of Chemical Analysis Laboratory**

**Credits:** 2.00 or 3.00

Experimental parameters, error analysis, and applications of the methods covered in CHEM 762. Special fee.

**Co-requisites:** CHEM 762

### **CHEM 774 - Inorganic Chemistry**

**Credits:** 3.00

Basic theoretical concepts and their applications to inorganic reactions and compounds. Prereq: organic chemistry; physical chemistry;/or permission.

**Co-requisites:** CHEM 775

### **CHEM 775 - Inorganic Chemistry Laboratory**

**Credits:** 2.00

In-depth instruction of selected techniques of synthesis and characterization of inorganic compounds. Emphasis on the analysis and presentation of results and experiment planning. Includes open-ended and collaborative projects. Special fee.

**Co-requisites:** CHEM 774

### **CHEM 776 - Physical Chemistry III**

**Credits:** 4.00

Application of quantum theory to atomic electron structure, spectroscopy, and molecular structure. Prereq: CHEM 683-684. Special fee. Lab.

### **CHEM 795 - Special Topics**

**Credits:** 2.00 to 4.00

New or specialized topics not covered in regular course offerings. May be repeated to a maximum of 4 credits. Prereq: permission.

## Chinese

### **CHIN 400 - Conversational Chinese**

**Credits:** 4.00

this course, for students with no previous training in Chinese, is designed to promote conversational skills in the target language. Communicative strategies are developed within the context of cultural components. Topics include those which enable students to function in China in everyday situations (e.g., food, leisure activities, transportation, business exchanges, tourism, and daily life). this course does not satisfy the foreign language requirement. It may be repeated for up to a maximum of 8 credits. Cr/F. Special fee.

### **CHIN 401 - Elementary Chinese I**

**Credits:** 4.00

Aural-oral practice in meaningful contexts of the fundamental vocabulary and grammar of Mandarin Chinese. Reading and writing in Romanization (pinyin) and in Chinese characters. Special fee.

### **CHIN 402 - Elementary Chinese II**

**Credits:** 4.00

Aural-oral practice in meaningful contexts of the fundamental vocabulary and grammar of Mandarin Chinese. Reading and writing in Romanization (pinyin) and in Chinese characters. Special fee.

### **CHIN 410 - Communicative Chinese for the Professions**

**Credits:** 4.00

A skill-based course for students who wish to focus on the Chinese language in relation to the health fields, business, law, tourism, and social service. Helps students develop a practical understanding of China through communicative activities in specific fields. Does not satisfy the foreign language requirement. Special fee.

### **CHIN 425 - Introduction to Chinese Culture and Society**

**Credits:** 4.00

Taught in English. Aspects of the political, social and cultural life of China through readings, discussion, papers, and film. Strongly recommended for students planning an Asian Studies minor. Special fee.

### **CHIN 503 - Intermediate Chinese I**

**Credits:** 4.00

Continuation of CHIN 401-402. Conducted entirely in Chinese, with work on listening comprehension, speech, reading, and writing of Chinese characters, with increasing attention to reading contemporary Chinese texts. Special fee

### **CHIN 504 - Intermediate Chinese II**

**Credits:** 4.00

Continuation of CHIN 401-402. Conducted entirely in Chinese, with work on listening comprehension, speech, reading, and writing of Chinese characters, with increasing attention to reading contemporary Chinese texts. Special fee

### **CHIN 521 - Chinese Literature in Translation**

**Credits:** 4.00

Representative works of master Chinese writers reflecting themes of 20th century China. Lu Hsun, Shen Ts'ung-Wen, Bei Dao, and others. Lectures, discussion, and readings in English. Special fee.

### **CHIN 631 - Advanced Chinese Conversation and Composition I**

**Credits:** 4.00

Advanced spoken and written Chinese to attain aural-oral fluency. Advanced reading and composition. Prereq: CHIN 504 with a grade of C or better or permission of the instructor. Special fee.

**CHIN 632 - Advanced Chinese Conversation and Composition II**

**Credits:** 4.00

Advanced spoken and written Chinese to attain aural-oral fluency. Advanced readings and composition. Prereq: CHIN 631 with a grade of C or better or permission of instructor. Special fee.

**CHIN 795 - Independent Study**

**Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be taken only with the permission of department chairperson and of the supervising faculty member or members. Barring duplication of subject, may be repeated for credit.

## Civil Engineering

### **CIE 402 - Introduction to Civil Engineering**

**Credits:** 4.00

Introduction to the civil engineering profession: structural, geotechnical, water resources, materials, and environmental. Overviews the civil project process including the creative design process, teamwork, bidding and construction. The relationship between civil engineering works and society including ethics, earthquakes, failures, successful signature structures, current events, and professional licensure. The production of professional engineering documents including writing tasks and calculations sets. Campus resources, the University system, and relationship between required curriculum, student objectives, and the civil engineering profession. Introduction to spreadsheet software, data analysis, and probability and statistics.

### **CIE 444 - Housing - Everyone Needs a Place to Live**

**Credits:** 4.00

This course provides a student with the opportunity to explore the various technological, environmental, economic and societal aspects of providing housing for people in various locations around the world. Included in the course are discussions of what housing means to different people, sustainability, energy issues, etc. Students also have the opportunity to design their own house.

### **CIE 505 - Surveying and Mapping**

**Credits:** 4.00

Principles of land measurements by ground, photogrammetric and satellite methods to model the environment. Application of theory of measurements to perform and adjust engineering survey. Conformal mapping and its application to state plane coordinates. Digital mapping and Geographic Information Systems. Construction and cadastral surveying. Pre- or Coreq: MATH 425 or permission. Lab. Writing intensive.

### **CIE 525 - Statics for Civil Engineers**

**Credits:** 3.00

Introduction to statics with emphasis on civil engineering topics; two and three dimensional force systems; static equilibrium; friction; analysis of trusses and beams; centroids; and moment and shear diagrams for flexural members. Pre- or Coreq: MATH 426.

### **CIE 526 - Strength of Materials**

**Credits:** 3.00

Strength of materials with emphasis on civil engineering applications. Virtual work; work and energy relationships; analysis of members subjected to flexure, torsion, and axial loads; stresses and strains; and stability of columns. Prereq: CIE 525 or ME 525.

### **CIE 533 - Project Engineering**

**Credits:** 3.00

Techniques for financial analysis, and operation and management of engineering systems, engineering economics, material take-offs, estimating, scheduling, modeling physical systems, and decision-making. CIE/ENE major or permission.

### **CIE 622 - Engineering Materials**

**Credits:** 4.00

Structural properties and applications of the various materials used in civil engineering projects, including

steel, cement, mineral aggregates, concrete, timber, and bituminous materials. Microstructure and properties of common metals, plastics, and ceramics. Prereq: CIE major or permission, CIE 526 or ME 526. Lab. Writing intensive.

### **CIE 642 - Fluid Mechanics**

**Credits:** 4.00

Properties of fluids, fluid statics, continuity, momentum and energy equations, resistance to flow, boundary layer theory, flow in open channels and piping systems, dimensional analysis, similitude, drag, and lift. Laboratory exercises on measurement of fluid properties, energy principles, flow resistance, discharge measurements, momentum, hydropower, groundwater flow, and settling of spheres. Prereq: PHYS 407, CIE/ENE Hydrology major; or permission. Lab. Writing intensive.

### **CIE 665 - Soil Mechanics**

**Credits:** 4.00

Soil classification and physical properties. Permeability, compressibility, consolidation, and shearing resistance are related to the behavior of soils subjected to various loading conditions. Prereq: CIE 622, 642, CIE/ENE major; or permission. Lab.

### **CIE 681 - Classical Structural Analysis**

**Credits:** 3.00

Analytical stress and deflection analysis of determinate and indeterminate structures under static and moving loads by classical methods. Prereq: CIE 526, CIE major; or permission.

### **CIE 721 - Pavement Design**

**Credits:** 3.00

Flexible and rigid pavements and bases for highways, airports, city streets, and industrial floors; pavement selection, construction methods, materials, specifications. Prereq: CIE 665 or permission.

### **CIE 722 - Properties and Production of Concrete**

**Credits:** 3.00

Basic properties of hydraulic cements and mineral aggregates, and their interactions in the properties of plastic and hardened concrete; modifications through admixtures; production handling and placement problems; specifications; quality control and acceptance testing; lightweight, heavyweight, and other special concretes. Prereq: CIE 622 or permission.

### **CIE 723 - Bituminous Materials and Mixtures**

**Credits:** 3.00

Considerations of major types of bituminous materials, asphalt cements, cutback asphalts, asphalt emulsions, and tars; influence of chemical composition on physical properties; desirable aggregate characteristics for bituminous mixtures; construction techniques; current practices for determining optimum asphalt contents. Prereq: CIE 622 or permission.

### **CIE 741 - Open Channel Flow**

**Credits:** 3.00

Energy and momentum principles in open channel flow; flow resistance; channel controls and transitions; unsteady flow concepts and dam failure studies. Modeling with HEC programs. Prereq: CIE 642 or permission.

### **CIE 745 - Engineering Hydrology**

**Credits:** 3.00

Hydrologic cycle, probability theory related to hydrology and the design of water resources structures, water law, flood discharge prediction, hydrograph development, hydraulic and hydrologic river routing,

reservoir routing, theory of storage, reservoir operations, hydropower development, modeling of watershed hydrology with program HEC-1, HEC-HMS, multipurpose projects.

### **CIE 750 - Ecohydrology**

**Credits:** 3.00

Introduction to ecohydrological concepts in terrestrial and riverine systems. Topics include the historical practices, resource management impacts, hydrologic variability, and the relationships among water and ecology, vegetation, biology, geomorphology, and water quality. Prereq: CIE 745 or ESCI 705 or permission.

### **CIE 754 - Transportation Engineering and Planning**

**Credits:** 3.00

Fundamental relationships of traffic speed, density, and flow applied to public and private modes of transport. Principles of demand forecasting and urban systems planning. Prereq: permission.

### **CIE 755 - Design of Pressurized Water Transmission Systems**

**Credits:** 4.00

Theory developed for individual components to large complex systems. Analysis and designs of components and systems. Topics include: steady and unsteady closed conduit flow, valves and meters, pump requirements, pump selection, system planning and layout, water hammer, and system operation and maintenance. Pressure system modeling with program EPANET. Prereq: CIE 642 or permission.

### **CIE 757 - Coastal Engineering and Processes**

**Credits:** 3.00

Introduction to small amplitude and finite amplitude wave theories. Wave forecasting by significant wave and wave spectrum method. Coastal processes and shoreline protection. Wave forces and wave-structure interaction. Design of coastal structures. Introduction to mathematical and physical modeling. Prereq: CIE 642 or permission.

### **CIE 758 - Stormwater Management Designs**

**Credits:** 3.00

Historic review of stormwater management leading up to the current regulatory framework. Overview of stormwater management strategies, strategy selection, and the targeting of specific contaminants, contaminant removal efficiencies, construction and site selection, and system maintenance. Hydrologic concepts including watershed and storm characteristics, design hydrology (peak flows, storm and treatment volumes), hydrograph routing, and critical review of hydrology and drainage reports. Design and sizing of treatment systems including: conventional, BMPs, low impact development, and manufactured devices. Rainfall runoff calculations with US SCS TR55 model. Prereq: CIE 642 or permission.

### **CIE 759 - Stream Restoration**

**Credits:** 3.00

The assessment, planning, design, engineering, and monitoring of stream and watershed practices intended to protect and restore the quality and quantity of flowing surface waters and stream corridors. Lecture material covers hydrology, geomorphology, and ecosystems, with the intent of understanding the variables associated with stream systems and their interplay. Students measure field variables and then are challenged with actual designs. Examples of stream restoration issues include: in-stream flow, dam removal, induced recharge, improvements to fish habitat, and channel stabilization.

### **CIE 760 - Foundation Design I**

**Credits:** 4.00

Foundation design based on subsurface investigation and characterization using current methods of laboratory and in situ testing. Use of consolidation theory and bearing capacity theory for the design of

shallow foundations including footings and rafts. Basic design of pile foundations. Earth pressure theory applied to design of retaining walls. Slope stability theory and applications. Prereq: CIE 665 or permission.

### **CIE 761 - Foundation Design II**

**Credits:** 3.00

Advanced pile and pier design under vertical and lateral loads. Slope stability by circular and noncircular arc methods. Design of flexible bulkhead walls and mechanically stabilized walls. Excavation and dewatering. Soil and site improvement. Prereq: CIE 760 or permission.

### **CIE 762 - Introduction to Geotechnical Earthquake Engineering**

**Credits:** 3.00

Overviews earthquake source mechanisms; magnitude and intensity; seismicity of the United States. Dynamics of simple structures; response spectra. Selection of design parameters; source, magnitude, input records. Measurement of dynamic characteristics of soils; site response, liquefaction, and ground deformation. Prereq: CIE 760 or permission.

### **CIE 763 - Geological Engineering**

**Credits:** 3.00

Functional classification of rocks and rock masses, stereographic projection, engineering properties of rocks, and rock mechanics. The influence of geology in the design of underground excavations, tunneling, foundations, and rock slope engineering. Prereq: ESCI 401 or permission.

### **CIE 766 - Geo-Environmental Engineering**

**Credits:** 3.00

Soil composition and structure; hydrogeology; attenuation and contaminant transport; containment design including landfills, geo-synthetics for liners and covers, leachate collection systems, vertical cutoff walls and stability analyses; geo-environmental site characterization and investigation using geotechnical and geophysical methods; ground water, soil and gas monitoring and sampling; remediation including in situ and ex situ techniques and treatment methods. Prereq: CIE 665 or permission.

### **CIE 774 - Reinforced Concrete Design**

**Credits:** 4.00

Introduces the design of reinforced concrete structural members by the strength method and considering deflection performance. Includes loads, approximate analyses, slabs, beams, and columns. Prereq: CIE 622, 681; or permission.

### **CIE 776 - Structural Design in Masonry**

**Credits:** 3.00

Introduces the design of reinforced masonry structural members by the stress and strength method and considering deflection and other serviceability performance criteria. Includes development of wind and seismic load, curtain wall, shear wall, lintels and columns. Prereq: CIE 622, 681; or permission.

### **CIE 778 - Issues in Engineering Practice and Management**

**Credits:** 3.00

Non-technical professional engineering topics including: participation in multidisciplinary teams, interpersonal and human resources skills, verbal and written communication skills, project management, marketing, ethics, professional licensure, professional liability, and contract administration. Prereq: seniors only; juniors with permission.

### **CIE 780 - Building Information Modeling**

**Credits:** 3.00

Building Information Modeling (BIM) is the process of generating and managing project data during its life

cycle by integrating 3D multidisciplinary drawings with dynamic scheduling and visualization. BIM provides a digital representation of project data to facilitate the exchange of information beyond the standard two dimensional plan set. This course introduces students to the fundamentals of model creation, scheduling, material take-offs, visualizations, and animations that improve the communication of information to potential clients. Pre- or Coreq: TECH 564.

### **CIE 782 - Timber Design**

**Credits:** 3.00

Introduces the design of timber structures. Structural properties of wood, determination of horizontal and vertical loads, horizontal and vertical load-resisting systems, and design of horizontal diaphragms, shear walls, beams, and columns. Bolted, screwed, and nailed connections. Prereq: CIE 681 or permission.

### **CIE 783 - Matrix Structural Analysis and Modeling**

**Credits:** 3.00

Modeling and analysis of determinate and indeterminate structures by matrix computer methods. Creation of matrix elements using compatibility, equilibrium, and constitutive relationships. Plane trusses, beams, frames, and space trusses. Prereq: CIE 681 or permission.

### **CIE 784 - Introduction to Project Planning and Design**

**Credits:** 1.00

Part one of a two-part sequence. Student groups develop a project statement to address a large-scale civil engineering system design. Each team prepares a project plan to be executed in CIE 788, part two of this sequence. Cr/F.

### **CIE 787 - Dynamics of Structures**

**Credits:** 3.00

Dynamics of single- and multi-story buildings. Response due to earthquakes, blasting, traffic, and mechanical equipment. Analysis in the time domain and through the Fourier Transform. Fundamentals of structural vibration measurement. Prereq: CIE 785 or permission.

### **CIE 788 - Project Planning and Design**

**Credits:** 3.00

Student groups are formed into design teams to prepare a design plan for a large-scale civil engineering system including consideration of budgetary constraints, building code criteria, and environmental impacts. Each team prepares a final written report and gives a formal presentation. Prereq: CIE 784. Writing intensive.

### **CIE 791 - Pre-stressed Concrete**

**Credits:** 3.00

Analysis and design of prestressed and post-tensioned concrete sections in flexure and shear. Strength, deflection, and losses in flexural members. Optimization of section and prestressing force selection. Prereq: CIE 774 or permission.

### **CIE 792 - LRFD Bridge Design**

**Credits:** 3.00

AASHTO LRFD Bridge Design Specifications using SI units. Design objectives, loads, load case analysis and selection, load distributions, static analysis, and design for axial loads, flexure, and shear. Design of slender columns, composite, beams, and plate girders. Prereq: CIE 774. Pre- or Coreq: CIE 793 or permission.

**Co-requisites:**

### **CIE 793 - Structural Design in Steel**



**Credits:** 3.00

Design of members and connections: tension and compression members, beams, and beam/columns, bolted and welded joints. Prereq: CIE 622, 681; or permission.

**CIE 795 - Independent Study**

**Credits:** 1.00 to 4.00

Seniors in good standing may pursue independent studies under faculty guidance. A written culminating report is required. Prereq: permission.

**CIE 796 - Special Topics**

**Credits:** 1.00 to 4.00

Advanced or specialized topics not normally covered in regular course offerings. May be repeated, but not in duplicate areas. Prereq: permission.

**CIE 799H - Senior Honors Thesis**

**Credits:** 4.00

Students in the honors program in civil engineering complete a project under the direction of a faculty sponsor resulting in a written thesis which must be accepted by the sponsor by the end of the second semester, senior year. Four credits total during senior year; 3 of which may be used to fulfill a CIE non-design elective.

## Civil Technology

### **CT 220 - Professional Practice**

**Credits:** 1.00

Serves as an introduction to the civil technology program and various fields in the civil environment in a seminar format. Provides for student contact with industry professionals and employment opportunities. Assists with student learning skills and serves as common period for Freshmen guidance on academic matters. 2-hr sem.

### **CT 222 - Computer Aided Design Level I**

**Credits:** 4.00

The student designs fundamental design project work including site work and buildings, prepares plans using computer software (AutoCAD). Emphasis is on learning the software, basic design and plan requirements. Students then apply this knowledge to produce presentation drawings and develop proficient skills with this software. The student also works concurrently on course projects. 2-hr lec/2-hr rec.

### **CT 227 - Mechanical and Electrical Systems**

**Credits:** 4.00

Description, analysis and design application of conventional heating, ventilating, air conditioning, lighting and plumbing systems for residences. Electrical principles, laws, and installation with emphasis on the National Electrical Code. 2-hr lec/2-hr rec.

### **CT 230 - Statics and Materials**

**Credits:** 4.00

Determining and evaluating physical properties of common building construction materials: wood, steel and non-ferrous metals, cement, concrete, brick, and bituminous materials. Application of materials to design of structural elements in beam and column applications, under various load conditions. Emphasis on appropriate material selection and optimization of design. Prereq: MTH 203. 2-hr lec/2-hr rec.

### **CT 231 - Design I**

**Credits:** 4.00

Provides foundational skills in critical thinking, design process, verbal and graphic description/idea documentation, project implementation, and creative process activation. Presentation and demonstration skills to be developed as part of individual and group project solutions. Course develops 3D CAD skills. Prereq: CT 222. 2-hr lec/2-hr rec.

### **CT 233 - Construction Surveying**

**Credits:** 4.00

This course applies methods and techniques learned in CT 223 to real world situations. The student works as part of a project team on a proposed construction site. Tasks and materials covered include: setting control, mapping of sites, design and layout of roadways, site planning, building and infrastructure layout, area and volume calculations. Class expands on use of survey equipment to include data collectors and land design computer software. Prereq: CT 223 with a grade of C- or better. 2-hr lec/1-hr rec/2-hr lab.

### **CT 234 - Soils and Foundations**

**Credits:** 4.00

Subsurface exploration, soil sampling, testing and evaluating subsurface materials, and their effect on foundations, site development, and construction. Hands-on laboratory component. Introduction to site excavation methods and foundation design. 2-hr rec/2-hr lab/rec.

### **CT 240 - Legal Aspects of Surveying**

**Credits:** 4.00

The legal issues involved when performing a property boundary survey are presented. Ownership of land, the search for boundary evidence, methods of performing research and resolving conflicting information and disputes are discussed. Other topics include: An introduction to legal principles, statutes, case law, terminology, liability, ethics and standards relating to surveying. A course-long project is undertaken whereby research, the search for evidence, a field survey, boundary determination and a plat are completed. Prereq: CT 223 with a grade of C- or better. 2-hr lec/1-hr rec.

### **CT 243 - Advanced Surveying and Mapping**

**Credits:** 4.00

A continuation of surveying topics not covered in CT 223, CT 233 and 240. Specifically: Geodesy, Map Projection Systems, State Plane Coordinates, Control Surveys, Static and Real Time Satellite Positioning, Astronomic Observations, Equipment Testing and , GIS Applications in Surveying, and Obseravtion Adjustment Theory and Methods. Prereq: CT 223. 3-hr lec/2-hr lab.

### **CT 244 - Advanced Surveying Computations**

**Credits:** 4.00

Emphasis on how to perform the typical surveying computations encountered in the field. Use of surveying and mapping software and plotters for topographic mapping and subdivision design. Advanced GIS theory and applications including Photogrammetry and Remote Sensing. Field equipment testing and adjustment. Prereq: CT 223, 233, 243, or permission. 3-hr lec/2-hr lab.

### **CT 247 - Construction Contracting**

**Credits:** 4.00

Overview of administrative skills required to manage a construction concern. Emphasis on project management through the entire construction and design process. Building codes and the ADA code included. 2-hr lec/2-hr rec.

### **CT 250 - GIS Apps in Sustainability**

**Credits:** 4.00

Students gain an understanding of how modern Geographic Information Systems (GIS) can be used as a tool to better understand and address issues of sustainability, such as population growth, climate change, energy consumption and natural resources. While gaining a rich understanding of the complex nature of sustainability issues, students also develop competencies in GPS data collection, the essential functionality of GIS software and the application of GIS in decision making processes.

### **CT 281 - Architecture I History and Design**

**Credits:** 4.00

Develops a basic understanding of American residential architectural history while developing architectural programming and design skills in a project based environment. Moderate CAD usage for project submissions 2-hr lec/2-hr rec.

### **CT 282 - Architecture II**

**Credits:** 4.00

Studio application of principles and skills developed in the architectural concentration. Design of a complete shelter system into the design development phase. Prereq: CT 281. 2-hr lec/2-hr rec.

### **CT 291 - Studies**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose

of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Examples may include energy conservation, surveying, construction, or hydrographic surveying.

### **CT 292 - Studies**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Examples may include energy conservation, surveying, construction, or hydrographic surveying.

### **CT 297 - Work Experience**

**Credits:**

Career-oriented work experience (10 weeks, full time) to include, but not limited to, architecture, construction, surveying, and mapping. Cr/F.

### **CT 423 - Introduction to Surveying and Mapping**

**Credits:** 3.00

An introduction to the field of surveying and mapping and its fundamental principles, theories and methods. Specifically: horizontal and vertical distance measurements, angle and direction measurements, determination of positions, areas and topographic contours. Includes mapping, geographic information systems and the Global Positioning System, measurement accuracy, and statistical analysis.

**Co-requisites:** CT 424

### **CT 424 - Surveying and Mapping Lab**

**Credits:** 2.00

A series of labs and recitations that provide an introduction to the field of surveying and mapping and its fundamental principles, theories and methods. Specifically: horizontal and vertical distance measurements, angle and direction measurements, determination of positions, areas and topographic contours. Includes mapping, geographic information systems and the Global Positioning System, measurement accuracy, and statistical analysis.

**Co-requisites:** CT 423

### **CT 437 - Land Design and Regulations**

**Credits:** 4.00

Hydrology of drainage and storm water runoff, basic concepts of hydraulic flow in pipes and channels, and overview of pump systems. Technical and regulatory requirements of designing residential water supply and septic disposal systems. Review of federal, state, and local ordinances with respect to construction and land development. 2-hr lec/2-hr rec.

## Classics

### **CLAS 401 - Classical Mythology**

**Credits:** 4.00

Survey of myths and sagas of ancient Greece and Rome. No classical preparation necessary. Background course for majors in English, the arts, music, history, modern languages, classics. Special fee.

### **CLAS 401H - Honors/Classical Mythology**

**Credits:** 4.00

Survey of myths and sagas of ancient Greece and Rome. No classical preparation necessary. Background course for majors in English, the arts, music, history, modern languages, classics. Special fee. Writing intensive.

### **CLAS 405 - Introduction to Greek Civilization**

**Credits:** 4.00

A broad historical exploration of Greek civilization. Topics include: architecture, art, law, literature, philosophy, poetry, politics, religion, society, warfare, and their legacy to the modern world. Open to all students. No prior knowledge of the ancient world assumed; all readings are in English. Ideal background for students of English, philosophy, history, Latin, Greek, the arts, music, modern languages. Special fee.

### **CLAS 406 - Introduction to Roman Civilization**

**Credits:** 4.00

A broad historical exploration of Roman civilization. Topics include: architecture, art, law, literature, philosophy, poetry, politics, religion, society, warfare, and their legacy to the modern world. Open to all students. No prior knowledge of the ancient world assumed; all readings are in English. Ideal background for students of English, philosophy, history, Latin, Greek, the arts, music, modern languages. Special fee.

### **CLAS #410B - Greek and Roman Religion**

**Credits:** 4.00

Exploration of the religious practices of the Greeks and Romans. Topics include: gods, sacrifice, rituals, sacred space, prayer, magic, curses, oracles, mystery religions, divination, and religious festivals. Particular attention paid to how religion intersected with daily life. Open to all students. All readings in English. Students who have previously taken CLAS 402 cannot receive credit for CLAS 410A, although they may receive credit for CLAS 410B and CLAS 410C. Special fee.

### **CLAS #410C - The Ancient Stage: Tragedy and Comedy**

**Credits:** 4.00

Investigations into the dramatic works of the Greeks and Romans, the power of performance, and the cultural importance of stage productions. Readings include the tragedies of Aeschylus, Sophocles, and Euripides, and the comedies of Aristophanes, Menander, and Plautus. Ideal background for students of all theatrical and performance traditions. Open to all students. All readings in English. Students who have previously taken CLAS 402 cannot receive credit for CLAS 410A, although they may receive credit for CLAS 410B and CLAS 410C. Special fee.

### **CLAS 411 - Elementary Hittite I**

**Credits:** 4.00

Elements of grammar, reading of simple prose. Special fee.

### **CLAS 412 - Elementary Hittite II**

**Credits:** 4.00

Elements of grammar, reading of simple prose. Special fee.

**CLAS #413 - Elementary Sanskrit I**

**Credits:** 4.00

Elements of grammar, reading of simple prose. Special fee.

**CLAS #414 - Elementary Sanskrit II**

**Credits:** 4.00

Elements of grammar, reading of simple prose. Special fee.

**CLAS 421 - Major Greek Authors in English**

**Credits:** 4.00

Major classical authors such as Homer, the Tragedians of Athens, Herodotus, Thucydides, and Plato in the context of their civilization, from which so much of our contemporary culture derives. For students unprepared to read Greek. Background for majors in English, history, Latin, Greek, the arts, music, philosophy, modern languages. Open to all students. Special fee. Writing intensive.

**CLAS #422 - Major Roman Authors in English**

**Credits:** 4.00

Major classical authors such as Plautus, Terence, Cicero, Catallus, Vergil, Ovid, Seneca, Juvenal, and Tacitus in the context of their civilization, from which so much of our contemporary culture derives. For students unprepared to read Latin. Background for majors in English, philosophy, history, Latin, Greek, the arts, music, modern languages. Open to all students. Writing intensive.

**CLAS #444 - Individual and Society in the Ancient World**

**Credits:** 4.00

This class examines one of the major issues faced by people throughout history, whether and under what circumstances an individual should act against the wishes of society. The great philosophical and historical works of the ancient world shed light not only on how the Greeks and Romans approached the idea of personal responsibility but also on the assumptions we today make about human nature and the relationships on which society depends. No prior knowledge of the ancient world required. All readings are in English. Writing intensive.

**CLAS #444A - Individual and Society in Ancient Drama**

**Credits:** 4.00

An introductory investigation into the origins and development of ancient drama and its impact on European drama. Writing intensive.

**CLAS #444B - Heroic Epic: From Gilgamesh to Gandalf**

**Credits:** 4.00

An exploration of one of the oldest and most enduring of literary forms, tracing its development through thousands of years in various cultural contexts down to modern examples. Beyond that specific aim lies a broader and even more important one: to provide an introduction to the methods of literary history and criticism, that is, how we formulate and answer questions as we characterize, categorize, and analyze heroic epic. Writing intensive.

**CLAS 444C - Is Winning Everything? Competition in Ancient Sports**

**Credits:** 4.00

An investigation of the competitive nature of Greek athletics and the Roman games. Focus is on how Greek and Roman views of the value of competition reflect the differences in their histories. Particular attention paid to the types of evidence and methods used by ancient historians. Open to all students. All

readings in English.

### **CLAS 500 - Classical Mythology: Topics in World Literature**

**Credits:** 4.00

Topics are chosen to introduce students to major themes and genres. (Also offered as FREN 500, GERM 500, ITAL 500, PORT 500, RUSS 500, SPAN 500.) May be repeated for credit. Writing intensive.

### **CLAS 506 - Introduction to Comparative and Historical Linguistics**

**Credits:** 4.00

Major language families (primarily Indo-European) and the relationships among the languages within a family. Diachronic studies, methods of writing, linguistic change, glottochronology, etymological studies. Some language training and LING 505 desirable. (Also offered as LING 506.)

### **CLAS 510 - Building Rome**

**Credits:** 4.00

An introduction to the buildings and structures for which the Romans remain famous, such as the Pantheon, the Colosseum, and the aqueducts that allowed Rome to become a metropolis. A major focus is the connection between the changes in Roman society and the development of Roman architecture. Looks at both Rome and other important cities in the Roman Empire. All readings are in English. No prior knowledge of the ancient world required.

### **CLAS 520 - Greek and Roman Religion**

**Credits:** 4.00

Exploration of the religious practices of the Greeks and Romans. Topics include: gods, sacrifice, rituals, sacred space, prayer, magic, curses, oracles, mystery religions, divination, and religious festivals. Particular attention paid to how religion intersected with daily life. Open to all students. All readings in English. Students who have previously taken CLAS 402 cannot receive credit for CLAS 410A, although they may receive credit for CLAS 410B and CLAS 410C. Special fee.

### **CLAS 525 - Greek and Latin Origins of Medical Terms**

**Credits:** 4.00

Study of medical terminology. Exercises in etymology and the development of vocabulary in a context at once scientific, historical, and cultural. No knowledge of Greek or Latin is required. Useful to premedical, pre-dental, pre-veterinary, nursing, medical technology, and other students in the biological and physical sciences. Open to all students. Special fee.

### **CLAS 530 - The Ancient Stage: Tragedy and Comedy**

**Credits:** 4.00

Investigations into the dramatic works of the Greeks and Romans, the power of performance, and the cultural importance of stage productions. Readings include the tragedies of Aeschylus, Sophocles, and Euripides, and the comedies of Aristophanes, Menander, and Plautus. Ideal background for students of all theatrical and performance traditions. Open to all students. All readings in English. Students who have previously taken CLAS 402 cannot receive credit for CLAS 410A, although they may receive credit for CLAS 410B and CLAS 410C. Special fee.

### **CLAS 550 - Women in Antiquity**

**Credits:** 4.00

The impact of women on society in Greece and Rome throughout Antiquity. The role of women in public, religious, and private life as well as their legal status through law codes. Men's views of women in different literary texts. Especially concentrating on the few existing texts written by women. All readings are in English. No prerequisite. Special fee. Writing intensive.

## **CLAS 560 - Sports, Spectacle, and Competition in the Ancient World**

**Credits:** 4.00

This course treats the details of athletic training and competition, but its primary focus is on investigating the importance of athletics to society and how athletics reflected the broader cultural values of the Greeks and Romans. Open to all students. All readings in English. Students who have previously taken CLAS 402 cannot receive credit for CLAS 410A, although they may receive credit for CLAS 410B and CLAS 410C. Special fee.

## **CLAS 595 - Topics**

**Credits:** 4.00

Introduction and elementary study related to linguistic study of Latin and Greek or relevant to Greco-Roman culture and history. Primarily for students unprepared to read Latin and Greek. Topics: A) Byzantine Heritage; B) Grammar: Comparative Study of English and the Classical Languages; C) Greek and Latin Origins of Legal Terms; D) Greek and Latin Origins within the English Language; E) Classical Backgrounds of Modern Literature; F) Classical Archaeology.

## **CLAS 596 - Topics**

**Credits:** 4.00

Introduction and elementary study related to linguistic study of Latin and Greek or relevant to Greco-Roman culture and history. Primarily for students unprepared to read Latin and Greek. Topics: A) Byzantine Heritage; B) Grammar: Comparative Study of English and the Classical Languages; C) Greek and Latin Origins of Legal Terms; D) Greek and Latin Origins within the English Language; E) Classical Backgrounds of Modern Literature; F) Classical Archaeology.

## **CLAS 604 - Golden Age of Rome**

**Credits:** 4.00

A study of the early Roman Empire as created by Augustus and his immediate successors; glorified by Vergil, Horace, and the poets of the Golden Age; and described by Tacitus, Suetonius, and the prose writers of the Silver Age. Open to all students. Prereq: any CLAS course or permission of instructor. Writing intensive.

## **CLAS 694 - Supervised Practicum**

**Credits:** 2.00 or 4.00

Participants earn credit for suitable pre-professional activities, including high school outreach, assisting in undergraduate courses and work with professional organizations, museum work. Enrollment limited to juniors and seniors who are Classics, Latin, or Greek majors or minors and have above-average G.P.A.s. Writing assignments are required. Prereq: permission of instructor and program coordinator. Course does not count toward Classics, Latin, or Greek major or minor requirements. May be repeated up to a maximum of 8 credits. Cr/F.

## **CLAS 695 - Special Studies**

**Credits:** 2.00 or 4.00

Advanced work in classics. Research paper. Not open to freshmen and sophomores.

## **CLAS 696 - Special Studies**

**Credits:** 2.00 or 4.00

Advanced work in classics. Research paper. Not open to freshmen and sophomores. Special fee.



## College of Liberal Arts

### **COLA 653 - Introduction to British Culture**

**Credits:** 1.00

Students participating in the UNH London Program are required to take this course whose purpose is to familiarize them with British culture and the city of London. Variable topics. Pre- or Coreq: COLA 655.

### **COLA 654 - Intro to British Culture**

**Credits:** 1.00

Students participating in the UNH London Program are required to take this course whose purpose is to familiarize them with British culture and the city of London. Variable topics.

**Co-requisites:** COLA 656

### **COLA 655 - London Program**

**Credits:** 1.00 to 18.00

Enables students to pursue a semester or academic year of in UNH's programs in London, England. Students must be admitted before enrolling in the course. For information and application forms, consult program secretary, 53 Hamilton Smith Hall. Special fee. IA (continuous grading) grade will be assigned until official transcript is received. Program fee. Cr/F.

### **COLA 656 - London Program**

**Credits:** 1.00 to 18.00

Enables students to pursue a semester or academic year of in UNH's programs in London, England. Students must be admitted before enrolling in the course. For information and application forms, consult program secretary, 53 Hamilton Smith Hall. Special fee. IA (continuous grading) grade will be assigned until official transcript is received. Program fee. Cr/F.

### **COLA 657 - Justice Studies Budapest Program**

**Credits:** 6.00

This program is designed to introduce students interested in the field to a broader appreciation of the cross-cultural perspective. Each fall, fifteen UNH students spend the semester in residence at the Budapest University of Economic Sciences in Budapest, Hungary, where they have an opportunity to witness first hand the evolution of a criminal justice system within a context of significant cultural, political, economic, and social change. Situated along the Danube in one of Europe's oldest cities, the program offers a unique educational experience to students interested in the study of criminology, law and society, and the administration of justice. Under the supervision of a UNH faculty member also in residence, students carry a four course load, two of which are taught by the UNH faculty member. All courses are taught in English. Eligible students must hold sophomore standing, have completed either SOC 515 or POLT 507 and one other course in the Justice Studies curriculum, and have a minimum cumulative grade point average of 2.50. Special fee. Cr/F.

## Communication

### **CMN 444 - Going to War at the Movies: A Rhetorical History of War Films**

**Credits:** 4.00

This course introduces students to a rhetorical approach to the study of film, an understanding of how films act as both producers and products of social discourse. The course features mainstream war films throughout the past century and students will engage multiple perspectives to investigate the diverse ways that films invite audiences to make meaning, including ideological critiques (race, class, gender), political economic considerations, auteur theory, historical, formal, structural, and genre analysis, and mythic criticism. Writing intensive.

### **CMN 455 - Introduction to Media Studies**

**Credits:** 4.00

Nature, development, and the effects of mass media. Overview of mass communication history and theory.

### **CMN 455H - Honors/Introduction to Mass Communication**

**Credits:** 4.00

Nature, development, and the effects of mass media. Overview of mass communication history and theory.

### **CMN 456 - Propaganda and Persuasion**

**Credits:** 4.00

Introduction to theories of propaganda and persuasion. Examination of symbolic strategies designed to secure or resist social and institutional change. Attention given to case studies of social, political, economic, and religious reformation. Special consideration of the ethical ramifications of such efforts.

### **CMN 456H - Honors/Propaganda and Persuasion**

**Credits:** 4.00

Introduction to theories of propaganda and persuasion. Examination of symbolic strategies designed to secure or resist social and institutional change. Attention given to case studies of social, political, economic, and religious reformation. Special consideration of the ethical ramifications of such efforts.

### **CMN 457 - Introduction to Language and Social Interaction**

**Credits:** 4.00

An introduction to the study of the conversational basis of social reality. Presents an overview of interpersonal communication processes and the ways in which they influence the formation of identity, personal relationships, gender, interactional patterns, conflict, culture, and power. Readings and class material from a variety of authors in the communication discipline as well as related fields in the humanities and the social sciences.

### **CMN 500 - Public Speaking**

**Credits:** 4.00

Performance course buttressed by practical theories of public discourse. Focus on analysis of speaking situations and audiences, message construction, presentation, and critical evaluation. Does not count towards the CMN major.

### **CMN 503 - Introduction to Group Communication Processes**

**Credits:** 4.00

Introduction to the theoretical and empirical foundations of group communication processes in a variety of settings. Comparison of approaches to defining and understanding the pervasiveness, complexity, and

diversity of group communication and multi-party interaction in the many spheres of social life. Students undertake hands-on observation, recording, transcription, and analysis of naturally occurring group communication in and out of class. Prereq: CMN 457 with C or better, or by permission.

### **CMN 504 - Introduction to Argumentation**

**Credits:** 4.00

Persuasive discourse as inquiry and advocacy grounded in practical inductive and deductive reasoning. Discovery, analysis, and testing of practical arguments. The nature and function of proof. Some emphasis on applied presentation. Prereq: CMN 456 with C or better, or by permission. Writing intensive.

### **CMN 505 - Analysis of Popular Culture**

**Credits:** 4.00

Locates the development of popular cultural artifacts and practices within the 20th-century social history of the U.S. Examines the political-economic forces that underpinned the commercialization of art, leisure, sports, and other elements of culture in industrial and postindustrial America. Prereq: CMN 456 with C or better, or by permission.

### **CMN 507 - Introduction to Rhetorical Theory and Analysis**

**Credits:** 4.00

Major precepts of rhetorical theory. Application of those precepts in analysis and understanding of a wide range of human communication. Consideration of how precepts and issues of rhetorical theory apply to contemporary issues and problems. Prereq: CMN 456 with C or better, or by permission.

### **CMN 515 - Analysis of News**

**Credits:** 4.00

Explores the psychological, social, economic, political, and cultural factors that influence the definition and reporting of news. Prereq: CMN 455 with C or better, or by permission.

### **CMN 519 - Advertising as Social Communication**

**Credits:** 4.00

Social role of advertising, public policy debates concerning advertising, influence of advertising on culture, and methods of analyzing advertising messages. Prereq: CMN 455 with C or better, or by permission.

### **CMN #550 - Cinema and Society**

**Credits:** 4.00

The art, history, technology, economics, and theory of moving images from the silent period to the present. Focus on film as a social practice. Examination of both classic Hollywood film and alternative cinema. Students cannot receive credit for both CMN 550 and ENGL 533. Prereq: CMN 455 with C or better, or by permission. Special fee.

### **CMN 556 - Persuasion and Public Problems**

**Credits:** 4.00

Examination of communication about public problems using major precepts from classical and contemporary rhetorical theory. Application of those precepts discloses how persuasive communication frames public problems and constrains responses to them. By the end of the course students will know how to conduct a rhetorical analysis of public discourse and how to use results from that analysis to criticize, improve, or participate in deliberations about public problems. Prereq: CMN 456. Writing intensive.

### **CMN 567 - Gender, Race, and Class in the Media**

**Credits:** 4.00

The purpose of this course is to introduce students to contemporary critical scholarship on the construction of gender, race, and class in the media - particularly popular media. Subjects such as the portrayal of

ethnic groups, ideal body image, blue collar men, and gay, lesbian, bisexual, and transgender groups are case studies. This course is one that introduces students to performing communication analysis. Prereq: CMN 455.

### **CMN 572 - Analysis of Language and Social Interaction**

**Credits:** 4.00

In this mid-level course, students develop the observational and analytic skills necessary for the in-depth study of interaction in a variety of everyday and institutional social settings. Settings may include dialogue, multiparty interaction, non-verbal communication and embodiment, identity talk, and communication in organizations. Special attention to developing the reading and research skills used in upper level interpersonal communication courses. Prereq: CMN 457 with C or better, or by permission.

### **CMN 575 - Research Practicum**

**Credits:** 1.00 to 4.00

Student engagement through direct participation in faculty research projects. Elective credits which do not count towards the major. Instructor permission required. May be repeated for a maximum of 8 credits. Prereq: CMN 455, 456, 457, and permission. Cr/F.

### **CMN 588 - Analyzing Institutional Interaction**

**Credits:** 4.00

Examinations of institutional interactions in emergency services, justice/law, medicine, family school encounters, journalism and politics. Shows how the work of society gets done through interaction. Students get hands-on experience analyzing persons' conduct in these interactions. This course is designed to develop students' analytic skills in studying social interaction in institutions, using recorded data in the form of naturally-occurring interactions in these settings. Prereq: CMN 457.

### **CMN 595 - Critical Cultural Rhetorics**

**Credits:** 4.00

The course examines the prominence of and critical responses to the visual within contemporary culture and everyday life (governance, film, advertisement, digital media, culture jamming). By focusing on the reign of the visual within the contemporary moment, the course problematizes the notion of sight as unmediated access to the real, thus opening questions of interpretation, meaning production, and the effectivity of the visual. Students engage scholarship from rhetoric and visual cultural studies, and produce their own critical projects employing the critical concepts they learn throughout the semester. Prereq: CMN 456 with C or better, or by permission. Writing intensive.

### **CMN 596 - Special Topics in Media Studies**

**Credits:** 4.00

Selected topics not covered by existing courses in media studies. Topics vary; course descriptions are available in department office during preregistration. May be repeated for credit if topics differ. Prereq: CMN 455 with C or better, or by permission.

### **CMN 597 - Special Topics in Rhetorical Studies**

**Credits:** 4.00

Selected topics not covered by existing courses in rhetorical studies. Topics vary; course descriptions are available in department office during registration. May be repeated for credit if topics differ. Prereq: CMN 456 with C or better, or by permission.

### **CMN 598 - Special Topics in Interpersonal Studies**

**Credits:** 4.00

Selected topics not covered by existing courses in interpersonal communication. Topics vary; course descriptions are available in department office during registration. May be repeated for credit if topics differ.

Prereq: CMN 457 with C or better, or by permission.

### **CMN 599 - Internship**

**Credits:** 1.00 to 4.00

Internships are designed to integrate classroom study and supervised practical experience in a work setting. Each student is required to write a series of reports focusing on aspects of the work experience that are related to coursework in the Communications Department. These assignments are designed to enhance a student's ability to reflect critically on the internship experience and to merge theory and practice. Assignments are available, depending on the number of credits granted (1-4). Students are expected to hold the common exam time (TR, 1240-2) open for occasional meetings. Before starting the internship, students must submit a written proposal to both the work supervisor and the faculty sponsor. The proposal should include detailed information on the duties and responsibilities to be undertaken at the internship site and on the goals and learning objectives as relevant to the Communication Department curriculum. May be repeated for a maximum of 8 credits. Prereq: CMN 455, 456, 457, or permission. Cr/F.

### **CMN 600 - Public Speaking as a Civic Art**

**Credits:** 4.00

Performance course buttressed by the traditional civic art of rhetoric. Focuses on analysis of speaking situations and audiences, message of construction, presentation, and critical evaluation using major precepts of rhetorical theory. Theoretical and critical issues in the context of rhetorical practices. Prereq for CMN majors: CMN 455, 456, 457, and 500-level courses, or permission; prereq for non-majors: junior or senior standing. Writing intensive.

### **CMN 602 - Theories of Interpersonal Communication**

**Credits:** 4.00

Analysis and criticism of contemporary perspectives on interpersonal communication. Theories and concepts, issues, and research models are examined as they contribute to our understanding of social interaction. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

### **CMN 607 - Persuasion in American Politics**

**Credits:** 4.00

Study of the forms and strategies of persuasive discourse employed by contemporary American political leaders. Analysis of important political addresses of the 20th century, with attention to theoretical and critical issues in political communication and public address. Discussion of the status of rhetoric in modern politics, and the impact of persuasive discourse on campaigns, policy decisions, crisis management, political scandal, and the national identity. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

### **CMN 615 - Public Opinion and Mass Communication**

**Credits:** 4.00

Examines the historical development of the 18th century public sphere and its relationship to the press. Traces the transformation of the press from an ideological grounding to a commercial base. Analyzes the consequences of contemporary mass consumer-oriented media on the public sphere and democratic life. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

### **CMN 627 - Great Speakers and Speeches**

**Credits:** 4.00

Historical and critical survey of masterpieces of oratory examining the rhetorical situation and artistic features of great works of spoken discourse. Demosthenes, Cicero, Edmund Burke, Daniel Webster, Frederick Douglass, Abraham Lincoln, and Elizabeth Cady Stanton may be among the orators studied. The course will engage students in critical assessment of eloquence by emphasizing study of historical circumstances, ethical choices, and artistic virtue of the most effective and admired public speakers in

Western tradition. Prereq: CMN 455, 456, 457, and two 500-level courses, or permission. Writing intensive.

### **CMN 630 - Psychology of Communication**

**Credits:** 4.00

Recasts human psychology as a communicative accomplishment, offering a critique of the individualist tradition. Emphasis on the ways in which identity, knowledge, values, and beliefs are constructed in daily social engagements and the pragmatic, political, and moral implications of this view. Implications for our major cultural institutions such as education, health, and politics. Prereq: CMN 455, 456, and 457 with C or better and two 500-level courses with a C- or better, or by permission. Writing intensive.

### **CMN 634 - Media and Politics**

**Credits:** 4.00

The goal of this course is to study the role of the media in American politics, and what media evolution means for future politics. Topics such as political campaigns, media effects, news reporting, framing terrorists, etc. are studied in depth. Timely topics such as "are the media liberal or conservative?" are debated in class. Research projects and papers study questions related to important social issues such as women in the media. Prereq: CMN 455, CMN 456, CMN 457 and two 500-level CMN courses. Writing intensive.

### **CMN #650 - Critical Perspectives on Film**

**Credits:** 4.00

Advanced, focused study of film theory as cultural practice. Topics vary from year to year and with instructor. May be repeated for different topics. Focus may range from general considerations of film theory, criticism, and history, to specific analyses of selected genres, directors, national cinemas, and periods. Course descriptions available in department office during preregistration. Prereq: CMN 455, 456, 457, 550, ENGL 533, or permission. Special fee. Writing intensive. May be repeated for credit.

### **CMN 666 - Conversation Analysis**

**Credits:** 4.00

Exploration in how participants in interpersonal communication display their orientation to the fundamental orderliness of conversational sequences in everyday, institutional, and mass media settings. Basic concepts covered include the interactional co-construction of turn-taking, repair, overlap, openings, closings, silences, adjacency, pairs, disagreement, preference, and the role of various linguistic, paralinguistic, and nonlinguistic features in the conversation process. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

### **CMN 680 - Perspectives on Culture and Communication**

**Credits:** 4.00

Critical interpretation of culture focused on the communication practices and resources of diverse groups. Examination of the reciprocal relationship between communication practices, forms of culture, and cultural identity. Exploration of the conditions necessary for dialogue between differing cultural groups. Emphasis on the role of communication in constructing race, power, cultural domination, and globalization. Prereq: CMN 455, 456, and 457 with C or better and two 500-level courses with a C- or better, or by permission. Writing intensive.

### **CMN 696 - Seminar in Media Studies**

**Credits:** 4.00

Variable topics in media research, theory, and practice. May be repeated for different topics. Topic descriptions available in department office during preregistration. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

### **CMN 697 - Seminar in Rhetorical Study**

**Credits: 4.00**

Variable topics in rhetorical research, theory, and practice. May be repeated for different topics. Topic descriptions available in department office during preregistration. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

**CMN 697H - Honors/Seminar in Rhetorical Study****Credits: 4.00**

Variable topics in rhetorical research, theory, and practice. May be repeated for different topics. Topic descriptions available in department office during preregistration. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

**CMN 698 - Seminar Interpersonal Studies****Credits: 4.00**

Variable topics in interpersonal research, theory, and practice. May be repeated for different topics. Topic descriptions available in department office during preregistration. Prereq: CMN 455, 456, 457 and two 500-level courses, or permission. Writing intensive.

**CMN 702 - Seminar in Interpersonal Communication Theory****Credits: 4.00**

In-depth concentration on a particular theoretical orientation in interpersonal communication. Original works are read. Theoretical orientation varies by semester. Prereq: CMN 455, 456, and 457 with C or better and three required 500-level CMN courses (at least one must be in interpersonal studies) with C- or better, or by permission. Writing intensive.

**CMN 703 - Seminar in Rhetorical Theory****Credits: 4.00**

Focused study of problems in rhetorical theory construction through examination and criticism of selected theoretical frameworks used to explain or interpret rhetorical phenomena. Prereq: permission. Writing intensive.

**CMN 730 - Family Communication****Credits: 4.00**

Exploration of the patterned communication in families and the ways in which our understanding of these patterns can be utilized to understand and transform unwanted family interactions. Varying cultural discourses of family communication are used to explore the dialogic construction of family and self. Prereq: CMN 455, CMN 456, CMN 457, and two 500-level CMN courses, or permission. Writing intensive.

**CMN 732 - Communication Theory****Credits: 4.00**

Terminology, concepts, theoretical models, functions, levels, modes, and media in human communication. Prereq: CMN 455, 456, 457, and two 500-level CMN courses, or permission. Writing intensive.

**CMN 737 - Principles of Rhetorical Crit****Credits: 4.00**

Application of critical principles to message evaluation. Consideration of the varying roles, methods, and standards of rhetorical critics. Special attention to major perspectives on rhetorical criticism including Neo-Aristotelian, historical, dramatistic, generic, literary, and psychological. Prereq: CMN 455, 456, 457, and two 500-level CMN courses, or permission. Writing intensive.

**CMN 742 - Dialogue and Teamwork****Credits: 4.00**

This course is about team building, alternative conflict resolution, and creative problem solving. We will

explore the idea that, contrary to prevailing cultural assumptions, a significant factor in our achievements at work and play can be traced not to our individual attributes but rather to the relationships that we develop in our conversations with others. We will examine the dialogic basis of these relationships, drawing on a range of philosophic traditions and practical activities that highlight the social basis of thought. Prereq: CMN 455, 456, 457, and two 500-level CMN courses, or permission. Writing intensive.

### **CMN 755 - Communication and Healthcare**

**Credits:** 4.00

Exploration of the cultural discourse of healthcare from many different vantage points (i.e., physician, psychiatrist, patient, family, friend, colleague, government, culture, institutions, etc. ) Examination of both constraining and generative forms of discourse as they directly affect health, institutional life, and issues of well-being. Course focuses on narrative and interactional approaches to medicine and healthcare. Consideration of what it means to be "sick" or "well;" what constitutes "illness," "pain," and "cure;" and how being categorized as sick impacts the self and our interactions with others. Also examines the role of expertise and power in medical practitioner-patient interactions and the social norms that shape and constrain medical conduct. Prereq: CMN 455, 456, 457, and two 500-level CMN courses, or permission. Writing intensive.

### **CMN 756 - Rhetorics of Display**

**Credits:** 4.00

This course examines a selection of displays with the goal of acquiring perspective for understanding and evaluating how they engage with people who come into contact with them. Displays examined range among oratory, photographs, advertisements, films, architecture, monuments, and statuary, public demonstrations, and presentations of self. Attention is given to questions about identity and belonging, authenticity and simulation, and public memory. Prereq: CMN 455, 456, 457, and two 500-level courses, or permission. Writing intensive.

### **CMN 757 - Public Address and the American Experience**

**Credits:** 4.00

Study of persuasive texts set firmly in their historical and social contexts. Discussion of the impact of popular discourse on historically significant political and social events. Analysis of how leading persuasive speakers and writers responded to the fundamental questions confronting their age and articulated ideas in a manner that provoked or motivated their community, state, or nation. Historical period studied will vary. May be repeated for credit to a maximum of 12 credits when topic varies. Prereq: CMN 455, 456, 457 and two 500-level CMN course or permission. Special fee. Writing intensive.

### **CMN 758 - Media Analysis and Criticism**

**Credits:** 4.00

Approaches and methodologies for media criticism. Analysis of sample studies. Students work on original media analysis projects. Prereq: CMN 455, 456, 457 and any two 500-level CMN courses, or permission. Writing intensive.

### **CMN 760 - Mediation**

**Credits:** 4.00

This course will explore different theories and models of mediation as they inform the broader topic of conflict resolution. Emphasis will be on models that examine relational processes as opposed to models that provide a list of skills or techniques for mediation. To that end, the course will focus on transformative dialogue as a mode of mediation and conflict resolution rather than on compromise or consensus models. Prereq: CMN 455, 456, 457, and two 500-level CMN courses, or permission. Writing intensive.

### **CMN 765 - Police Talk**

**Credits:** 4.00



How do police get people to comply with a communicative action? How do they ask questions to investigate, to problem-solve, and to get a confession during an interrogation? How do citizens resist or cooperate with police action? This course examines questions such as these to understand basic communication processes, and how these processes are utilized in talk-in-interaction between police and citizens. This is a hands-on research methods course that instructs students in the methodology of video analysis, and has students pursue their own research projects in the content area of police-citizen interaction. Prereq: CMN 455, 456, 457, and two 500-level CMN courses, or permission. Writing intensive.

### **CMN 772 - Seminar in Media Theory**

**Credits:** 4.00

Detailed analysis of major theories related to the interaction of communication technologies and society. Application to current examples in politics, advertising, and entertainment. Prereq: at least one 600-level course or permission. Writing intensive.

### **CMN 788 - Openings of Everyday Interactions**

**Credits:** 4.00

Examination of how everyday human social interactions begin. Provides hands-on experience analyzing verbal and nonverbal social actions during naturally occurring interactions, including telephone conversations and especially face-to-face encounters between previously acquainted and unacquainted persons socializing and/or doing work. Explores how parties use the openings of interactions to (re)-create and maintain social relationships. Encourages students to develop intellectual curiosity about everyday social life. Prereq: CMN 455, 456, 457, (2)-CMN 500 levels or permission. Writing intensive.

### **CMN 795 - Independent Study**

**Credits:** 1.00 to 4.00

Advanced individual study in rhetoric, media, or interpersonal communication. Project to be developed with supervising instructor. May be repeated up to a maximum of 8 credits. Prereq: permission.

### **CMN 795W - Independent Study**

**Credits:** 1.00 to 4.00

Advanced individual study in rhetoric, media, or interpersonal communication. Project to be developed with supervising instructor. May be repeated up to a maximum of 8 credits. Prereq: permission. Writing intensive.

### **CMN 796 - Comm-Entary Journal**

**Credits:** 1.00

Serve on the editorial board of student run communication journal. Elective credit which does not count toward the major. May be repeated for a maximum of 2 credits. Prereq: CMN 455, 456, 457, or permission. Cr/F.

### **CMN 799H - Honors Thesis**

**Credits:** 4.00

Written thesis based on substantial and original research under the direction of a full-time member of the communication faculty. Thesis must be in the form and style of a publishable, scholarly work. Restricted to seniors seeking honors in major.

## Communication Arts

### **CA 450 - Introduction to Public Speaking**

**Credits:** 4.00

Theories of rhetoric applied to the practice of speech composition, oral performance, and critical evaluation. Focus on student speeches for a variety of situations and audiences. Not for credit if credit earned for CMN 500.

### **CA 500 - Media Writing**

**Credits:** 4.00

An introduction to business, creative and freelance writing for a variety of media. Writing, editing and rewriting in areas such as video scripts, short magazine articles, audio scripts, ads, press releases, news, short one-act plays, blogs and more. Prereq: ENG 401. Writing intensive.

### **CA 501 - Internship/Communication in the Urban Community**

**Credits:** 1.00 to 4.00

Field-based learning experiences. Connects students to the urban community and integrates their classroom education within a business or organizational setting. Students work under the direction of a faculty advisor and workplace supervisor to fulfill the obligations of the workplace internship plan and to complete individually-designed academic projects. Projects must be approved in advance by the faculty advisor. Open to matriculated students with a GPA of 2.50 or better and junior standing. Permission of instructor required. May be repeated for up to 8 credits, with 4 credits maximum accepted toward satisfaction of requirements for the CA major. Cr/F.

### **CA 502 - Image and Sound**

**Credits:** 4.00

Image and Sound is a foundation course in the aesthetics of motion picture and sound production. This course explores the aesthetic principles that are used to communicate stories, emotions and messages in popular media. Students will study film, television and new media and survey production methods. This is not a production course per se, but is particularly helpful to students interested in video and film production. No credit for students who have completed CA 444.

### **CA 503 - Techniques for News Reporting**

**Credits:** 4.00

Focuses on the essential elements of fact-based reporting and discussion of the principles and ethics of independent journalism. Techniques include determining the different perspectives and voices that belong in a story, developing research skills for locating information, strategies for reconciling conflicting information, and procedures for effective interviewing. Prereq: ENGL 401 plus CMN 455; or permission.

### **CA 504 - Film Criticism**

**Credits:** 4.00

An introduction to the practice of film criticism. Critique of film as both art form and medium of communication. Examines the process of film production, basic principles of film form, techniques of film style, and major approaches to film criticism. Prereq: ENGL 401 and CMN 455 or permission. Special fee.

### **CA 506 - Gender**

**Credits:** 4.00

How gender is created, maintained, repaired, and transformed through communication in particular historical, cultural, and relational contexts. Examines a variety of topics including the relationship between

sex and gender, language, cultural mythologies, identity, health care, sexuality, and strategies for resisting conventional gender definitions. Prereq: CMN 457 or permission.

### **CA 508 - Conflict in Relational Communication**

**Credits:** 4.00

Introduces communication theories relevant to the study of conflict interaction in interpersonal relationships. Considers interpersonal concerns contributing to conflict such as power, face-saving, and goals. Examines behaviors that affect our ability to resolve conflict, and strategies, such as mediation, to resolve conflict. Develops the ability to diagnose productive and destructive conflict patterns in relationships. The course is both theoretical and practical in orientation. A combination of lecture, discussion, case studies, and in-class group assignments are employed. Prereq: CMN 457.

### **CA 512 - Scriptwriting**

**Credits:** 4.00

Examines the preproduction phase of moving image media, focusing especially on the art and business of writing for the screen. Covers the process of developing student work from original story idea to completed, first draft screenplay. Topics include script formats, narrative structure, plot development, characterization, style, and marketing strategies. Prereq: ENGL 401 plus either CMN 455 or 456; or permission. Writing intensive.

### **CA 513 - Radio News Production**

**Credits:** 4.00

Theory and practice of producing news stories for radio. Covers the research, organization, and technical skills necessary to produce a basic three-and-half to four-minute radio piece that includes three interviews, a scene created with sound, instructions for a studio mix, and a host introduction. Intended for beginning and intermediate students who have a strong interest in news writing and news production. Prereq: ENGL 401, plus CMN 455; or permission. Special fee. Writing intensive.

### **CA 514 - Fundamentals of Video Production**

**Credits:** 4.00

Beginning electronic field production using digital video and nonlinear editing formats. Covers basic aesthetic principles and practices of video communication. Introduces techniques for effective image and sound recording in the field, fundamentals of shot and sequence construction, and basic postproduction practices on nonlinear editing systems. Prereq: ENGL 401, CA 502 or CA 444, CMN 455, or permission. Preference given to CA majors. Special fee.

### **CA 515 - Advanced Video Production**

**Credits:** 4.00

Advanced electronic field production and post production using digital video and nonlinear editing formats. Emphasizes original student work of increasing conceptual, formal, and technical complexity that begins to incorporate a wider range of images, sounds, and editing techniques. Prereq: CA 514 or permission. Preference given to CA majors. May be repeated, with permission, to a maximum of 8 credits. Special fee.

### **CA 516 - Speechwriting**

**Credits:** 4.00

The strategies of art and persuasion in the craft of professional speechwriting for a variety of modes, audiences, and exigencies. Examines a wide array of famous speeches from political, literary and cinematic sources to uncover the fundamental theories of rhetoric and persuasion at work in these texts. Application of these theories and strategies of persuasion in original speechwriting projects. Prereq: ENGL 401 plus CMN 456; or permission.

### **CA 517 - Fundamentals of Audio Prod**

**Credits: 4.00**

This course provides students with an introduction to the history, principles, and techniques of audio production. Through hands-on experience, class projects, and homework assignments, students learn how to use voice, music, writing, sound effects, and audio hardware and software to design sound and tell a story. This class will also look at the radio industry and how sound design is being used by a variety of industries. Special fee.

**CA 520 - Special Topics in Applied Communication****Credits: 1.00 to 4.00**

New or specialized topics in applied communication not covered in regular course offerings. Topics vary; descriptions listing course content and any prerequisites are available during preregistration. May be repeated for credit if topics differ for a maximum of 12 credits. Prereq: contingent on topic. Writing intensive when topic is advanced feature scriptwriting.

**CA 525 - Media Programming****Credits: 4.00**

Process of program planning for electronic media. Covers the contexts -- social, cultural, institutional, economic, technical, regulatory -- within which decisions concerning program selection, form, content, and scheduling are made. Prereq: CMN 455 or permission.

**CA 526 - Organization of Newswork****Credits: 4.00**

Examines news as socially situated discourse. The professional norms, work routines, representational practices, ideologies, and ethics of news producing organizations. Prereq: CMN 455 or permission.

**CA 527 - History of Film****Credits: 4.00**

The history of film since 1948. Historical analysis of the development of cinema since the emergence of television, both in the United States and abroad. Selected topics include cinema and the cold war, international stylistic movements, film exhibition, the decline of the studio system, new technologies, third cinema, globalization and economic consolidation. Prereq: CMN 455 or permission. Special fee.

**CA 531 - History and Organization of Advertising****Credits: 4.00**

Examines the development of advertising in historical context, focusing on the evolving structure and function of advertising agencies, market research practices, advertising design, anthropological approaches to advertising and consumer culture, and contemporary policy issues. Prereq: CMN 455 or permission.

**CA 535 - Marital Communication****Credits: 4.00**

Introduces students to the study of communication in marital relationships. Examines the major theoretical orientations that characterize the marriage field and investigates the processes by which communication facilitates or hinders marital adjustment and stability: understanding, and relationship satisfaction. Also explores popular cultural constructions of marriage and intimacy and how these influence personal expectations for marital relationships. Students need not be married to take or benefit from this course. Prereq: CMN 457, or permission. Writing intensive.

**CA 539 - Communicating in Families****Credits: 4.00**

Explores the role of communication in the creation, maintenance, and transformation of family systems. Focus on how meanings of "family" are constructed through familial and popular discourses, and the

consequences these communication practices have for lived experience. Prereq: CMN 457 or permission.

### **CA 540 - Public Relations**

**Credits:** 4.00

This course provides students with an overview of the field of public relations, including its history, ethics, and current practices. Will include case studies of major public relations issues that have occurred both historically and in recent years; individual and class projects that enable students to determine how best to plan for and respond to public relations issues; and quest practitioners who work in various fields, including business, government, the non-profit sector, and education. Prereq: CMN 456 or CMN 455 or permission.

### **CA 550 - Special Topics in Communication Organization, History, and Policy**

**Credits:** 1.00 to 4.00

New or specialized topics in the organization, history, and policy of communication practices not covered in regular course offerings. Topics vary; descriptions of course content and any prerequisites are available during preregistration. May be repeated for a maximum of 12 credits if topics differ. Prereq: contingent on topic.

### **CA 600 - Research Methods in Media**

**Credits:** 4.00

Qualitative research practices for the study of mass communication. Tools for investigating the production contexts of media institutions, the cultural and ideological meanings of media texts, and the social dimensions of media consumption in home and family. Emphasis on how to review literature, develop a research question, define a unit of analysis, select and apply method, interpret data, and draw conclusions grounded in theory. Prereq: any two 500 level CA courses (excluding CA 501), one of which must have CMN 455 is prerequisite or permission. Writing intensive.

### **CA 601 - Exploring Relationships**

**Credits:** 4.00

Critically examines the myriad ways qualitative researchers approach the study of interpersonal communication. With an emphasis on the artistic practice of fieldwork, the course considers the process of research design, the relationship between researcher and researched, the moral and ethical aspects of research, issues of representation and audience, and evaluation strategies. Students design, conduct, and present original qualitative research projects. Prereq: any two 500 level CA courses (excluding CA 501), one of which must have CMN 457 as a prerequisite or permission. Writing intensive.

### **CA 610 - Communication Technologies and Culture**

**Credits:** 4.00

The role of communication technologies in shaping cultural meanings and human consciousness. Covers the work of Innis, McLuhan, Ong, Postman, Carey and others to understand the historical development of shifting communication technologies and patterns of culture from orality to computer communication. Also explores the dynamic between mass culture and sub-cultural appropriations of media forms and content. Prereq: any two CA courses (excluding CA 501), one of which must have CMN 455 as a prerequisite or permission. Writing intensive.

### **CA #611 - Theories of Relational Communication**

**Credits:** 4.00

Critically examines a variety of theories which seek to explain the dynamics of interpersonal relationships including performance theory, social construction theory, systems theory, feminist theory, and narrative theory. Prereq: any two 500 level courses (excluding CA 501), one of which must have CMN 457 as a prerequisite, or permission. Writing intensive.

### **CA 612 - Narrative**

**Credits: 4.00**

Considers the ways humans make sense of experience through the stories we construct within particular relational, cultural, and historical contexts. Explores a variety of topics including narrative conventions, canonical stories, subjectivity and reflexivity, the relationship between story and audience, space and time, memory and imagination, and narrative truth. Each student will conduct an original narrative research project. Prereq: any two 500 level CA courses (excluding CA 501), one of which must have CMN 457 as a prerequisite, or permission. Writing intensive.

**CA 614 - Communication and Power****Credits: 4.00**

Explores the concept of power -- how we conceive of power, how we enact power, and the effects of power in our interpersonal relationships. Using a variety of theoretical approaches such as relational theory, feminist theory, and social constructionist, we will consider the idea that the expression of power is an act of self-definition, that power resides in the ability to define one's reality while identifying and choosing courses of action, and that disempowerment is the end result of the loss of freedom of action. Prereq: Any two 500 level CA courses (excluding CA 501), one of which must have CMN 457 as a prerequisite, or permission. Writing intensive.

**CA 615 - Film History/Theory and Method****Credits: 4.00**

Intensive study of philosophical, rhetorical, and methodological issues in film history research. Examines a series of selected historical problems in the areas of social, aesthetic, industrial, and technological film history up to 1948 and reviews existing historiography on these problems. Focus is on original student research. Prereq: any two 500 level CA courses (excluding CA 501), one of which must have CMN 455 as a prerequisite, or permission. Special fee. Writing intensive.

**CA 618 - Documentary****Credits: 4.00**

Exploration of the historical development, ethics, funding, socio-cultural significance, and communication strategies of documentary film and video. May focus on a particular genre or genres. Prereq: any two 500 level CA courses (excluding CA 501), one of which must have CMN 455 as a prerequisite, or permission. Special fee. Writing intensive.

**CA 720 - Seminar****Credits: 4.00**

Intensive readings and research course in a highly focused area of study. Topics vary. Descriptions of course content and any prerequisites are available during preregistration. May be repeated for credit to a maximum of 12 credits if topics differ. Prereq: contingent on topic. Writing intensive.

**CA 795 - Independent Study****Credits: 1.00 to 4.00**

Advanced individual study under the direction of a faculty member. Content area and research project to be developed in consultation with faculty supervisor. Prereq: permission. May be repeated for up to 8 credits, with 4 credits maximum accepted toward satisfaction of requirements for the CA major.

## Communication Sci&Disorders

### **COMM 401 - American Sign Language I**

**Credits:** 4.00

Introduction to the vocabulary, finger spelling, grammatical processes, phonology, syntax, and semantics of American Sign Language. Emphasis on applying principles of sign language; psychosocial aspects of deafness, and the Deaf person as bilingual; grammatical processes that modulate meaning of sign in discourse; development of receptive language skills. Lab.

### **COMM 402 - American Sign Language II**

**Credits:** 4.00

Emphasis on the advanced linguistic principles of American Sign Language including idioms slang and its place in the communication pattern of the Deaf. Improvement of speed and accuracy in receptive and expressive skills for communicating with the Deaf. Educational and vocational problems associated with deafness. Prereq: COMM 401 or its equivalent; juniors and seniors only. Lab.

### **COMM 520 - Survey of Communication Disorders**

**Credits:** 4.00

Causes, diagnosis, and treatment of speech, language, and hearing disorders.

### **COMM 521 - Anatomy and Physiology of the Speech and Hearing Mechanisms**

**Credits:** 4.00

Anatomy, physiology, neurology, and function of the mechanisms for the production and perception of speech.

### **COMM 522 - Acquisition of Language**

**Credits:** 4.00

Introduction to normal language acquisition; stages of children's developing language examined within a linguistic framework with attention paid to syntax, morphology, phonology, semantics, and pragmatics. Theories of language acquisition overviewed.

### **COMM 524 - Clinical Phonetics**

**Credits:** 4.00

Application of the International Phonetic Alphabet to normal and clinical populations; use of broad and narrow transcriptions. Basic speech science, acoustic phonetics, and acoustic analysis of speech production.

### **COMM 525 - International Service Learning in Nicaragua**

**Credits:** 4.00

This course emphasizes cross-cultural communication and linguistic skills in the Spanish Language and Nicaraguan sign language. It promotes an understanding of global, social, economic, health, educational, and environmental issues affecting the peoples of Nicaragua, Latin American and the two-thirds world. Students culminate their semester studies with a two-week service visit in Managua, Nicaragua. Special fee.

### **COMM 536 - Introduction to Deaf Studies**

**Credits:** 4.00

This course addresses various aspects of the Deaf community, including the value of American Sign Language and the culture it reflects, professions within the Deaf community, legislation affecting Deaf

people, educational approaches and controversies, activities and events relating to the population, and hearing-related issues.

### **COMM 575 - Have You Heard? The Fundamentals of Hearing and Hearing Loss**

**Credits:** 4.00

This course will provide an overview of hearing loss including current issues and technology. Areas of study will focus on the incidence of hearing loss, terminology and definitions, service delivery models, educational trends, accessibility regulations and the impact of noise. Information about the various professionals, who work with individuals with hearing loss, and their respective roles, will also be provided. This 4 credit course is open to all undergraduates and it has no prerequisites.

### **COMM 630 - Organic Pathologies**

**Credits:** 4.00

Neurological bases, diagnosis, and treatment of communication disorders; emphasis on motor speech disorders and aphasia. Prereq: permission.

### **COMM 631 - Articulation and Language Disorders in Children**

**Credits:** 4.00

Research, diagnosis, and therapy procedures as applied to articulation and language disorders.

### **COMM 635 - Professional Issues in Speech-Language Pathology**

**Credits:** 4.00

Introduction to the profession of speech-language pathology; review of issues related to scope of practice; professional ethics, certification/licensure, and current challenges facing the profession. Discussion of employment opportunities for speech-language pathologists. Juniors and Seniors only. Writing intensive.

### **COMM 637 - Multicultural Issues in Communication Disorders**

**Credits:** 4.00

The purpose of the course is to allow students to become informed about the complexity and the ways in which cultures differ. The students develop a comprehensive understanding of, cross cultural sensitivity to, and competence of one's own culture and the characteristics of the four major cultural groups in the United States. The students also develop intercultural skills for assessing and counseling individuals as mandated by our professional association policies and positions on language diversity in the clinical management of clients from diverse cultural and linguistic backgrounds.

### **COMM 638 - American Sign Language Teaching Assistant**

**Credits:** 3.00

Students pursuing advanced training in ASL have opportunities to hone their own signing skills by assisting ASL instructors in classroom and other settings, serving as student mentors, ASL lab assistants, and tutors. Course may be repeated up to a maximum of 6 credits. Prereq: ASL I and II. Permission required.

### **COMM 660 - Special Problems**

**Credits:** 2.00 to 8.00

Individual or group projects to enrich or expand theoretical knowledge and to afford an opportunity for applied experience. May be repeated to a maximum of 8 credits. Prereq: permission and arrangement with faculty.

### **COMM 704 - Basic Audiology**

**Credits:** 4.00

Normal hearing process and pathologies of the auditory system. Hearing screening, pure-tone testing, and speech audiometry. Prereq: COMM 521 or permission.



## **COMM 705 - Introduction to Auditory Perception and Aural Rehabilitation**

**Credits:** 4.00

Research, testing, and clinical procedures of auditory perception, applied to the communicatively impaired. Prereq: COMM 704; permission.

## **COMM 725 - Cued Speech**

**Credits:** 4.00

This course covers the fundamentals of the Cued Speech system, its applications and research as well as its relevance to other communication options for children who are deaf or hard of hearing. Various topics are covered, including CS and language development, reading, auditory and speech skill development, auditory processing, bilingualism, Down Syndrome, Autism, cochlear implants and transliteration.

## **COMM 734 - American Sign Language III**

**Credits:** 4.00

Builds upon the information covered in Introductory ASL I and II. Development of basic grammatical rules, vocabulary, manual alphabet/numbers, visual-gestural communication, and information related to Deaf Culture are covered. All lectures, laboratory activities, outside assignments build upon rudimentary competency in receptive and expressive use of ASL and develop fluency and competency. Class is conducted using ASL only. Prereq: American Sign Language I and II.

## **COMM 735 - American Sign Language IV**

**Credits:** 4.00

Builds upon the information covered in Introductory ASL I, II, and III. Development of basic grammatical rules, vocabulary, manual alphabet/numbers, visual-gestural communication and information related to Deaf Culture are covered. All lectures, laboratory activities, outside assignments build upon rudimentary competency in receptive and expressive use of ASL and develop fluency and competency. Class is conducted using ASL only. Prereq: American Sign Language I, II, and III.

## **COMM 736 - Clinical Assistant**

**Credits:** 2.00

This course is designed for seniors who are majoring in Communication Sciences and Disorders (CS&D). This course offers an opportunity to gain pre-professional clinical experience by serving as an assistant to a graduate clinician who is participating in a practicum at the UNH Speech-Language-Hearing Center. Clinical assistants will be able to take an active part in the treatment of an individual with a communication delay, disorder or difference. The undergraduate's role in the clinical process will be contingent upon his or her level of training and assigned responsibilities. The supervising clinical faculty is responsible for overseeing the intervention program. Prereq: Seniors who are majoring in CS&D and have a GPA of 3.3 or above. Permission of the instructor is required. Enrollment is limited and varies each semester depending on the number of clients available. May be repeated up to a maximum of 4 credits.

## **COMM 738 - Linguistics of American Sign Language**

**Credits:** 4.00

This course provides linguistic study of the major structural aspects of phonology, morphology, syntax, lexicology, and discourse in American Sign Language. Concepts of language variation, dialect, creolization, and bilingualism are studied. Taught primarily in ASL. Prerequisites/Proficiencies: COMM 733 - Elementary American Sign Language II Minimum grade of: C.

## **COMM #739 - Introduction to Aphasia in Adults**

**Credits:** 4.00

This course introduces the student to the relationship of brain and language and the resulting language processing problem following cerebral vascular accident (CVA). Differential diagnosis of language symptoms and treatment strategies are discussed and observed in clinical situations. Permission required.

**COMM 740 - Treatment of Adults with Acquired Brain Injury****Credits:** 4.00

This "hands-on" interdisciplinary experience enables students to acquire clinical skills and professional competence in a community-based day program where they assist adults with acquired brain injury meet their physical, emotional, cognitive-linguistic, social, spiritual, recreational, and vocational needs. Permission required.

**COMM 777 - Speech and Hearing Science****Credits:** 4.00

Physical, acoustical, and perceptual correlates of normal speech production and audition. Includes theoretical models with the generation, transmission, detection, and analysis of speech signals.

**COMM 779 - Deaf and Hard of Hearing Internship****Credits:** 4.00

This internship will allow students in the Deaf and Hard of Hearing Minor to expand their knowledge about the needs, challenges and experiences of deaf and hard of hearing individuals. The internship locations will be varied and matched, as closely as possible, to the student's particular interests. Potential placement opportunities include a school for the deaf, a public agency or vocational setting which provides services for deaf and hard of hearing individuals. Prereq: COMM 533, COMM 536, and COMM 733; permission. Cr/F.

**COMM 795 - Independent Study****Credits:** 1.00 to 8.00

Individual or group projects involving directed study of an area of communication sciences and disorders that students wish to explore in greater depth than is covered in the required curriculum. May be repeated to a maximum of 8 credits. Prereq: permission.

**COMM 798 - Special Topics****Credits:** 1.00 to 4.00

New or specialized topics not covered in regular course offerings. May be repeated for a total of 8 credits. Special fee on some topics.

## Community&Environmental Plan

### **CEP 415 - Community Development Perspectives**

**Credits:** 4.00

Introduces students to a range of community development and environmental planning issues facing communities as they undergo social, economic, and environmental change. Through class discussion and examination of case studies, this course instills basic principles and processes of community development and environmental planning, formulation, and conflict resolution. Community and environmental planning topics covered in the course include land use conflict, urban/suburban sprawl, rural development, economic development, local food systems, community infrastructure, and environmental stewardship. Emphasis is placed on the roles and responsibilities of community development professionals, including land use planners, municipal administrators, and community leaders.

### **CEP 508 - Applied Community Development**

**Credits:** 4.00

Students work in an actual community, assisting individuals and groups to identify needs and problems, establish attainable and objective goals, assess requirements and resources, and formulate programs for development and methods of collection, analysis, and integration of pertinent primary and secondary economic, social, political, and physical data for community development. Prereq: CEP 415 or permission. Lab

### **CEP 614 - Fundamentals of Planning**

**Credits:** 4.00

Community planning process in nonmetropolitan communities; practical application of planning techniques. Communities' components: housing, jobs, schools, recreation, transportation, community appearance, and the administrative structure for planning. Use of planning tools: data gathering and analysis, the master plan, zoning and subdivision regulations, community development programs. Prereq: EREC 411; CEP 415;/or permission. (Offered every other year.) Writing intensive.

### **CEP 672 - Fundamentals of Real Estate**

**Credits:** 4.00

This course covers timely subjects in National and regional real estate, such as types of property ownership, easements, financing, contracts, appraisal, brokerage, property listings, commissions, fair housing, and property management. The goal of this class is to prepare students to pass the New Hampshire Real Estate Sales Agent License Exam and/or be knowledgeable real estate investors. Prereq: MATH 420 or higher.

### **CEP 673 - Green Real Estate**

**Credits:** 4.00

This class covers issues related to existing and new real estate development with respect to history, law (state statutes and federal legislation), economics, and technology. The course looks at impacts of green development from an individual building level, and out to regional and global levels. We look at common problems and solutions, review case studies, and discuss emerging trends in "green development."

### **CEP 710 - Seminar**

**Credits:** 2.00 to 4.00

Seminars arranged to students' needs and offered as demand warrants: in-depth treatment of area, including classic work. May be repeated.

### **CEP 720 - Community-Based Natural Resource Management: Lessons from the Field**

**Credits:** 3.00

Guest lectures by extension agents and practitioners from a variety of natural resource-based fields, including: agriculture, forestry, marine resources, planning, and community/economic development. Theoretical and practical aspects of community outreach in the natural resources arena. Prereq: CEP 415, EREC 411, NR 401 or permission from instructor. Participation in outreach project required.

### **CEP 777 - Topics in Community Planning**

**Credits:** 4.00

Advanced treatment of the concepts and tools required for effective local and regional planning to guide land use, capital investment in infrastructure, and organization for service delivery. Prereq: CEP 614 or permission. (Also listed as RAM 877.) (Offered every other year.) Writing intensive.

### **CEP 793 - Community Administration Internship**

**Credits:** 1.00 to 8.00

Fieldwork in governmental agency or a local government unit for on-the-job skill development. Normally supervised by a qualified administrator in the organization with frequent consultation with a faculty sponsor. A written report is required. Internship may be part- or full-time with course credits assigned accordingly. Prereq: permission. Cr/F.

### **CEP 794 - Community and Environmental Planning Internship**

**Credits:** 1.00 to 8.00

Fieldwork in a public planning office or agency for on-the-job skill development. Normally supervised by a qualified planner in the planning organization with frequent consultation with a faculty sponsor. A written report is required. Internship may be part- or full-time with course credits assigned accordingly. Prereq: permission. Cr/F.

### **CEP 795 - Investigations**

**Credits:** 2.00 to 4.00

Special assignments in readings, investigations, or field problems, or teaching experience. May be repeated. Prereq: permission.

### **CEP 795W - Investigations**

**Credits:** 2.00 to 4.00

Special assignments in readings, investigations, or field problems, or teaching experience. May be repeated. Prereq: permission. Writing intensive.

### **CEP 796 - Investigations**

**Credits:** 2.00 to 4.00

Special assignments in readings, investigations, or field problems, or teaching experience. May be repeated. Prereq: permission.

### **CEP 796W - Investigations**

**Credits:** 2.00 to 4.00

Special assignments in readings, investigations, or field problems, or teaching experience. May be repeated. Prereq: permission. Writing intensive.

### **CEP 797 - Community Administration and Planning Seminar**

**Credits:** 1.00 to 4.00

Selected topics in community administration and in community and regional planning. Focuses on current issues of major importance that are not usually covered in regular community administration to a maximum of 8 credits. Prereq: permission. Special fee.



## Community Leadership

### **CSL 200 - Technology for Community Service and Leadership**

**Credits:** 2.00

This two-credit course will provide students with the skills needed to effectively use Microsoft Office and other related computer applications. During the second half of the semester, students will further develop their computer skills and their social science research skills by completing research assignments and other projects designed to enhance their understanding of the information available to them through web-based investigation.

### **CSL 210 - Capstone Seminar**

**Credits:** 4.00

This seminar provides the opportunity for students in their final semester to synthesize their learning and skills as they broaden their understanding of the political and social policy dimensions of community organizing and leadership. Each student will engage in a significant service project that will serve as the focal point for both skill application and issue analysis. Prereq: CSL 401, 402, 403, and CSL 405.

### **CSL 291 - Studies in Community Service and Leadership**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include a specific community leadership/organizing topic. Prereq: CSL 201 or equivalent.

### **CSL 401 - Introduction to Community Service and Leadership**

**Credits:** 4.00

Students are introduced to differing concepts of community and influence within communities, and to the challenges facing leaders within community organizations as they work to address key problems. All students participate in a significant community project which serves as the basis for both learning specific community organizing skills and for reflecting on the rewards and challenges of community leadership. Writing intensive.

### **CSL 402 - Introduction to Nonprofit Organizations**

**Credits:** 4.00

This practical course provides an overview of the unique responsibilities and practices needed to effectively manage a community-based nonprofit organization. Topics include: issues of organizational structure and staffing, strategic planning, board effectiveness, financial management, leadership roles and responsibilities, and public accountability.

### **CSL 403 - Organizing and Supervising Volunteers**

**Credits:** 4.00

This course provides students with the knowledge and skills necessary to design, organize, and manage effective volunteer programs. Topics covered include: identifying organizational volunteer needs, recruiting, supervising, and motivating volunteers, integrating volunteers into the overall goals and services of an organization, and creating effective volunteer training programs. Students will explore resources available for creating a successful volunteer program and will research the variety of approaches to volunteer management that organizations currently use. All students also volunteer with a community organization.

### **CSL 404 - Managing Change and Conflict in Communities**

**Credits:** 4.00

This course examines a variety of approaches to promoting and responding to community change. Through active participation and analysis of specific community initiatives, students will explore such topics as issue-identification, planning for change, power dynamics and conflict within diverse groups, strategies for action, lobbying, and influencing political action. Prereq: CSL 401, permission.

### **CSL 405 - Communication Within Communities**

**Credits:** 4.00

This course focuses on the ways we influence--and are influenced by--others within the communities in which we live and participate. Students have the opportunity to analyze how a specific "real life" community issue is presented, interpreted, and resolved through various written and oral mediums. Additional coursework involves frequent writing and speaking assignments, with particular emphasis on the forms of persuasion that most commonly shape "community opinion." Students will also examine on-line forms of communication such as web sites and e-newsletters and contribute to at least one of these as a service to a community organization.

### **CSL 406 - Literature of Family and Community**

**Credits:** 4.00

Through a wide range of readings, primarily fiction, this course examines what it means to be an individual living in the context of family and community. Students use these readings both to examine differing concepts of community and to explore how individuals and groups respond to the challenges of creating as well as changing their communities. Coursework involves critical analysis, group-led discussions, and frequent short papers. Prereq: COM 211 or instructor permission.

### **CSL 407 - Introduction to Non-profit Budgeting and Accounting Practices**

**Credits:** 3.00

This course is designed to help students understand the responsibilities of nonprofit financial management for program managers and board members. It introduces key budgeting and accounting practices for community-based nonprofit organizations. Students will explore such topics as budget planning and development, budget design, roles and responsibilities of those involved in budgeting, and how to read and interpret financial data. Case studies are used throughout the class to illustrate these financial skills.

### **CSL 490 - Civic and Community Internship**

**Credits:** 4.00

This internship is designed to promote experiential learning about community service and leadership through active involvement within a community organization. It provides students with an opportunity to build upon their skills and interests while developing an awareness of civic and community issues. In addition to participating in community projects, students are expected to reflect upon their experiences and to relate them to assigned reading. Each student will also complete a research project based on a problem encountered at the service site. Prereq: CSL 401 or permission of instructor. May be repeated for up to 8 credits.

### **CSL 492 - Studies in Community Service and Leadership**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include a specific community leadership/organizing topic. Prereq: CSL 201 or equivalent.

## **CSL 508 - Essentials of Fundraising for Community-Based Organizations**

**Credits:** 2.00

The ability to raise funds is essential to all community-based and nonprofit organizations. This course is designed to provide students with the essential knowledge and skills to develop and execute a successful fundraising program. Topics covered include: prospect research, choosing fundraising strategies, common fundraising mistakes, maintaining relationships with donors, raising money by mail, personal solicitation, event planning, and other key approaches to raising money.

## **CSL 509 - Essentials of Grant Writing for Community-Based Organizations**

**Credits:** 2.00

This course provides the information and skills necessary to research and apply for grants from government agencies, foundations, corporations, and other sources. Students will follow the process of grant-seeking from identifying need through application and follow up.



## Computer Information Systems

### **CIS 405 - Introduction to Internet and Web Authoring**

**Credits:** 4.00

The fundamental technologies, protocols, and practices that make up the Internet. The Internet as a global information system that has transformed the current business environment. Additional topics include: Internet structure; applications; business uses; legal and ethical issues introduced by networked computers such as privacy, fraud, and security. A significant portion of the course covers Web authoring procedures and languages. Students create a Web site using xhtml language and are introduced to JavaScript. No prior computer experience is required. Cannot receive credit if credit earned for CS 403.

### **CIS 411 - Introduction to Computer Applications**

**Credits:** 4.00

Beginning course on computer technology, specifically microcomputer systems. Emphasis is on (1) using computers to manage information for personal and professional applications and (2) the impact of computer information technology on today's society. Software applications used include word processing, spreadsheets, database, and graphics. Independent lab activities are a major part of the course content. No prior computer experience is required. No credit if credit has been received for DCE 491; 492; CS 401.

### **CIS 425 - Introduction to Programming**

**Credits:** 4.00

An introduction to problem solving and object-oriented programming. Emphasis is on programming concepts and techniques and their application to software development. Students learn to write, review, document, share, and demonstrate interactive applications and participate in pair programming, peer-led tutoring, and collaborative learning throughout the course.

### **CIS 505 - Advanced Web Authoring**

**Credits:** 4.00

An introduction to web applications development. The course builds on introductory programming and web authoring. Emphasis is on dynamic web concepts and advanced programming techniques using markup languages and client-side and server-side scripting. Students learn to develop interactive web pages and integrate them with web-based systems. Students participate in real-world team projects. Prereq: CIS 405 and CIS 425, or permission.

### **CIS 510 - Fundamentals of Computer Information Systems**

**Credits:** 4.00

Investigates the role and impact of computer applications on computer information systems in general and specifically as applied to business requirements. Surveys the components of a computer information system; explores computer information systems in areas such as manufacturing, medicine, education, and government; discusses the issues of computerizing information resources. Directs attention to computer information systems in business and identifies the need for and function of formal systems development methodologies. Prereq: CIS 411 or equivalent. Writing intensive.

### **CIS 515 - Multimedia: Introduction and Applications**

**Credits:** 4.00

Examines the history and underlying theory behind computer integration of text, sound, video, and graphics. Topics include: hardware and software requirements, design criteria, analysis of current hypertext, and multimedia applications in education and business. Students gain practical experience in developing multimedia applications on the Macintosh platform.

## **CIS 520 - Database Design and Development**

**Credits:** 4.00

An introduction to developing database applications with business users. Topics include fundamentals of the relational model, structured query language, data modeling and database design and implementation. Students use a variety of database management system tools to model, code, debug, document, and test database applications. Students complete real-world team projects. Prereq: CIS 505 and CIS 510, or permission.

## **CIS 542 - Operating System Applications**

**Credits:** 4.00

Introduction to operating system concepts with relevant lab experiences. Topics include the goals and objectives of operating systems; the management of memory, processing, files, and resources; and a survey of current operating components. Students will understand and apply basic operating system concepts and principles, learn an operating system in some detail, appreciate the design considerations involved in O/S development. Prereq: CIS 411, CIS 510, or permission.

## **CIS 550 - Networking Concepts**

**Credits:** 4.00

Explores the fundamentals of data communications and networking requirements for an organization, including the standard layers of network organization; network technologies; and protocols for LANs, WANs, wireless networks, and switched and routed networks. Includes issues of security, topology, management, and future developments. Prereq: CIS 542 or permission.

## **CIS 560 - Computer Law and Ethics**

**Credits:** 4.00

Examines the ethical and legal issues that face a computer professional. Surveys ethical theories and moral problems related to information technology. Students develop and articulate a personal point of view on computer issues based on sound ethical principles and consider the impact of such views on co-workers, employers, and society in general. Topics also include: major social issues involving computerization such as intellectual property, privacy, computer reliability, and security; current U.S. and international laws relevant to computer and network usage. Case study analysis is a major component in course delivery. Prereq: CIS 510 or permission. Writing intensive.

## **CIS 620 - Network Administration and Maintenance**

**Credits:** 4.00

Advances the understanding of networks through practical application of administering and maintaining and intranet and its servers. Students use a modern server operating system and network management tools. Routine tasks include: install and configure servers, setup directory services and access privileges, tune network services, understand and implement network security, perform routine maintenance, and practice troubleshooting techniques. Prereq: CIS 550 or permission.

## **CIS 630 - Advanced Application Programming**

**Credits:** 4.00

An introduction to object-oriented design, analysis, and implementation of data structures and algorithms. Students apply concepts and techniques to develop information processing applications. Best programming practices of editing, debugging, documentation, testing, and code review are stressed. Familiarity with an object-oriented programming language and experience with application development are required. Prereq: CIS 425 and CIS 505, or permission.

## **CIS 640 - Human Computer Interaction**

**Credits:** 4.00

This course familiarizes students with Human Computer Interaction and the significant role it plays in product design and development. The principles of HCI, examples of good and bad applications, and factors that determine a design's effectiveness are covered. Stages of the product development life cycle are discussed to understand the progression of a project from conception to delivery and the impact it has on HCI. No credit for students who took CIS 599 Special Topics: Human Computer Interaction.

### **CIS 685 - Professional Develop Seminar**

**Credits:** 1.00

The Professional Development Seminar is designed to prepare students for successful internship placement and future work opportunities in the computer profession. You will learn the tools to effectively market yourself, manage job fairs, practice informational interviews, prepare for interviews, and learn about the workplace in general. You will also actively seek a work experience for the following semester. Prereq: Majors must complete 40 CIS credits, or have permission from the program coordinator. Not open to students who passed CIS 680.

### **CIS 690 - Internship Experience**

**Credits:** 3.00

The internship provides field-based learning experience through placement in a computing field. Students gain practical computing experience in a business, non-profit, or government organization. Under the direction of a faculty advisor and workplace supervisor, the student is expected to contribute to the information technology products, processes, or services of the organization. Prereq: CIS 685 and instructor permission. May be repeated up to 6 credits but no more than 3 credits may fill major requirements. Cr/F.

### **CIS 698 - Special Topics**

**Credits:** 1.00 to 4.00

Course topics not offered in other courses. Topics covered vary depending on contemporary computing topics, programmatic need, and availability and expertise of faculty. Barring duplication of subject, may be repeated for credit. Prereq: permission.

### **CIS 705 - Web Application Development**

**Credits:** 4.00

Students work in teams and implement, test, document, demonstrate, and deploy web systems that solve organizational needs expressed by real clients. Emphasis is on advanced server-side and client-side programming and integration of web application with database and web server applications. Free and open source development and communication tools are used to carry out the course project. Prereq: Senior status or permission. No credit for students who have completed CIS 605.

### **CIS 710 - Object-Oriented Software Development**

**Credits:** 4.00

Presents an iterative methodology for developing software systems. Development activities include requirements elicitation and analysis, system and object design, implementation and testing, project and configuration management, infrastructure maintenance, and system deployment to end user. Students work in team, assume developer roles, build models of a real-world system, and deliver a proof-of-concept or prototype. Prereq: Senior status or permission. No credit for students who have completed CIS 610. Writing intensive.

### **CIS 715 - Information Security**

**Credits:** 4.00

Topics include general security principals and practices, network and system security, access control methodology, and cryptography. Students develop a simple cryptographic system based on sound mathematical principals, work to improve it, and find ways to attack it. Some programming required. Prereq: Senior status or permission. No credit for students who have completed CIS 615.

**CIS 720 - Database Application Development****Credits:** 4.00

This is a project course that provides practical experience with developing a storage subsystem of a computer information system. Topics include data modeling, database design, system implementation, and integration with a target application. Emphasis is on implementation activities, database application development artifacts, project communication, and supporting system development and project management tools. Prereq: Senior status or permission. No credit for students who have completed CIS 650.

**CIS 790 - Capstone Project****Credits:** 4.00

This course requires the development of a real world project that responds to an IT organizational need. The project is undertaken by a team of students. An iterative approach is used to incrementally address the project requirements while constructing a prototype of the IT solution to the original problem.

**CIS 795 - Independent Study****Credits:** 1.00 to 4.00

Advanced individual study under the direction of a faculty mentor. Content area to be determined in consultation with faculty mentor. Prereq: permission. May be repeated.

## Computer Science

### **CS 400 - Introduction to Computer Science**

**Credits:** 1.00

Initial exploration of computing, including comparison of the various subfields. A wide range of issues, including fundamental concepts, selected current topics and the role of both computing and computing professionals in organizations and in society are also discussed. Cr/F.

### **CS 401 - Computers and Their Applications**

**Credits:** 4.00

Use of computers to manage and analyze information across a variety of settings and disciplines. Introduces major categories of computer software, including word processing, spreadsheets and database systems. Covers basic computer concepts and the computer's role in today's society. Significant hands-on work required outside of the class. Not open to CS majors. CEPS students should check with their major department for approval.

### **CS 401H - Honors/Computers & Their Appl**

**Credits:** 4.00

Use of computers to manage and analyze information across a variety of settings and disciplines. Introduces major categories of computer software, including word processing, spreadsheets and database systems. Covers basic computer concepts and the computer's role in today's society. Significant hands-on work required outside of the class. Not open to CS majors. CEPS students should check with their major department for approval.

### **CS 403 - Weaving the Web: Creating Content for the World Wide Web**

**Credits:** 4.00

Introductory course exploring the World Wide Web and its role in modern society. Students develop an understanding of the Web's underlying technologies and learn how to utilize them as contributing members of the online community. Students become proficient with creating and publishing Web pages using XHTML and CSS. Additional subjects include the security of computer communications and the various social implications of a networked world. No prior knowledge or experience is assumed. No credit if credit earned for CIS 405 (Note: CIS 405 is offered at UNH Manchester, and is not related to CS 405 at UNH Durham.)

### **CS 404 - Do-It-Yourself Internet**

**Credits:** 4.00

The objective of this course is to demystify the design process that leads to the evolution of the Internet. In doing so, we investigate the ways that technology changes to meet the needs of society, how society changes in response to these new technologies and how these societal changes create pressures that produce needs for new technologies.

### **CS 405 - Introduction to Applications Programming with Visual Basic**

**Credits:** 4.00

Introduces the concepts and techniques of microcomputer windows programming. Students use the Visual Basic language to develop modular, event-driven programs/applications. Topics include: forms, properties, controls, variables, decision structures, and built-in and user-defined functions and subroutines. CEPS students should check with their major department for approval. Not open to CS majors.

### **CS 408 - Living in a Networked World: The Good, the Bad, and the Ugly**

**Credits: 4.00**

The objective of this course is to explore the implications of living in a networked world. The course surveys the fundamental technologies and practices that make up the Internet and then ask the student to examine the ramifications of using the technologies. Users of the technologies should understand the technology in order to make educated decisions about how to use it safely and effectively. Students have the opportunity to self-publish by using various current technologies including blogs, discussion boards, email and creating web pages using xhtml.

**CS 410 - Introduction to Scientific Programming****Credits: 4.00**

Introduces the concepts and techniques of computer programming. Particular emphasis on computer programming as a problem-solving technique in science and engineering applications. The C language is taught and used for assignments. Good programming style is stressed. Significant out-of-class programming required. Not open to students who have completed CS 407, 415, or the equivalent. Pre- or Coreq: MATH 425.

**CS 415 - Introduction to Computer Science I****Credits: 4.00**

Theory and practice of computer science. Algorithm development and analysis; data abstraction techniques; elementary data structures; dynamic memory manipulation; debugging; and program design issues. Computer systems and applications. Intended for CS majors.

**CS 416 - Introduction to Computer Science II****Credits: 4.00**

Theory and practice of computer science. Algorithm development and analysis; data abstraction techniques; elementary data structures; dynamic memory manipulation; debugging; and program design issues. Computer systems and applications. Intended for CS majors.

**CS 444 - Computer Technology: Balancing Risks Against Reward****Credits: 4.00**

Computer technology permeates life in our modern world, for better and for worse. Its rewards to individuals and society are unprecedented. Yet so are its risks. This course examines computer technology's role in modern society and endeavors to assess its impact - both beneficial and detrimental. Problems are evaluated from a variety of perspectives, including technological, societal, legal, commercial and ethical.

**CS 503 - Introduction to Web Programming****Credits: 4.00**

Introduces the concepts and techniques of client-side development for the World Wide Web. Students will be taught the basics of programming and how to apply that knowledge to enhance Web pages. Topics include variables, control structures, functions, events, objects, user feedback, form handling, and the Document Object Model. Significant out-of-class programming required. Prereq: CS 403.

**CS 515 - Data Structures****Credits: 4.00**

Reviews basic data structures; advanced data structures such as graphs, B-trees, and AVL trees; abstract data structure design and programming techniques; use of data abstraction language. Introduction to algorithm analysis. Prereq: CS 416.

**CS 520 - Assembly Language Programming and Machine Organization****Credits: 4.00**

Assembly language programming and machine organization: program and data representation; registers,

instructions, and addressing modes; assemblers and linkers. Impact of hardware on software and software on hardware. Historical perspectives. Prereq: CS 515.

### **CS 595 - Professional Ethics and Communication in Computer Science**

**Credits:** 2.00

A seminar course intended to improve both reasoning and ability to communicate effectively in front of an audience. Students learn basic forms of ethical argument, they read about ethical situations in which technology and technology professions play a key role, and they participate in student-led discussions about the reading. Students also make oral presentations about both ethical and technical topics, and evaluate each others' presentations in order to improve their sense for what makes a good presentation.

### **CS 600 - Internship**

**Credits:** 1.00

Provides opportunity to apply academic experience in settings associated with future professional employment. A written proposal for the internship must be approved by the department chair. The proposal must specify what the student will learn from the internship, why the student is properly prepared for the internship, and what supervision will be available to the student during the internship. A mid-semester report and a final report are required. Prereq: permission. May be repeated up to a maximum of 4 credits. Cr/F.

### **CS 619 - Introduction to Object-Oriented Design and Development**

**Credits:** 4.00

Principles of problem analysis and software design applied to the development cycle of a software system (i.e. from system requirements specification to design, implementation, and system test). Design and implementation using object-oriented principles, patterns, and tools. Experience in understanding and debugging software systems. Experience in working in groups. Prereq: CS 515.

### **CS 620 - Operating System Fundamentals**

**Credits:** 4.00

Introduces operating system concepts and design. Job, process, and resource management; scheduling; file systems; inter-process communication. Prereq: CS 515 and CS 520 or ECE 562.

### **CS 645 - Introduction to Formal Specification and Verification**

**Credits:** 4.00

Mathematical reasoning can be applied to study the behavior of software systems, an approach that is particularly relevant to critical systems. This can be achieved through the description of those systems along with their properties in formally-defined, logically-based languages. Introduces techniques relevant to the application of formal specification and verification methods, including symbolic logic and proof techniques related to program correctness. Prereq: CS 515, MATH 531, MATH 532.

### **CS 659 - Introduction to the Theory of Computation**

**Credits:** 4.00

Review of sets, relations, and languages. Induction and diagonalization. Finite automata, context-free languages, pushdown automata. Basic complexity theory. Prereq: MATH 531

### **CS 671 - Programming Language Concepts and Features**

**Credits:** 4.00

Explores the main features of modern, high-level, general purpose programming languages from the user (programmer) point of view. Provides students with an opportunity to use non-imperative programming paradigms, such as object-oriented, functional, and logical, and to learn how specific features of such languages can be used efficiently in solving programming problems. Prereq: CS 619.

### **CS 696 - Independent Study**

**Credits:** 1.00 to 6.00

Individual projects developed and conducted under the supervision of a faculty member. Prereq: permission of faculty supervisor and department chairperson. May be repeated for credit.

### **CS 696W - Independent Study**

**Credits:** 1.00 to 6.00

Individual projects developed and conducted under the supervision of a faculty member. Prereq: permission of faculty supervisor and department chairperson. May be repeated for credit. Writing intensive.

### **CS 712 - Compiler Design**

**Credits:** 4.00

Formal languages and formal techniques for syntax analysis and parsing; organization of the compiler and its data structures; code generation. LL and LR parsing; automatic generation of scanners and parsers from high level descriptions. Implementation of features from imperative and object-oriented languages. Students required to design and implement a compiler for a simple language. This course can be counted as either a theory elective or an implementation-intensive elective, but not both. Prereq: CS 520 and CS 659.

### **CS 720 - Operating System Programming**

**Credits:** 4.00

Detailed discussion of operating system concepts and features. Practical examples and exercises that utilize advanced operating system features, including inter-process communication, synchronization, client-server communication, shared memory, threads, remote procedure calls, and device-level I/O. Discussion of POSIX 1003.1 Part I Standards. Prereq: CS 619.

### **CS 721 - Operating System Kernel Design**

**Credits:** 4.00

Design and implementation of an operating system kernel, using LINUX as an example. Detailed discussion of the data structures and algorithms used in the kernel to handle interrupts, schedule processes, manage memory, access files, deal with network protocols, and perform device-level I/O. Course is project-oriented, and requires the student to make modifications and additions to the LINUX kernel. Prereq: CS 720 or permission.

### **CS 723 - Performance Evaluation of Computer Systems**

**Credits:** 4.00

Introduces the main concepts, techniques, and tools needed to evaluate the performance of computer systems under various configurations and workloads. The techniques allow one to perform capacity planning based on quality of service requirements of users and workload characteristics. Course is mainly based on the use of analytic queuing network models of computers systems. The performance techniques are applied to study the performance of centralized, distributed, parallel, and client/server systems. The course also discusses performance measuring tools for operating systems such as Unix and Windows NT. Prereq: CS 620 or equivalent.

### **CS 725 - Computer Networks**

**Credits:** 4.00

Introduces local, metropolitan, and wide area networks using the standard OSI Reference Model as a framework. Introduces the Internet protocol suite and network tools and programming. Discusses various networking technologies. Prereq: CS 619.

### **CS 730 - Introduction to Artificial Intelligence**

**Credits:** 4.00



In-depth introduction to artificial intelligence, concentrating on aspects of intelligent problem-solving. Topics include situated agents, advanced search techniques, knowledge representation, logical reasoning techniques, reasoning under uncertainty, advanced planning and control, and learning. Prereq: CS 671.

### **CS 730W - Introduction to Artificial Intelligence**

**Credits:** 4.00

In-depth introduction to artificial intelligence, concentrating on aspects of intelligent problem-solving. Topics include situated agents, advanced search techniques, knowledge representation, logical reasoning techniques, reasoning under uncertainty, advanced planning and control, and learning. Prereq: CS 671. Writing intensive.

### **CS 735 - Introduction to Parallel and Distributed Programming**

**Credits:** 4.00

Programming with multiple processes and threads on distributed and parallel computer systems. Introduces programming tools and techniques for building applications on such platforms. Course requirements consist primarily of programming assignments. Prereq: CS 619.

### **CS 745 - Formal Specifications and Verification of Software Systems**

**Credits:** 4.00

Course focuses on the formal specification and verification of reactive systems, most notably concurrent and distributed systems. Topics relevant to these systems, such as non-determinism, safety and liveness properties, asynchronous communication or compositional reasoning, as discussed. We rely on a notation (TLA+, the Temporal Logic of Actions) and a support tool (TLC, the TLA+ Model Checker). Prereq: CS 659.

### **CS 758 - Algorithms**

**Credits:** 4.00

An introduction to important concepts in the design and analysis of algorithms and data structures, including implementation, complexity analysis, and proofs of correctness. Prereq: CS 515 and CS 659.

### **CS 760 - Introduction to Human-Computer Interaction**

**Credits:** 4.00

Human-computer interaction is a discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. Prereq: CS 619.

### **CS 760W - Introduction to Human-Computer Interaction**

**Credits:** 4.00

Human-computer interaction is a discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. Prereq: CS 516 and CS 620. Writing intensive.

### **CS 767 - Interactive Data Visualization**

**Credits:** 4.00

Detailed discussion of how an understanding of human perception can help us design better interactive displays of data. Topics include color, space perception, object perception and interactive techniques. Students write interactive programs, give presentations and undertake a project designing and evaluating a novel display technique. Prereq: instructor's permission.

### **CS 767W - Interactive Data Visualization**

**Credits:** 4.00

Detailed discussion of how an understanding of human perception can help us design better interactive displays of data. Topics include color, space perception, object perception and interactive techniques.

Students write interactive programs, give presentations and undertake a project designing and evaluating a novel display technique. Prereq: instructor's permission. Writing intensive.

### **CS 770 - Computer Graphics**

**Credits:** 4.00

Input-output and representation of pictures from hardware and software points of view; interactive techniques and their applications; three-dimensional image synthesis techniques and their applications. Prereq: CS 671.

### **CS 770W - Computer Graphics**

**Credits:** 4.00

Input-output and representation of pictures from hardware and software points of view; interactive techniques and their applications; three-dimensional image synthesis techniques and their applications. Prereq: CS 671. Writing intensive.

### **CS 771 - Web Programming Paradigms**

**Credits:** 4.00

In this course you will learn languages to program the Web. Languages integrated into browsers, like JavaScript, and languages invoked on the server, like Ruby. You will also learn about frameworks, like Rails, and various techniques used to support the programming process. In addition, you will learn languages you will need to create, modify, and process Web documents. Although we will learn how to read and write in these languages, our primary goal will be an understanding of how the design of these multi-paradigm dynamic languages support the process of developing Web applications. Prereq: CS 671.

### **CS 775 - Database Systems**

**Credits:** 4.00

Database analysis, design, and implementation. Focus on the relational model. Data description and manipulation languages, schema design and normalization, file and index organizations, data integrity and reliability. Usage of selected DBMS. No credit if credit earned for IT 775. Prereq: CS 671 and MATH 531.

### **CS 780 - Topics**

**Credits:** 1.00 to 4.00

Material not normally covered in regular course offerings. May be repeated for credit.

### **CS 791 - Senior Project I**

**Credits:** 2.00

The principal goal of CS 791 is to develop precise functional specifications for the senior projects as well as a complete software design specification. The course will review and expand upon design concepts presented in previous courses, including UML, and CRC approach, and design patterns. Students apply these concepts to the design of their own senior projects. A significant component of the design includes specifications of the testing methodology to be used. Prereq: CS 620 and CS 671.

### **CS 792 - Senior Project II**

**Credits:** 2.00

Continuation of CS 791: Senior Project I. Students complete the project by implementing their design. Students work in teams. Successful completion of this course fulfills the Capstone Experience requirement for Computer Science majors. Prereq: CS 791.

## Culinary Arts & Nutrition

### **CAN 200 - Introductory Chemistry**

**Credits:** 3.00

Introduces chemical concepts and principles, including chemical symbols, conversion factors, chemical calculations, chemical and physical properties, and changes. Touches upon organic compounds--their structure, major reactions, and applications--followed by an elementary introduction to biomolecules and how they function in metabolism. Dietetic technician students only. 3 lec.

### **CAN 201 - Food Preparation Fundamentals**

**Credits:** 2.00 or 3.00

Preparation techniques, knife skills, measurements, food handling, selection, and classification. CAN majors only. 2hr lec. Students in both Restaurant Management and Dietetic Technician concentrations must also complete a lab. Practical application of skills and techniques utilized in a professional kitchen. 2hr lab.

### **CAN 202 - Quantity Food Practicum**

**Credits:** 3.00

Students utilize cooking principles and food preparation techniques learned in CAN 201 to produce foods in a quantity food setting. Elements of food sanitation and workplace safety in the operation of commercial cooking equipment are stressed. Students operate Stacey's Express, open to the public and participate in various positions such as production manager, cashier, production cooks, and utility workers. Students standardize, cost, and assign selling prices for all menu items prepared for Stacey's Express. Prereq: CAN 201.

### **CAN 203 - Introduction to Culinary Arts**

**Credits:** 3.00

Course introduces students to the profession of culinary arts. Topics include a history of the culinary arts, becoming a culinary professional, managing assets, people, and time, fundamentals of purchasing, importance of choosing the right work experience, and career opportunities available for culinary professionals upon graduation. 2 hour lecture, 2 hour lab.

### **CAN 204 - Baking and Pastry Products**

**Credits:** 4.00

Course presents hands-on fundamental approaches to general baking and pastry production. The first three classes are demonstrations followed by 12 weeks of demonstrations and practical, hands-on laboratory experience. Activities may include make-up of pie dough, rolling, molding and piping exercises, weighing/scaling of ingredients, recipe production and cost management. Emphasis placed on techniques, coordination, teamwork and production of baked products to be served in our student-operated enterprises. A high level of student interaction and participation expected. Guest presenters and field trips may address additional topics.

### **CAN 206 - Food and Beverage Cost Control**

**Credits:** 4.00

Course places emphasis on methods used to solve mathematical problems that relate to food service operations as they apply to controls. Topics: weights and measures, recipe conversion, menu pricing, purchasing, food costs, inventories, break-even analysis, and financial statements.

### **CAN 210 - Introduction to the Dietetic Technician Profession**

**Credits: 1.00**

This course provides an introduction to the dietetics profession with an emphasis on dietetic technician practice. Topics include educational requirements, credentialing, nutrition resources and professional development. Students participate in a health and wellness project.

**CAN 211 - Facilities and Equipment Planning****Credits: 3.00**

Course covers all the elements included in the pre-planning and layout of a food service facility. Topics covered include, but are not limited to, menu development, site selection, as well as concepts of layout and design of the front and back of the house. The final project for the course requires each student to develop his or her own restaurant concept from beginning to end using concepts and materials covered in the lectures. Prereq: CAN 201, CAN 203, CAN 206. 1 2-hr lec.

**CAN 212 - Hospitality Personnel Management****Credits: 3.00**

Designed to teach the first-line hospitality supervisor how to create a positive work climate to assist identifying and keeping employees who cook, serve and tend bar. Students learn and develop skills, attitudes and abilities needed to lead and manage in an industry with numerous demands. Course focuses on employee recruitment, training and development, performance evaluation, disciplinary action, and wage and fringe benefit administration. Through case studies, students practice planning, organizing, communicating effectively, delegating and decision-making. 2 lec.

**CAN 226 - Dining Room Practicum****Credits: 3.00**

A front-of-the house supervised training experience with an emphasis on customer service and table service techniques in one of the TSAS restaurants. Students also take the Serve Safe Alcohol Examination and, upon successful completion of the exam, are awarded a certificate from the National Restaurant Association.

**CAN 235 - International Cuisine****Credits: 5.00**

International Cuisine allows students to explore different cultures and cuisines of the world. Students study a different country or region each week and learn how history, geography, and main ingredients influence the different cuisines. Students prepare multi-course international menus one evening a week in the dining room at Cole Hall. Prereq: CAN 201, 204, 242, 243. Majors only. Pre-or Coreq: CAN 244, 245. 2 hr lec/6 hr lab.

**CAN 241 - Applied Buffet & Catering Mgt****Credits: 4.00**

Students learn hands-on while managing a weekly international buffet series and catering special events at the Thompson School. Emphasis is on food arrangement and presentation, garde-manger display work, buffet set-up, garnishments, banquet presentations, and on/off premises catering. Prereq: CAN 201, 202, and 207. CAN majors only. 1 lec/6-hr lab.

**CAN 242 - Culinary Skill Development****Credits: 4.00**

This course serves as the foundation course for students in the Culinary Arts concentration. Students practice and become proficient in all areas of food preparation required in the commercial kitchen. Topics include but are not limited to sanitation and safety, knife skills, butchering, stocks, sauces, soups, vegetables, breakfast cookery and entree preparation. Majors only. 1 hr lec/6 hr lab.

**Co-requisites:** CAN 201

### **CAN 243 - Quantity Food Production and Display Cooking**

**Credits:** 4.00

Students gain practical-based experiential learning in quantity food production working directly with chefs in the Holloway Commons (one of UNH's dining commons) facility. Students also prepare cooked-to-order menu items in front of customers while rotating through the eight culinary concepts at Holloway; including stir-fry, sushi, brick oven pizza, vegan, vegetarian and gluten free stations. 1 hr lec/6 hr lab.

### **CAN 244 - Catering and Garde Manger**

**Credits:** 4.00

Students apply skills and techniques learned in prior courses and enhance skills in advanced aspects of culinary preparation and management such as garde manger, buffet presentation, event booking, scheduling, and buffet staging. Advanced techniques of garde manger include production of canapes, savory pastries, charcuterie, farces, and sculptured centerpieces. Prereq: CAN 201, CAN 207, CAN 242, CAN 243. CAN Major Only. 2 hours lecture, 9 hours lab.

### **CAN 245 - American and Regional Cuisine**

**Credits:** 4.00

Students apply and enhance skills in advanced aspects of a la carte cooking. Course introduces students to foods available in the United States and prepare meals for service in 180 Blue restaurant. Students are also introduced to the art of pairing foods with fine wines for special events. Prereq: CAN 201, 207, 242, 243. Majors only. 1 hour lecture/6 hour lab.

### **CAN 260 - Dietetics Practicum in the Community**

**Credits:** 3.00

A supervised practice in programs and organizations that offer nutrition services to the community with a focus on federally/state funded programs with nutrition components, food insecurity, and health and wellness promotion. Students work with a variety of target groups throughout the life cycle. Prereq: CAN 201/207, NUTR 400/476. 90 hrs. supervised practice.

### **CAN 265 - Community Nutrition for Dietetic Technicians**

**Credits:** 3.00

A study of community programs and agencies providing food and nutrition services to age groups throughout the life cycle. Emphasis is on community nutrition assessment, health promotion and disease prevention, life cycle nutrition, and the planning and delivery of nutrition education programs. Prereq: NUTR 400.

### **CAN 275 - Diet Therapy and Counseling**

**Credits:** 4.00

This is the study of clinical nutrition-diet therapy and counseling strategies to manage various diseases. The class integrates case studies to allow the student practice in planning, calculating, and counseling of commonly modified diets for individuals with health problems. Prereq: CAN 200, NUTR 400/476, ZOOL 401. lecture/2 hour lab.

### **CAN 276 - Dietetics Practicum in Long Term Care**

**Credits:** 1.00

A supervised practice that introduces the student to nutrition services in long term care facilities. Students participate in the nutrition care process and plan and execute a special function meal. Prereq: CAN 207, NUTR 476, CAN 275. 35 hr. supervised practice.

### **CAN 290 - Dietetics Practice in Acute Care**

**Credits:** 5.00

This supervised practice introduces the student to the clinical nutrition services of medical facilities.

Students participate in diet office operations, the nutrition care process, and gain management experience as it relates to clinical services. Prereq: CAN 275, NUTR 400, NUTR 476. 250 hr. supervised practice.

### **CAN 291 - Independent Studies in Culinary Arts**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research.

### **CAN 292 - Independent Studies in Restaurant Management**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Independent studies may include experiences in culinary, dining room, or marketing.

### **CAN 293 - Studies in Dietetic Technology**

**Credits:** 3.00 to 6.00

A Dietetic Technician Practicum. Students gain hands-on experience in one of the following: A) Food Service Management; B) Clinical Nutrition; C) Community Nutrition. Prereq: permission of instructor and student's advisor.

### **CAN 294 - Studies in Dietetic Technology**

**Credits:** 3.00 to 6.00

A Dietetic Technician Practicum. Students gain hands-on experience in one of the following: A) Food Service Management; B) Clinical Nutrition; C) Community Nutrition. Prereq: permission of instructor and student's advisor.

### **CAN 295 - Professional Issues for Dietetic Technicians**

**Credits:** 1.00

Review of the professional credentialing process, skills and practice for the registration exam for dietetic technicians, completion of a professional portfolio for continuing education in the field of dietetics. 1hr.

### **CAN 296 - Dietetic Technician Independent Study - Dietetic Technician Practicum**

**Credits:** 3.00 to 6.00

For Dietetic Technician students who need to take practica at alternate times. There are two practica in the Dietetic Technician major: CAN 290 Clinical Nutrition Practicum 7 cr.; and CAN 260 Community Nutrition Practicum 5 cr. May be repeated for a maximum of 13 credits. Prereq: permission.

### **CAN 298 - Work Experience**

**Credits:**

This course enables students to enhance basic cooking skills and techniques learned in the first year. Students obtain industry related employment over the summer generally between the first and second year of academic course work. Documentation of the work experience is required as well as a final written paper. Prereq: CAN 201, 204, 207, 214, 243. Majors only. Cr/F.

### **CAN 407 - Hospitality Sanitation and Safety**

**Credits:** 2.00

Focuses on food safety and sanitation for food service operators in both public and private sectors. Topics include development, control and implementation of industry standards and procedures, pest control, and crisis management. A proactive approach to providing safe food is explored. Students have the opportunity to gain food safety certification after successful completion on the National Restaurant Association's certification exam. CPR certification is included. Guest speakers and field trips may be used to address specific topics. Supplementary materials are utilized as needed.

### **CAN 422 - Local Food for Local Tables Enriching and Sustaining NH's Restaurants, Tourism, and Small Farms**

**Credits:** 4.00

Focuses on how to connect local food production with the New Hampshire restaurant and tourism industry using community partnerships to benefit small farms and local economies. Explores current practices, evolving trends, and emerging food movements in a variety of national and international farm-to-table models, and examines how these may apply to New Hampshire. Guest speakers provide additional depth, with field trips used to illustrate specific topics.

### **CAN 428 - Culinary Nutrition**

**Credits:** 2.00

The study of dietary needs from a culinary perspective. The focus is on basic nutrition and health with an emphasis on healthy menu and recipe development. Students research, evaluate, plan and prepare healthy menus and recipes using healthy cooking techniques. Course will culminate in students completing a healthy cooking demonstration. Pre- or Coreq: CAN 201, CAN 407. 1hr lec/2 hr lab.

## Decision Sciences

### **DS 444 - Meaning of Entrepreneurship**

**Credits:** 4.00

This course explores the idea and ideals of entrepreneurship, the creating of value through individual initiative, creativity and innovation. The idea of entrepreneurship is of significant relevance in the highly dynamic and competitive 21st century global economy. It is an idea that is important for students to understand and to critically consider and apply. Encourages the development of multiple views of entrepreneurship, and uses a broad, not just business, approach to the study as it engages students in the subject matter. Open to freshmen from all majors. (Also offered as MGT 444.) Writing intensive.

### **DS 698 - Topics**

**Credits:** 4.00

Special topics; may be repeated. Prereq: permission.

### **DS 741 - Private Equity/Venture Capital**

**Credits:** 4.00

This course will notably increase knowledge and understanding of the private equity financing market, develop analytical skills in evaluating private equity financing details, learn from the experience of market practitioners, and enhance oral and written presentation skills. Prereq: ADMN 570 or ADMN 601 and senior standing.

### **DS 742 - Internship in Entrepreneurial and Management Practice**

**Credits:** 4.00

Involves working for leading companies and dynamic entrepreneurs, as well as classroom instruction. The priority experiential, real-world, and real-time learning in the high-growth environment of entrepreneurial ventures. Focus on several topic areas, including venture capital. Prereq: senior standing; permission. (Also listed as MGT 742.)

### **DS 773 - Managing Information Across Enterprise**

**Credits:** 4.00

Provides students with the skills necessary to understand the database environment of the firm and a background to develop moderately complex, stand-alone databases. Gives the foundation to study database development in multiuser, client/server environments. Prereq: senior standing.

### **DS 774 - E-Business Strategies and Solutions**

**Credits:** 4.00

Covers the concepts, tools, and strategies for understanding the challenges and exploiting the opportunities associated with e-commerce/e-business. Provides an understanding of the technology platform and its components. Additional material covers various models of e-commerce/e-business and its impacts on the firm's performance. Prereq: senior standing.

### **DS 775 - Corporate Project Experience**

**Credits:** 4.00

Provides real-life experience in organizations. Work in groups on information systems projects identified by sponsoring organizations. Integrate concepts and skills learned in prior business and technology courses. Learn project management concepts, work with project management tools, and use presentation techniques. Prereq: senior standing.



**DS 798 - Topics**

**Credits:** 4.00

Special topics; may be repeated. Prereq: permission.

## Earth Sciences

### **ESCI 400 - Freshman Field Seminar**

**Credits:** 1.00

A field introduction for new or prospective majors to New Hampshire's mountains, rivers, estuaries, and beaches. Field excursions (approximately five) are scheduled on Friday afternoons. Special fee. Cr/F.

### **ESCI 401 - Dynamic Earth**

**Credits:** 4.00

In this course we study the minerals, rocks and fluids which make up the Earth; the landforms on the surface of the Earth such as mountains, flood plains and stratovolcanoes; and processes such as volcanism, earthquakes, erosion and glaciation that create and alter them. The rock cycle and plate tectonics are used to integrate activity at the surface of the Earth with processes in the Earth's interior. Campus field exercises. Special fee. Lab. Students may not receive credit for both ESCI 401 and ESCI 409.

### **ESCI 402 - Earth History**

**Credits:** 4.00

Course provides knowledge and skills necessary to interpret, understand, and appreciate the Earth's 4.6 billion-year history. The first third of the course introduces basic principles, including geological materials, plate tectonics, geological time, fossil preservation, and biological evolution. The remainder of the course tells the story of Earth history through case studies that illustrate scientific methods used to reconstruct critical events in our planet's evolution through time. Topics include the origin of the Earth, the Cambrian explosion of life, building of the Appalachians, assembly of Pangaea, the rise and fall of dinosaurs, the formation of the Rocky Mountains, mammalian evolution, human origins, and Pleistocene glaciation. Students gain experience in making geological observations through laboratory exercises and during one afternoon field trip. Special fee. Lab.

### **ESCI 405 - Global Environmental Change**

**Credits:** 4.00

Human activity rivals nature as an agent of change in the global environment. Explores evidence of environmental degradation in Earth's crust, hydrosphere, and atmosphere; considers prospects for future sustainable human health, diversity, and economic development. Problem solving through critical analysis of environmental variables. Special fee. Lab.

### **ESCI 409 - Geology and the Environment**

**Credits:** 4.00

Environmental impact of geologic processes; natural hazards, landslides, earthquakes, volcanoes, flooding, erosion, and sedimentation; land exploitation and site investigations; environmental considerations of water-supply problems; the recovery of energy and mineral resources. Special fee. Lab. Students may not receive credit for both ESCI 401 and ESCI 409.

### **ESCI 410 - Earth Hazards**

**Credits:** 4.00

Introductory-level physical science course concerning earth processes that impact humanity, with natural disasters as the focus. Topics include the causes and effects of earthquakes, tsunamis, volcanic eruptions, floods, and landslides. The course covers basic concepts of physical geology using hands-on-activities, small-group discussions, and in-class demonstrations and is intended for students with little or no previous experience in earth sciences. No prerequisites. Special fee.

## **ESCI 420 - Our Solar System**

**Credits:** 4.00

Course focuses on the nature and formation of our solar system and the planets associated bodies it contains, with emphasis on the physical and chemical processes significant in the system's origin and evolutionary history. Our approach provides the basis for understanding key differences between the Earth-like terrestrial planets and those farther out in the solar system (the gas giants). We also explore recent discoveries on Mars and moons of the gas giant planets and their implications for the search for life elsewhere in our solar system. Special fee.

## **ESCI 444 - Water - How Much is Enough?**

**Credits:** 4.00

The natural distribution of water is not adequate to sustain modern civilization. As water mining and redistribution projects continue to grow in number and size, so do the concomitant stresses on the environment. Through a detailed look at the unique properties of water and the processes that drive the earth's hydrologic cycle; this course will explore the concepts of water stress, water scarcity, and safe yield.

## **ESCI 444A - Philosophy of Earth Science**

**Credits:** 4.00

Course provides an introduction to the discipline of Philosophy of Science, but from an Earth Science perspective. Considers various philosophical perspectives on the nature of science and scientific progress, drawing from works by thinkers such as Aristotle, Popper, Kuhn and Lakatos. Particular attention is given to the following questions: What is scientific knowledge? Is the acquisition of scientific knowledge a rational process? And, what makes some scientific discoveries "revolutionary"? These questions are considered using examples from the history of scientific progress in the Earth Sciences, focusing on groundbreaking discoveries such as the age of the earth, the evolution of organisms as observed in the fossil record, sea-floor spreading, and modern-day global warming.

## **ESCI 501 - Introduction to Oceanography**

**Credits:** 4.00

Introduces students to the four oceanographic disciplines: the geology of the ocean basins, including the creation of oceans and continents. The physics of the seas, including the origin of the ocean currents and their effect on the Earth's climate. The chemistry of the ocean waters, including how the distribution of elements reflects circulation and biology. The life in the ocean, including animals, plants and microbes, and humanity's influence on them. Special fee. Lab.

## **ESCI 512 - Principles of Mineralogy**

**Credits:** 4.00

Minerals record variations in chemistry, pressure, temperature, and time in the Earth. This course emphasizes minerals and mineral assemblages in rocks, sediments and soils; their identification, symmetry, chemistry, equilibria, and physical properties. Introduction to x-ray diffraction and optical techniques. Prereq: CHEM 403 or 405. Special fee for field trips. Lab.

## **ESCI 514 - Introduction to Climate**

**Credits:** 3.00

The climate as a system controlled by the fluid, chemical, geological, and biological dynamics of the earth. Investigation of natural and man-made climate change over the period of 100 to 100 million years, including the greenhouse effects, tectonic climate forcing, astronomic (Milankovich) cycles, deep ocean circulation, and biological feedback. How past climate is measured. Prereq: one introductory course in Earth Sciences or permission.

## **ESCI 530 - Geological Field Methods**

**Credits:** 4.00

An introduction to basic geologic field mapping of bedrock and surficial materials using pace and compass, surveying and GPS techniques. Observational data plotted on topographic maps and/or aerial photographs, accompanied with stratigraphic measurements and sampling sites where appropriate, provide the basis for interpretative maps, cross sections and written reports and a field context for more advanced Earth sciences course work and independent research. One weekend field trip to western or northern New England. Prereq: ESCI 401 or 409, 402. Special fee. Writing intensive.

### **ESCI 534 - Techniques in Environmental Sciences**

**Credits:** 3.00

Elementary mapping and monitoring methods. Map interpretation, preparation of maps; survey techniques including pace and compass, leveling, and global positioning systems; environmental monitoring. Field lab. Cannot receive credit if taken after receiving credit for ESCI 530 or NR 542. Special fee.

### **ESCI 561 - Landscape Evolution**

**Credits:** 4.00

Course focuses on the processes that shape the Earth's surface. Lectures discuss the development of landscapes in a wide variety of climatic and geologic settings, with an emphasis on understanding the process mechanics that create landforms and surficial deposits. Labs involve topographic map interpretation, geomorphic data analysis, and short field exercises. Course incorporates one weekend field trip that explores the landscapes of Cape Cod. Students also gain practical experience in geomorphic research by teaming up and completing a required lab- or field-based project. Prereq: ESCI 401, 402, or permission. Lab. Special fee.

### **ESCI 595 - Introductory Investigations**

**Credits:** 1.00 to 4.00

Special topics by means of lectures, conferences, assigned readings, and/or field or laboratory work in the areas of geology, hydrology, or oceanography. May be repeated up to a maximum of 8 credits.

### **ESCI 596 - Introductory Investigations**

**Credits:** 1.00 to 4.00

Special topics by means of lectures, conferences, assigned readings, and/or field or laboratory work in the areas of geology, hydrology, or oceanography. May be repeated up to a maximum of 8 credits.

### **ESCI 614 - Optical Mineralogy and Petrography**

**Credits:** 4.00

Description and classification of igneous, sedimentary, and metamorphic rocks in hand specimen and thin section; optical mineralogy. Prereq: ESCI 512. Special fee. Lab.

### **ESCI 631 - Structural Geology**

**Credits:** 4.00

Structural units of the Earth's crust and mechanics of their formation. Prereq: ESCI 530. Special fee. Lab and fieldwork.

### **ESCI 652 - Paleontology**

**Credits:** 4.00

Use of the fossil record to address current problems in Earth history, paleoecology, and evolutionary biology. Examples are drawn from both vertebrates and invertebrates. Lab combines analytical paleontological methods with a systematic survey of important fossil groups. Prereq: ESCI 402 or permission. Special fee. Lab.

### **ESCI 654 - Fate and Transport in the Environment**

**Credits:** 4.00

Introduces the basic processes controlling the migration and transformation of chemicals in surface water, groundwater, and the atmosphere; basic models of advection, dispersion, retardation, and attenuation. Prereq: CHEM 404, MATH 426.

### **ESCI 658 - Principles of Earth, Ocean, and Atmospheric Dynamics**

**Credits:** 4.00

Introduces the basic elements of kinematics and dynamics, relevant to processes important in earth, ocean, and atmospheric sciences. Reviews particle dynamics and introduces continuum mechanics of the solid earth, hydrologic, and environmental fluid systems. Includes biweekly laboratories and homework problem recitation sessions. Prereq: MATH 426, PHYS 407.

### **ESCI 705 - Principles of Hydrology**

**Credits:** 4.00

Basic physical principles important in the land phase of the hydrologic cycle, including precipitation, snowmelt, infiltration and soil physics, evapotranspiration, and surface and subsurface flow to streams. Problems of measurement and aspects of statistical treatment of hydrologic data. Field trips. Prereq: MATH 425 (or MATH 424) and PHYS 402 and ESCI 654 (or ESCI 658 or CIE 642). Special fee. Lab. Writing intensive.

### **ESCI 710 - Groundwater Hydrology**

**Credits:** 4.00

Principles for fluid flow in porous media with emphasis on occurrence, location, and development of groundwater but with consideration of groundwater as a transporting medium. Major topics include well hydraulics, regional groundwater flow, exploration techniques, and chemical quality. Laboratory exercises involve use of fluid, electrical, and digital computer models to illustrate key concepts. Prereq: ESCI 705 or permission. Special fee. Lab.

### **ESCI 715 - Global Atmospheric Chemistry**

**Credits:** 3.00

Introduction to the principles of atmospheric chemistry and their relationship to biogeochemical cycles, climate, and global change. Focus is on understanding the basic physical and chemical processes that determine the trace gas distribution in the global troposphere. An introduction to atmospheric vertical structure and global circulation dynamics provides the foundation. Then chemical cycles of important C, S, N molecules are examined, including their possible perturbation by human activities. Basic photochemical processes are outlined, particularly with respect to reactive nitrogen, hydrocarbons, and the production/destruction of ozone. Prereq: one year chemistry.

### **ESCI 717 - Macro-scale Hydrology I**

**Credits:** 3.00

Focus on the numerous roles of water in the Earth system. Topics include the global water cycle, impacts of the greenhouse effect and other anthropogenic disturbances, hydrologic modeling, soil-vegetation-atmosphere transfer schemes, water quality, GIS and water-related remote sensing tools, global freshwater resources. Course is organized around formal lectures, in-class discussion, student presentations, class projects. Prereq: ESCI 705 or permission. (Offered alternate years.)

### **ESCI 718 - Macro-Scale Hydrology II**

**Credits:** 3.00

A continuation of ESCI 717. Students and instructor jointly select a research topic in macro-scale hydrology to be analyzed in-depth during the course of the semester. A primary goal is the preparation of a manuscript for publication in a refereed scientific journal. Extensive library research, reading of recent and relevant scientific literature, technical analysis and writing. Prereq: ESCI 717. (Offered alternate years.)

### **ESCI 726 - Metamorphic Petrology**

**Credits:** 4.00

The metamorphism of pelitic, mafic, and calc silicate rocks as determined from field, petrographic, mineral chemistry, experimental, and theoretical studies. Closed- and open-system reactions, multi-systems, reaction space. Calculation of pressure-temperature time paths. Prereq: mineralogy; petrography; adequate background in calculus, chemistry, and physics. Field trips. Special fee. Lab. (Offered in alternate years with ESCI 725.) Writing intensive.

### **ESCI 734 - Geophysics**

**Credits:** 4.00

The structure of the solid Earth, including the continental and oceanic lithosphere and the deep interior as revealed by investigations of seismic waves, the Earth's gravitational and magnetic fields, heat flow, and earthquakes. Prereq: ESCI 401; one year of calculus; one year of college physics; ESCI 658; or permission. Special fee. Lab.

### **ESCI 741 - Geochemistry**

**Credits:** 4.00

Course focuses on the application of chemical principles to solve problems in the Earth sciences. Students learn the chemical tools of thermodynamics and kinetics, element partitioning, conservation of mass, and isotope geochemistry. Explore geochemical properties/processes in the deep Earth and the Earth surface, atmosphere and marine systems, and cosmo-chemistry and investigate the interactions between these components of the Earth system. Prereq: ESCI 512 or permission. Lab. Writing intensive.

### **ESCI 745 - Isotope Geochemistry**

**Credits:** 4.00

Course focuses on the application of radiogenic, radioactive and stable isotopes to improve students' knowledge about the processes and timescales relevant to the formation of the planet and solar system, the evolution of the Earth system and interactions in the hydrosphere and biosphere. Topics include geochronology, tracer applications, Earth surface applications, as well as applications in the hydrosphere and biosphere. Systems discussed include the classic radiogenic systems (K-Ar, Rb-Sr, Sm-Nd, Lu-Hf and U-Th-Pb), traditional (H, C, N, O) as well as nontraditional (e.g., Mg, Ca, Fe) stable isotope systems, and radioactive isotopes (e.g., radiocarbon). Course consists of lecture, where students are exposed to these applications, and a lab section to work through any questions on the homework assignments, discuss relevant papers from the literature, and carry out a project. Prereq: ESCI 741 or permission. Special fee. Lab.

### **ESCI #746 - Analytical Geochemistry**

**Credits:** 4.00

Theory, instrumentation, and applications of analytical methods in geochemistry. Prereq: one year of chemistry or geochemistry; or permission. Special fee. Lab.

### **ESCI 747 - Aqueous Geochemistry**

**Credits:** 4.00

The chemical processes that determine the composition of aquatic systems such as rivers, lakes, groundwater and the ocean. The goal is to quantitatively understand the behavior of inorganic species such as carbon dioxide, nutrients, trace metals and inorganic pollutants in natural waters. Topics include, acid-based equilibria, carbonate chemistry, reduction-oxidation reactions, organic complexation and mineral precipitation and dissolution. Lab. Prereq: one year college chemistry or geochemistry or permission.

### **ESCI 750 - Biological Oceanography**

**Credits:** 4.00

Biological processes of the oceans, including primary and secondary production, trophodynamics, plankton

diversity, zooplankton ecology, ecosystems and global ocean dynamics. Field trips on R/V Gulf Challenger and to the Jackson Estuarine Laboratory. Prereq: one year of biology or permission of the instructor. (Also offered as ZOOL 750.) Special fee. Lab. (Not offered every year.)

### **ESCI 752 - Chemical Oceanography**

**Credits:** 3.00

Water structure, chemical composition and equilibrium models, gas exchange, biological effects on chemistry, trace metals, and analytical methods. Prereq: permission. Optional 1 credit lab (see ESCI 752L).

### **ESCI 754 - Sedimentology**

**Credits:** 4.00

This course focuses on modern sedimentary processes and ancient sedimentary records through the examination, identification, and interpretation of sediments and sedimentary rocks. Topics such as sediment transport mechanisms, depositional environments, and time in sedimentary records will provide a strong framework for any student studying Earth processes and sedimentary systems. Prereq: ESCI 401 or 402 or 501, and 512; or permission. Special fee. Lab and field trips.

### **ESCI 756 - Geotectonics**

**Credits:** 3.00

The geological record of plate tectonics past and present. The first part of the course focuses on modern tectonic settings with an emphasis on plate geometries, geodynamical processes, and sedimentary products. The second part of the course focuses on reconstructing ancient tectonic settings with an emphasis on methodology (paleomagnetism, basin analysis, provenance) and case studies (e.g. India-Asia collision). Field trip. Prereq: ESCI 614 or ESCI 631 or permission. Special fee. Writing intensive.

### **ESCI 758 - Introductory Physical Oceanography**

**Credits:** 3.00

Descriptive treatment of atmosphere-ocean interaction; general wind-driven and thermo-haline ocean circulation; waves and tides; continental shelf and near-shore processes; instrumentation and methods used in ocean research. Simplified conceptual models demonstrate the important principles. Prereq: college physics; ESCI 501;/or permission.

### **ESCI 759 - Geological Oceanography**

**Credits:** 4.00

Major geological features and processes of the ocean floor; geological and geophysical methods; composition of the earth, sedimentary processes, plate tectonics and paleoceanography. Prereq: Senior standing in Earth Science major or permission. Writing intensive.

### **ESCI 762 - Glacial Geology**

**Credits:** 4.00

Course provides a survey of glacier dynamics and processes, with an emphasis on understanding the origin and significance of glacial deposits and landforms. The first half of the course examines the physics of glaciers, and the second half focuses on glacial geologic processes. Lectures discuss glaciers and ice sheets as key agents of large-scale geomorphic change, as well as their central role in the Earth's past and present climate system. Labs involve analysis of glaciological data, glacial-geologic map interpretation, and short field exercises. Course incorporates one mandatory weekend field trip that explores the glacial landscapes of New England. Prereq: ESCI 561 or permission. Special fee. Lab. Writing intensive.

### **ESCI 764 - Data Analysis in Earth System Science**

**Credits:** 4.00

Analytical and numerical methods used to understand geospatial and time series data sets encountered in Earth system science research. Students develop skills in data analysis, primarily through writing and

modifying their own computer programs, focused on particular aspects of real data sets. Understanding various data types, formats, and projections, and how to handle them, are also covered. Prereq: one year calculus, one year chemistry, basic statistics;/or permission. Special fee.

### **ESCI 765 - Paleoclimatology**

**Credits:** 3.00

Course reviews the study of past changes in the Earth's climate system. Main discussion topics include astronomical theories of ice ages, Quaternary dating methods, Antarctic and Greenland ice core records, greenhouse gases, marine-based climate proxies, glacial mega-floods, and linkages between ocean circulation and abrupt climate change. Emphasis on climate variability during the Quaternary period (the last approximately 1.8 million years), a time interval dominated by cycles of global glaciation. Lectures include discussion of recent and emerging scientific papers in order to keep pace with the latest findings in paleoclimatic research. Writing intensive.

### **ESCI 766 - Volcanology**

**Credits:** 4.00

Provides a comprehensive overview of volcanic processes and their influences on planetary evolution and modern-day Earth systems. Lectures discuss the generation and properties of magma, tectonic setting of volcanism, eruption styles, volcanic landforms and products, monitoring of active volcanoes, volcanic hazards, and volcanism on other planets. Laboratory topics include modeling volcanic processes, hand-sample observation, topographic map interpretation, volcanographical data analysis, and two afternoon field trips. As volcanology is a rapidly developing field of active research, the course incorporates discussions of recent and emerging scientific papers from the literature and student-led updates of ongoing volcanic activity. Prereq: one year of calculus and one ESCI course or permission. Special fee. Lab.

### **ESCI 770 - Fundamentals of Ocean Mapping**

**Credits:** 4.00

Introduces the principles and practice of hydrography and ocean mapping. Methods for the measurement and definition of the configuration of the bottoms and adjacent land areas of oceans, lakes, rivers, estuaries, harbors and other water areas, and the tides or water levels and currents that occur in those bodies of water. Prereq: PHYS 407-408. (Also listed as OE 770.) Lab.

### **ESCI 771 - Geodesy and Positioning for Ocean Mapping**

**Credits:** 4.00

The science and technology of acquiring, managing, and displaying geographically-referenced information; the size and shape of the earth, datums and projections; determination of precise positioning of points on the earth and the sea, including classical terrestrial-based methods and satellite-based methods; shoreline mapping, nautical charting and electronic charts. Prereq: MATH 426, PHYS 408. (Also listed as OE 771.)

### **ESCI 795 - Topics**

**Credits:** 1.00 to 4.00

Geologic, hydrologic, and oceanographic problems and independent studies by means of conferences, assigned readings, and field or laboratory work fitted by ESCI faculty to individual student needs; or new or specialized courses. Topics include geochemistry; geomorphology; geophysics; glaciology; groundwater; structural and regional geology; crystallography; mineralogy; petrology; thermodynamics; ore deposits; earth resource policy; paleontology; sedimentation; stratigraphy; water resources management; chemical, physical, and geological oceanography; earth systems. Also, senior synthesis and earth science teaching methods.

### **ESCI 796 - Topics**

**Credits:** 1.00 to 4.00

Geologic, hydrologic, and oceanographic problems and independent studies by means of conferences,



assigned readings, and field or laboratory work fitted by ESCI faculty to individual student needs; or new or specialized courses. Topics include geochemistry; geomorphology; geophysics; glaciology; groundwater; structural and regional geology; crystallography; mineralogy; petrology; thermodynamics; ore deposits; earth resource policy; paleontology; sedimentation; stratigraphy; water resources management; chemical, physical, and geological oceanography; earth systems. Also, senior synthesis and earth science teaching methods. Special fee on some topics.

### **ESCI 797 - Colloquium**

#### **Credits:**

Presentation of recent research in the earth sciences by guest speakers and department faculty. May be taken four times. Cr/F.

### **ESCI 799 - Senior Thesis**

#### **Credits:** 1.00 to 4.00

Students work under the direction of a faculty sponsor to plan and carry out independent research resulting in an oral presentation and a written thesis. Research projects should include the development of a research question; collection analysis, and synthesis of data; and interpretation and presentation of results. A copy of the written thesis must be submitted to the Chair of the Department of Earth Sciences prior to graduation. A total of 4 credits is required and may be completed over multiple semesters. Writing intensive. Cr/F.

## **Ecogastronomy**

### **ECOG 401 - Introduction to Ecogastronomy**

**Credits:** 4.00

This team-taught, interdisciplinary course introduces students to the principles and practices of EcoGastronomy. It provides students with a foundation for understanding the connections among food production, ecology, ethics, cuisine, nutrition and health within the framework of sustainability.

### **ECOG 685 - EcoGastronomy in Italy**

**Credits:** 1.00 to 20.00

Open to students studying abroad in the discipline as approved by the EcoGastronomy program director and the student's college dean. Special fee. Cr/F.

## Economics

### **ECON 401 - Principles of Economics (Macro)**

**Credits:** 4.00

Basic functions of the United States economy viewed as a whole; policies designed to affect its performance. Economic scarcity, supply and demand, the causes of unemployment and inflation, the nature of money and monetary policy, the impact of government taxation and spending, the federal debt, and international money matters. ECON 401A emphasizes applications to the international economy. ECON 401H is open to students in the Honors Program. No credit for students who have received credit for ECON 401A, ECON 401H, ECN 411, or equivalent.

### **ECON 401A - Principles of Economics (Macro) International**

**Credits:** 4.00

Basic functions of the United States economy viewed as a whole; policies designed to affect its performance. Economic scarcity, supply and demand, the causes of unemployment and inflation, the nature of money and monetary policy, the impact of government taxation and spending, the federal debt, and international money matters. ECON 401A emphasizes applications to the international economy. ECON 401H is open to students in the Honors Program. No credit for students who have received credit for ECON 401, ECON 401H, ECN 411, or equivalent.

### **ECON 401H - Honors/Principles of Economics (Macro)**

**Credits:** 4.00

Basic functions of the United States economy viewed as a whole; policies designed to affect its performance. Economic scarcity, supply and demand, the causes of unemployment and inflation, the nature of money and monetary policy, the impact of government taxation and spending, the federal debt, and international money matters. ECON 401A emphasizes applications to the international economy. ECON 401H is open to students in the Honors Program. No credit for students who have received credit for ECON 401, ECON 401A, ECN 411, or equivalent.

### **ECON 402 - Principles of Economics (Micro)**

**Credits:** 4.00

Functions of component units of the economy and their interrelations. Units of analysis are the individual consumer, the firm, and the industry. Theory of consumer demand and elasticity, supply and costs of production, theory of the firm under conditions of perfect and imperfect competition, demand for and allocation of economic resources, general equilibrium, and basic principles and institutions of international trade. ECON 402A emphasizes applications to the international economy. ECON 402H is open to students in the Honors Program. No credit for students who have received credit for ECON 402A, ECON 402H, EREC 411, ECN 412, or equivalent.

### **ECON 402A - Principles of Economics (Micro) International**

**Credits:** 4.00

Functions of component units of the economy and their interrelations. Units of analysis are the individual consumer, the firm, and the industry. Theory of consumer demand and elasticity, supply and costs of production, theory of the firm under conditions of perfect and imperfect competition, demand for and allocation of economic resources, general equilibrium, and basic principles and institutions of international trade. ECON 402A emphasizes applications to the international economy. ECON 402H is open to students in the Honors Program. No credit for students who have received credit for ECON 402, ECON 402H, EREC 411, ECN 412, or equivalent.

### **ECON 402H - Honors/Principles of Economics (Micro)**

**Credits:** 4.00

Functions of component units of the economy and their interrelations. Units of analysis are the individual consumer, the firm, and the industry. Theory of consumer demand and elasticity, supply and costs of production, theory of the firm under conditions of perfect and imperfect competition, demand for and allocation of economic resources, general equilibrium, and basic principles and institutions of international trade. ECON 402A emphasizes applications to the international economy. ECON 402H is open to students in the Honors Program. Writing intensive. No credit for students who have received credit for ECON 402, ECON 402A, EREC 411, ECN 412, or equivalent.

### **ECON 444 - Life in a Small Town: The Economics of Local Politics**

**Credits:** 4.00

Examines the economic implications of public policy decisions made at the local level. Explores questions such as: Why are property taxes so high in New Hampshire? Why does everyone pay to support education? How do local zoning regulations contribute to the high cost of housing in a town? Does local economic development improve or harm the quality of life? Students apply basic economic analysis to these and other questions.

### **ECON 501 - Business and Economic History**

**Credits:** 4.00

This course studies the historical influence of business enterprises on the development of capitalist economies, with an emphasis on the United States after the Civil War. Business enterprises touch virtually every aspect of our lives. The primary objective of this class is for students to gain an intimate knowledge of the historical development of business as the major economic agent in our lives.

### **ECON 515 - Economic History of the United States**

**Credits:** 4.00

U.S. economy from colonial times to the present. Models of economic development applied to the U.S. How social, political, technological, and cultural factors shape economy; development and influence of economic institutions. Prereq: ECON 401 or 402;/or permission.

### **ECON 605 - Intermediate Microeconomic Analysis**

**Credits:** 4.00

Analysis of supply and demand. Determination of prices, production, and the distribution of income in noncompetitive situations and in the purely competitive model. General equilibrium. Prereq: ECON 402.

### **ECON 605W - Intermediate Microeconomic Analysis**

**Credits:** 4.00

Analysis of supply and demand. Determination of prices, production, and the distribution of income in noncompetitive situations and in the purely competitive model. General equilibrium. Prereq: ECON 402. Writing intensive.

### **ECON 611 - Intermediate Macroeconomic Analysis**

**Credits:** 4.00

Macroeconomic measurement, theory, and public policy determination. Prereq: ECON 401 and 402.

### **ECON 615 - History of Economic Thought**

**Credits:** 4.00

Examination and critical appraisal of the work of major economists, including the work of contemporary economists, and major schools of economists, particularly with reference to the applicability of their theories to current economic problems. Prereq: ECON 401 and 402. Writing intensive.

### **ECON 635 - Money and Banking**

**Credits:** 4.00

Study of interest rates, financial markets, financial institutions, monetary institutions, the supply of money, the demand for money, monetary theory, and monetary policy. Prereq: ECON 401 and 402.

### **ECON 641 - Public Economics**

**Credits:** 4.00

Alternative prescriptions and explanations concerning the role of government in contemporary market economies. General principles of public expenditure analysis. Selected case studies of public spending programs, e.g., welfare, defense, education. Analysis of various federal, state, and local taxes. Prereq: ECON 401; 605;/ or permission.

### **ECON 642 - Health Economics**

**Credits:** 4.00

Theoretical and empirical analysis of the U.S. health care delivery sector. Topics include health insurance markets and their effects on patient demand, uninsured populations and their access to health care services, breakdowns in the principal/agent relationship between patient and providers, competition in the medical sector, technology, pharmaceuticals and the scope and effect of government involvement in the delivery of health care. Prereq: ECON 402. (Also listed as HMP 642.)

### **ECON 645 - International Economics**

**Credits:** 4.00

Covers both international trade theory and open-economy macroeconomics. Some of the major issues include whether free trade is always preferred to restricted trade, the controversy over industrial policy and how best to structure the international financial system. Students gain an understanding of topics including currency exchange rate movements, macroeconomic adjustment mechanisms and trade policy, among others. Prereq: ECON 401 and 402.

### **ECON 651 - Governmental Regulation of Business**

**Credits:** 4.00

Mergers, competition, monopoly, and the regulated industries. Prereq: ECON 402.

### **ECON 653 - Law and Economics**

**Credits:** 4.00

Introduces the field of Law and Economics. Focuses on the legal system and the economic consequences of property, contract, tort, criminal law and mediation. Prereq: ECON 402. Writing intensive.

### **ECON 656 - Labor Economics**

**Credits:** 4.00

Functioning of labor markets from theoretical and policy perspectives. Labor demand and supply, wages and employment. Welfare programs, human capital, discrimination in the labor market, unions, wage differentials. Prereq: ECON 401; ECON 402; ECON 605 recommended.

### **ECON 668 - Economic Development**

**Credits:** 4.00

Theories of development/underdevelopment. Trade, growth, and self-reliance. The role of agriculture (land tenure, food crisis, Green Revolution). World Bank policy, industrialization strategies. Role of the state. Prereq: ECON 401; ECON 402;/or permission. Writing intensive.

### **ECON 669 - Women and Economic Development**

**Credits:** 4.00

Examines the position, roles, and contributions of women in economic development as interpreted though

different discourses (feminisms, modernity, post modernity) and in theoretical conceptualizations (neoclassical integrationist, liberal feminism, class and gender, feminist ecology). Applied analyses on Africa, South Asia and Latin America. Prereq: permission. Writing intensive.

### **ECON 685 - Study Abroad**

**Credits:** 1.00 to 16.00

Open to students studying abroad in the discipline as approved by the economics program director. Cr/F.

### **ECON 686 - Study Abroad**

**Credits:** 1.00 to 16.00

Open to students studying abroad in the discipline as approved by the economics program director. Cr/F.

### **ECON 695 - Independent Study**

**Credits:** 2.00 to 12.00

Individual research projects that are student designed. Initial sponsorship of an economics faculty member must be obtained, and approval of WSBE adviser and dean. For juniors and seniors in high standing. Up to 4 credits may be used as a major elective.

### **ECON 695W - Independent Study**

**Credits:** 2.00 to 12.00

Individual research projects that are student designed. Initial sponsorship of an economics faculty member must be obtained, and approval of WSBE adviser and dean. For juniors and seniors in high standing. Up to 4 credits may be used as a major elective. Writing intensive.

### **ECON 696 - Supervised Student Teaching Experience**

**Credits:** 1.00 to 8.00

Participants are expected to perform such functions as leading discussion groups, assisting faculty in undergraduate courses that they have successfully completed, or working as peer advisers in the advising center. Enrollment is limited to juniors and seniors who have above-average G.P.A.s. Reflective final paper is required. Prereq: permission of instructor, department chair, and director of undergraduate programs. No more than 4 credits may be earned as a teaching assistant in any one course. May be repeated to a maximum of 8 credits. Cr/F.

### **ECON 698 - Topics**

**Credits:** 4.00

Special topics. May be repeated. Prereq: permission. Writing intensive.

### **ECON 707 - Economic Growth and Environmental Quality**

**Credits:** 4.00

Analysis of the interrelationships among economic growth, technological change, population increase, natural resource use, and environmental quality. Application of alternative theoretical approaches drawn from the social and natural sciences. Focus on specific environmental problems, e.g., affluence and waste disposal problems, and loss of biodiversity. Prereq: ECON 605; 611;/or permission.

### **ECON 726 - Introduction to Econometrics**

**Credits:** 4.00

Introduces regression techniques as used in economics and management; estimation and statistical inference in the context of the general linear model; discussion of problems encountered and their solutions; extensions of the general linear model. Prereq: ADMN 420 or equivalent.

### **ECON 736 - Seminar in Monetary Theory and Policy**

**Credits:** 4.00

Contemporary developments in monetary theory and the evaluation of policy measures. Prereq: ECON 635. Writing intensive.

### **ECON #745 - International Trade**

**Credits:** 4.00

Contemporary issues in international economic theory and policy. Analysis of trade theory, dynamics of world trade and exchange, and international commercial policy. Prereq: ECON 605; ECON 645.

### **ECON 746 - International Finance**

**Credits:** 4.00

International monetary mechanism; balance of payments, international investment, exchange rates, adjustment systems, international liquidity, foreign aid, multinational corporations. Prereq: ECON 611; ECON 645. Writing intensive.

### **ECON 747 - Multinational Enterprises**

**Credits:** 4.00

Internationalization of economies. Growth and implications of multinational corporations at the level of systems. Theories of imperialism, international unity/rivalry; theories of direct investment, exercise of influence and conflict, technology transfer, bargaining with host country; effects on U.S. economy. Prereq: permission. Writing intensive.

### **ECON 768 - Seminar in Economic Development**

**Credits:** 4.00

Advanced reading seminar. Topics include methodologies underlying economic development theory, industrialization and post-import substitution, state capitalist development, stabilization policies, appropriate technologies, the capital goods sector, agricultural modernization schemes, and attempts at transition to socialism. Prereq: permission.

### **ECON 775 - Applied Research Skills for Economists**

**Credits:** 4.00

Capstone course for students enrolled in B.S. in economics. Uses analytical and problem-solving skills plus data-analysis and computer skills from earlier classes to study and analyze the U.S. economy, sector by sector. Topics will include time-series and simultaneous-equations models. Research paper combines theory and data-analysis skills. Prereq: ECON 605, 611, 726; MATH 424A or equivalent. Writing intensive.

### **ECON 795 - Internship**

**Credits:** 1.00 to 16.00

On-the-job skill development through fieldwork in an organization (business, industry, health, public service, etc.). Normally, supervision is provided by a qualified individual in the organization, with frequent consultation by a faculty sponsor. Written report required. Internships may be part or full time, with course credits assigned accordingly. May not be used as a major elective. Cr/F.

### **ECON 798 - Economic Problems**

**Credits:** 2.00 or 4.00

Special topics; may be repeated. Prereq: permission of adviser and instructor. Writing intensive.

### **ECON 799 - Honors Thesis**

**Credits:** 4.00 to 8.00

Supervised research leading to the completion of an honors thesis; required for graduation from the honors program in economics. Prereq: permission of director of undergraduate programs and department chair. Writing intensive.

## Education

### **EDUC #444 - Learning to Learn**

**Credits:** 4.00

The central issue in this seminar is the nature of learning. What does it mean to learn? To be a learner? What role does learning play in students' own lives - both in and out of school? Students consider the roles of the environment, the teacher, and the learner in thinking about what it means to learn. Through readings, discussions, classroom activities, investigations and observations students develop their own beliefs and understandings about what it means to learn. Students in the course explore specific topics related to learning, including the nature of intelligence and motivation, and the roles of attention, memory and context in learning. They consider both formal and informal learning environments as well as structures that support or impede learning. Students work together in groups to solve problems and present information to others. They use reflection as a tool for learning and increase their understanding of themselves as learners. Writing intensive.

### **EDUC 444B - Be the Change You Want to See: Active Citizenship in a Multicultural World**

**Credits:** 4.00

This is a first-year inquiry course intended primarily for students participating in the Common Purposes residential living program. The course offers multidisciplinary content focused on active citizenship in a pluralistic democracy. The primary organizing concept of the course is community; assignments focus on deliberative dialogue, public reasoning, collective action, and social justice. The course is taught as a seminar and includes on-campus and off-campus applied projects.

### **EDUC 451 - Welding and Fabrication Technology**

**Credits:** 4.00

Processes and procedures of welding including: Shielded Metal Arc Welding (SMAW), Oxyacetylene Welding (OAW), Oxy-Fuel Gas Cutting (OFC-A), Gas Metal Arc Welding (GMAW), Plasma Arc Cutting (PAC) and Tungsten Arc Welding (GTAW). Welding metallurgy and control of distortion. Special fee. Prereq: permission. 2 lec/2-hr rec.

### **EDUC 461 - Internal Combustion Engines I**

**Credits:** 4.00

Internal combustion engines (spark-ignited and diesel) and their subsystems with emphasis on their design, how they function, preventive maintenance, and troubleshooting. 2 lec/2-hr rec.

### **EDUC 462 - Internal Combustion Engines II**

**Credits:** 4.00

Advanced engine principles and theory. Detailed major failure analysis and overhaul techniques. Prereq: permission, AM 261, AOE 461, or EDUC 461. 2 lec/2 rec.

### **EDUC 470 - Residential Electricity**

**Credits:** 2.00

Electrical principles, laws, and installation with emphasis on the National Electrical Code. While modeled at the residential level, concepts and terminology will be applicable to the commercial and light industrial sectors as well. Concepts and methodologies will be supported with design and when appropriate, hands-on application to enhance the learning environment. 2 lec/2-hr rec. (half semester course.) No credit earned if credit earned for the second half of CT 227.

### **EDUC 475 - Building Science/Residential Construction**



**Credits: 4.00**

Studies the interrelationship of physical principles that affect the functionality and life span of a building. The materials and methodologies of residential construction. 3 lec/2-hr lab. Special fee.

**EDUC 500 - Exploring Teaching****Credits: 4.00**

For students considering a teaching career. In-school experiences to develop introductory skills in teaching. On-site seminars for analysis and evaluation. Assessment and advising related to teaching as a career. Prerequisite for further work toward teacher licensure. Minimum of 7 hours a week, plus travel time, required. Prereq: permission. Cr/F.

**EDUC 506 - Service Learning Experiences in Literacy****Credits: 1.00**

Supports students engaged in school-based literacy tutoring as service learning experiences. Explores tutoring methods in literacy, community/school service, and contemporary issues in education. May be repeated to six credits, one credit per semester. Prereq: permission required. Cr/F.

**EDUC 507 - Mentoring Adolescents****Credits: 2.00**

This seminar is intended for undergraduate men and women who are mentoring local middle-school students on a weekly basis. The mentoring involves minimally tutoring the mentees once a week at their schools. The seminar meets twice a month for two hours. Additionally, one tutoring session a month is reserved for a focus group discussion involving the mentors and their mentees at the school site. May be repeated for a maximum of 12 credits.

**EDUC 520 - Education, Poverty, and Development****Credits: 4.00**

An examination of the human and institutional relationships among education, poverty, and social development. This course will emphasize the ways in which access to universal, effective education is correlated with the incidence of childhood poverty and its reduction in the US and selected countries in the developed and developing world. Interactive, discussion-based classes. Prior coursework in social or political sciences, economics, international affairs, health sciences, or related fields suggested. Not open to freshmen. 4 credits.

**EDUC 556 - Mentoring Adolescents with Disabilities in the Transition to Work****Credits: 2.00**

This course introduces undergraduates to a mentoring experience with an adolescent with a disability in a supportive setting. Students develop a beginning understanding of disabilities and the impact those disabilities might have on learning; the development of work related skills; and the importance of natural supports within the work environment. Each mentor/mentee relationship will be individualized based on the needs of the participants.

**EDUC 694 - Courses in Supervised Teaching****Credits: 8.00**

Supervised Teaching of Music. Cr/F. Supervised Teaching of Adult and Occupational Education. Cr/F. Supervised Teaching of Mathematics. Cr/F.

**EDUC 694D - Courses in Supervised Teaching****Credits: 4.00**

Supervised teaching of Kinesiology. Cr/F.

**EDUC 700 - Educational Structure and Change**

**Credits:** 2.00 or 4.00

Organization, structure, and function of American schools; historical, political, social and cross-cultural perspectives; nature and processes of change in education. A) Educational Structure and Change; B) Education in America: Backgrounds, Structure, and Function; C) Governance of American Schools; D) School and Cultural Change; F) Social Perspectives of Conflict in the Schools; G) Nature and Processes of Change in Education; H) What is an Elementary School?; I) Schooling for the Early Adolescent; J) Curriculum Structure and Change; K) Stress and Educational Organizations. Candidates teacher licensure must take either 4-credit course 700A, or 2 credits each of 700F and and 700C. Prereq: for teacher licensure: EDUC 500 and junior status. Prereq: for students not seeking teacher licensure: instructor permission. Writing intensive.

### **EDUC 701 - Human Development and Learning: Educational Psychology**

**Credits:** 2.00 or 4.00

Child development through adolescence, learning theory, cognitive psychology, research in teaching and teacher effectiveness, cross-cultural variability, and evaluation-- all applied to problems of classroom and individual teaching and learning. A) Human Development and Learning: Educational Psychology; B) Human Development: Educational Psychology; C) Human Learning: Educational Psychology; D) Developmental Basis of Learning and Emotional Problems; E) Learning Theory, Modification of Behavior, and Classroom Management; F) Cognitive and Moral Development; G) Evaluating Classroom Learning; H) Deliberate Psychological Education; I) Sex Role Learning and School Achievement; J) The Development of Thinking. Each semester 2-credit and 4-credit courses are offered. 2-credit courses emphasize either development or learning. Candidates for teacher licensure are required to have the 4-credit course (701A) or 2 credits each of 701B and 701C. Prerequisite for teacher licensure: EDUC 500 and junior status. Prerequisite for students not seeking teacher licensure: instructor permission and junior status. 701A has a special fee when taught in Manchester. Writing intensive.

### **EDUC 703 - Alternative Teaching Models**

**Credits:** 2.00 or 4.00

Basic teaching models, techniques of implementation, and relationships to curricula. A) Alternative Teaching Models; B) Curriculum Planning for Teachers; C) Alternative Strategies for Maintaining Classroom Control; D) Social Studies Methods for Middle and High School Teachers; F) Teaching Elementary School Science; G) Language Arts for Elementary Teachers; H) Experiential Curriculum; I) Children with Special Needs; Teaching Strategies for the Classroom Teacher; K) Writing across the Curriculum; L) Learning and LOGO; M) Teaching Elementary School Social Studies. 2-credit and 4-credit courses are offered. Teacher education students should be aware of the specific course(s) required for their licensure area. EDUC 703F and M are required for elementary education candidates. EDUC 703D is required for social studies candidates. EDUC 791 is required for science candidates. For all other secondary education candidates, the appropriate methods course in the department of major is required. See the Schoolhouse Book for specific course listings. Prerequisite for teacher licensure: EDUC 500 and junior status. Prerequisite for students not seeking teacher licensure: instructor permission and junior status. 703F has a special fee when taught in Manchester.

### **EDUC 705 - Alternative Perspectives on the Nature of Education**

**Credits:** 2.00 or 4.00

Students formulate, develop, and evaluate their own educational principles, standards, and priorities. Alternative philosophies of education; contemporary issues. A) Contemporary Educational Perspectives; B) Controversial and Ethical Issues in Education; D) Concepts of Teaching: Differing Views; E) Curriculum Theory and Development; F) Readings on Educational Perspectives; G) Philosophy of Education; I) Education as a Form of Social Control; K) Schooling and the Rights of Children; L) Education, Inequality, and the Meritocracy; M) Readings and Philosophies of Outdoor Education; N) Alternative Perspectives on the Nature of Education; O) Classrooms: The Social Context; P) Teaching: The Social Context; Q) School

and Society. 2-credit and 4-credit courses are offered. Candidates for teacher licensure must choose either 4-credit course 705A, 705B, or 705Q. Prerequisite for teacher licensure: EDUC 500 and junior status. Prerequisite for students not seeking teacher licensure: instructor permission and junior status. Writing intensive.

### **EDUC 706 - Introduction to Reading in the Elementary School**

**Credits:** 4.00

Methods in reading and writing instruction; current procedures and materials; diagnostic techniques. Course satisfies reading/language arts requirement for prospective elementary teachers in the five-year teacher education program. Prereq: EDUC 500 and junior status.

### **EDUC 707 - Teaching Reading through the Content Areas**

**Credits:** 2.00

Approaches and methods for teaching reading through content materials; coursework includes practical applications through development of instructional strategies and materials. Required for candidates seeking certification in art, biology, chemistry, earth science, general science, physical science, physics, or social science.

### **EDUC 710A - Concepts of Adult and Occupational Education**

**Credits:** 4.00

Development of occupational education in the U.S.; socio-economic influences responsible for its establishment; federal and state requirements for secondary and postsecondary schools. Coordination of programs with general education and vocational fields. Focus on selected concepts relevant to adult education. Special attention on the adult as a learner, volunteer management, evaluation and accountability, experiential learning, and adult education. Required of all degree candidates in AOE concentrations. Writing intensive.

### **EDUC 710C - Youth Organizations**

**Credits:** 4.00

Organizational development (advising youth organizations, teaching parliamentary procedure, developing programs and activities, leadership). FFA/SAEP (Future Farmers of America/Supervised Agricultural Experience Programs, for high school youth). VICA (Vocational Industrial Clubs of America). 4-H (Cooperative Extension Youth Program).

### **EDUC 710E - Workshop in Adult and Occupational Education**

**Credits:** 1.00 to 4.00

Modularized instruction of in-service education. Focus varies with the needs of the student. May be repeated for up to 8 credits.

### **EDUC 710F - Investigations**

**Credits:** 1.00 to 4.00

Topics may include career education, secondary education, post-secondary education, adult education, extension education, exemplary education, cooperative education, disadvantaged and handicapped education, international agriculture, or teaching experience. Student-selected in one of the areas listed. Elective after consultation with instructor. Hours arranged. May be repeated.

### **EDUC 710H - Field Experience**

**Credits:** 2.00 to 16.00

Work with an agency, institution, or organization to gain technical and/or professional competence not otherwise available. Student plans experience with departmental adviser. Credit approval subject to recommendation of faculty members and performance of student. Prereq: permission.

### **EDUC 712 - Teaching Multilingual Learners**

**Credits:** 4.00

This course is for people interested in teaching English to speakers of other languages (ESOL) in schools and communities in NH and the U.S. Topics include: theories of first and second language acquisition, policies and laws affecting language minority students, strategies for teaching academic content in the mainstream classroom, creating classroom/school cultures that invite all students into learning, and the role of advocacy and professional collaboration in ESOL.

### **EDUC 717 - Growing up Male in America**

**Credits:** 4.00

An integrative view of growing up male in the American culture from birth through adulthood. Analysis of major perspectives on male development and the implications in parenting with specific emphasis on male education. Participants are expected to develop awareness of their own development as a male or alongside males, using current male development perspectives as a guide. They also create an awareness of how this will affect their behavior toward boys in their classrooms.

### **EDUC 720 - Integrating Technology into Classroom**

**Credits:** 4.00

Participants gain practical experience that takes specific advantage of technology to enhance and extend student learning. State academic standards and national technology standards are used to make decisions about curriculum content and to plan technology-based activities. Participants use electronic management tools such as iMovie, Powerpoint, podcast, webcast, Comic Life, Audacity, and Garage Band are featured in this hands-on course.

### **EDUC 733 - Introduction to the Teaching of Writing**

**Credits:** 4.00

Development of writers, child to adult; ways to respond to writing; organization of the classroom for the teaching of writing. Persons taking the course need to have access to students to carry out course requirements. Prereq: permission.

### **EDUC 734 - Children's Literature**

**Credits:** 4.00

Interpretive and critical study of literature for children in preschool and elementary settings. Methods of using literature with children.

### **EDUC #735 - Young Adult Literature**

**Credits:** 4.00

Critical study of the fiction and nonfiction genres that constitute literature written for the adolescent reader. Emphasis on literary analysis of young adult literature and its pedagogical uses in middle/junior high/high school curriculum.

### **EDUC 741 - Exploring Mathematics with Young Children**

**Credits:** 4.00

A laboratory course offering those who teach young children mathematics, and who are interested in children's discovery learning and creative thinking, an opportunity to experience exploratory activities with concrete materials. Offers mathematical investigations through which one may develop the ability to provide children with a mathematically rich environment to become adept at asking problem-posing questions.

### **EDUC 745 - Math with Technology in Early Education**

**Credits:** 2.00

The primary goal of this course is that students gain knowledge of learning standards and teaching

methods for the instruction of mathematics in early education settings with infants through 3rd grade. In addition, participants gain experience in applying their newfound knowledge in the areas of mathematics with technology through a combination of teaching and digital experiences. Prereq: EDUC 500 or graduate student status.

### **EDUC 750 - Introduction to Exceptionality**

**Credits:** 4.00

A life span perspective of the social, psychological, and physical characteristics of individuals with exceptionalities including intellectual, sensory, motor, health, and communication impairments. Includes implications for educational and human service delivery.

### **EDUC 751A - Educating Exceptional Learners: Elementary**

**Credits:** 4.00

Foundations of special education and an introduction to a variety of service delivery models with an emphasis on educating all learners in heterogeneous classrooms. Instructional strategies and supports for all students, particularly those with mild and moderate disabilities, will be the primary focus.

### **EDUC 751B - Educating Exceptional Learners: Secondary**

**Credits:** 4.00

Foundations of special education and an introduction to a variety of service delivery models with an emphasis on educating all learners in heterogeneous classrooms. Instructional strategies and supports for all students, particularly those with mild and moderate disabilities, is the primary focus. Preparation for students' transitions to post-secondary life is included.

### **EDUC 751C - Educating Exceptional Learners: Related Services**

**Credits:** 4.00

An overview of special education and related services in an educational setting. Focus on support services provided to general education and special education teachers, including laws relating to special populations, how related services interact with classroom and special educators, IEPs, and other topics that impact services provided to students with special needs.

### **EDUC 752 - Contemporary Issues in Learning Disabilities**

**Credits:** 4.00

Critical analysis of current and historical conceptions of learning disability in the areas of definition, supporting theories, assessment practice, and teaching methodologies. Focus on contemporary issues in the field that relate to working with students labeled as learning disabled at both elementary and secondary levels.

### **EDUC 753 - Contemporary Issues in Behavioral Disabilities**

**Credits:** 4.00

Nature and scope of emotional and behavioral disabilities in students for elementary through secondary levels. Theoretical perspectives, characteristics, assessment and educational intervention strategies are included.

### **EDUC 754 - Contemporary Issues in Developmental Disabilities**

**Credits:** 4.00

The causal factors, physical and psychological characteristics, and educational and therapeutic implications of mental retardation, cerebral palsy, epilepsy, autism, and related conditions. A life span perspective is included, with major emphasis on the school-age population.

### **EDUC 755 - Facilitating Social Understanding and Relationships for Students with Disabilities**

**Credits:** 2.00

The course will focus on the classroom and individual supports needed by students with intellectual and other developmental disabilities, including autism spectrum disorders, in order to have a wide variety of satisfying social relationships. Participants identify the factors that (a) are essential to the development of shared social understanding between students with and without disabilities; (b) promote reciprocal social relationships; and (c) how to recognize and mitigate barriers to reciprocal relationships.

### **EDUC 756 - Supporting Families of Individuals with Exceptionalities**

**Credits:** 4.00

An introduction to family system theory and the implications for families having members with exceptionalities. Issues addressed include diagnosis and prognosis, coping strategies, communication and team collaboration, cross-cultural competence, and agency and school delivery of services. Emphasis is on proactive collaboration with family members.

### **EDUC 757 - Contemporary Issues in Autism Spectrum Disorders**

**Credits:** 4.00

The goal of this course is to enhance students' understanding of contemporary issues related to educating students with autism spectrum disorders (ASD). The course is grounded in a theoretical foundation that values the perspectives of individuals with ASD in academic, research, policy, and clinical endeavors. Learning outcomes focus on strategies for identifying opportunities for learning, communication, literacy, and social relationships in a variety of inclusive environments. May be repeated up to a maximum of 8 credits. Permission required. Prereq: UNH Summer Institute on Autism.

### **EDUC 760 - Introduction to Young Children with Special Needs**

**Credits:** 4.00

Needs of children (birth to eight years) with developmental delays or who are at risk for disabilities. Strengths and special needs of such children; causes, identification, and treatment; current legislation; parent and family concerns; program models.

### **EDUC #767 - Students, Teachers, and the Law**

**Credits:** 4.00

Our public schools play a vital role in our society. What shall be taught and who shall teach our children are perennial questions. This course explores how the law impacts the educational lives of students and teachers, including issues of church-state relations, free speech, dress codes, and search and seizure. (Also offered as JUST 767.)

### **EDUC 776 - Reading for Learners with Special Needs**

**Credits:** 4.00

Techniques and procedures for teaching reading to learners with special needs. Emphasis on providing reading instruction in the least restrictive alternative.

### **EDUC 780 - Belize/New Hampshire Teacher Program**

**Credits:** 4.00

International course involving teams of teachers from Belize and New England. The program offers teachers in both countries the opportunity to work collaboratively on developing effective teaching practices, develop an understanding of each other's cultural and educational perspectives, extend the experience to other teachers and students upon return. Special fee.

### **EDUC 781 - Introduction to Statistics: Inquiry, Analysis, and Decision Making**

**Credits:** 4.00

An applied statistics course that covers introductory-level approaches to examining quantitative information. Students spend about half of class time in the computer lab analyzing real data from the behavioral and social sciences. An emphasis is placed on the role of statistics in making empirically-based

policy decisions.

**EDUC #785 - Educational Assessment**

**Credits:** 4.00

Theory and practice of educational evaluation; uses of test results in classroom teaching and student counseling; introductory statistical techniques.

**EDUC 791 - Methods of Teaching Secondary Science**

**Credits:** 4.00

Application of theory and research findings in science education to classroom teaching with emphasis on inquiry learning, developmental levels of children, societal issues, integration of technology, critical evaluation of texts and materials for science teaching, and planning for instruction. Lab.

**EDUC 795 - Independent Study**

**Credits:** 2.00 or 4.00

Juniors and seniors only, with approval by appropriate faculty member. Neither course may be repeated.

**EDUC 796 - Independent Study**

**Credits:** 2.00 or 4.00

Juniors and seniors only, with approval by appropriate faculty member. Neither course may be repeated.

**EDUC 797 - Seminar in Contemporary Educational Problems**

**Credits:** 1.00 to 4.00

Issues and problems of special contemporary significance, usually on a subject of recent special study by faculty member(s). Prereq: permission. May be repeated for different topics. Special fee on topic: Picturing Writing, Fostering Literacy through Art.

## Electrical&Comp Engineering

### **ECE 401 - Perspectives in Electrical and Computer Engineering**

**Credits:** 4.00

An introductory course for electrical and computer engineering majors that introduces incoming students to the fundamental concepts of analysis and design. Concepts are presented through an examination of real-world problems. Students are introduced to electrical and computer engineering problem solving and design through active learning techniques in lecture and in a laboratory setting. Provides a context for the electrical engineering and computer engineering curriculum and introduces the profession and activities of electrical and computer engineering. Lab.

### **ECE 444 - Bionics: Technology from Nature**

**Credits:** 4.00

Bionics is the study of living systems with the intention of applying their principles to the design of useful technology for mankind. Students learn strategies to discover bio-inspired technology. The student investigates the fields of bio-inspired cyborgs, defense and attack mechanisms in biology leading to military applications including non-lethal weapons, bio-inspired sensors including brain-computer interfaces, bio-inspired robots, and animal and plants that generate energy for technology. Writing Intensive. Lab.

### **ECE 537 - Introduction to Electrical Engineering**

**Credits:** 4.00

Fundamentals of electrical engineering. Topics are circuit elements; signal waveforms; circuit laws and theorems; transfer functions; free, forced, and steady state responses; power calculations; amplifiers; and magnetic circuits. Non-ECE majors only. Prereq: PHYS 408. Pre- or Coreq: MATH 527. Lab.

**Co-requisites:**

### **ECE 541 - Electric Circuits**

**Credits:** 4.00

Linear passive circuits beginning with resistive circuits, power and energy relations, mesh and node analysis. Transient and steady-state behavior of simple circuits containing energy storage elements (capacitors, inductors). Introduction to linear active circuits using dependent source models and ideal op amps. Introduction to transfer function and frequency response concepts. For ECE majors only. Pre- or Coreq: MATH 426; PHYS 408. Lab.

### **ECE 543 - Introduction to Digital Systems**

**Credits:** 4.00

Fundamental analysis and design principles. Number systems, codes, Boolean algebra, and combinational and sequential digital circuits. Lab: student-built systems using modern integrated circuit technology and an introductory design session on a CAD workstation. Lab.

### **ECE 548 - Electronic Design I**

**Credits:** 4.00

Introduction to electronic design for analog signal processing. Linear op amp circuits for amplification and filtering. Use of Laplace techniques for filter specification; simple passive and op amp filter realizations. Discrete active devices (FET and BJT): operating characteristics, biasing considerations, canonical amplifier configurations including differential amplifiers. Prereq: ECE 541. Lab.

### **ECE 562 - Computer Organization**

**Credits:** 4.00



Basic computer structure, including arithmetic, memory, control, and input/output units; the trade-offs between hardware, instruction sets, speed, and cost. Laboratory experiments involving machine language programming and I/O interfacing using microcomputers. Prereq: CS 410 or CS 415; ECE 543. Lab.

### **ECE 583 - Designing with Programmable Logic**

**Credits:** 4.00

Design methodologies for implementing digital systems in programmable logic. Covers topics related to the design, implementation, and testing of programmable logic devices. Students are introduced to the Very-High-Speed Hardware Description Language (VHDL) entry language and simulation procedures, along with common logic synthesis tools. Programmable logic families, device architectures, and testing procedures are covered in detail. Laboratory exercises lead the student through the complete programmable logic design cycle. Each student is required to prototype a digital system starting with VHDL entry, functional and timing simulations, logic synthesis, device programming, logic probing, and systems verification. Prereq: ECE 562. Lab.

### **ECE 602 - Engineering Analysis**

**Credits:** 4.00

Analyze and solve engineering problems using linear algebra and integral and differential calculus of functions of several variables. Boundary-value problems in mechanics, fluid dynamics, and electrostatics. Examination of electrostatics, magnetostatics, and fluid and wave mechanics using vector differential and integral calculus. Introduction of approximation and error analysis methods as fundamental engineering tools. Prereq: MATH 527.

### **ECE 603 - Electromagnetic Fields and Waves I**

**Credits:** 4.00

Maxwell's equations in integral and differential form with applications to static and dynamic fields. Uniform plane waves in free space and material media. Boundary conditions; simple transmission line theory; parallel plate and rectangular waveguides; simple radiating systems. Prereq: PHYS 408; ECE 602.

### **ECE 617 - Junior Laboratory I**

**Credits:** 4.00

Application of laboratory instrumentation to the investigation of active and passive circuit characteristics; introduction to computer-aided design, analysis, and testing; development of report writing and oral presentation skills. Pre- or Coreq: ECE 633; ECE 651. Writing intensive.

**Co-requisites:**

### **ECE 618 - Junior Laboratory II**

**Credits:** 4.00

Laboratory exercises in the design and analysis of active circuits, techniques of signal processing, and the properties of distributed circuits. Continued development of report writing and oral presentation skills. Prereq: ECE 617. Pre- or Coreq: ECE 603. Writing intensive.

**Co-requisites:**

### **ECE 633 - Signals and Systems I**

**Credits:** 3.00

Mathematical characterization of continuous-time systems using time- and frequency-domain concepts. Properties of linear systems described by ordinary differential equations. Fourier analysis of signals and system frequency response functions. Applications to communication and control systems. Introduction to system simulation using computer methods. Prereq: MATH 527.

**Co-requisites:**

### **ECE 633H - Signals and Systems I/Honors**

**Credits:** 4.00

Mathematical characterization of continuous-time systems using time- and frequency-domain concepts. Properties of linear systems described by ordinary differential equations. Fourier analysis of signals and system frequency response functions. Applications to communication and control systems. Introduction to system simulation using computer methods. Honors students will attend an additional one-hour meeting each week. Prereq: MATH 527.

**Co-requisites:****ECE 634 - Signals and Systems II****Credits:** 3.00

Transient response analysis of linear systems using Laplace transforms, application to feedback control systems. Introduction to discrete-time linear systems; system response determination using Z-transform; elementary design of digital filters and controllers. State variable formulation of dynamical systems. Prereq: ECE 633.

**ECE 647 - Random Processes and Signals in Engineering****Credits:** 3.00

Emphasis on applied engineering concepts such as component failure, quality control, noise propagation. Topics include random variables, probability distributions, mean and variance, conditional probability, correlation, power spectral density. Prereq: MATH 426; ECE 602.

**ECE 647H - Random Processes and Signals/Honors****Credits:** 4.00

Emphasis on applied engineering concepts such as component failure, quality control, noise propagation. Topics include random variables, probability distributions, mean and variance, conditional probability, correlation, power spectral density. Honors students attend an additional one-hour meeting each week. Prereq: MATH 426; ECE 602.

**ECE 649 - Embedded Microcomputer Based Design****Credits:** 4.00

An in-depth treatment of the design of embedded microcomputer systems. Topics include advanced architectures for embedded processors, hardware and software aspects of interfacing, handling interrupts, advanced programming including debugging of real time systems, embedded application implementations. Laboratory studies are required to reinforce theoretical and applied concepts in an actual embedded architecture. Prereq: ECE 562. Lab.

**ECE 651 - Electronic Design II****Credits:** 4.00

Design of fundamental circuit blocks in electronic systems. Multistage amplifiers; feedback systems and stability; power amplifiers. Nonlinear electronic circuits: oscillators, function generators; clippers and peak detectors; A/D and D/A conversion. Switching mode and logic circuits. Prereq: ECE 548.

**ECE 681 - Teaching Experience****Credits:** 1.00

Credit for assisting in the instruction of undergraduate laboratories. Available on a limited basis to students selected by the department chairperson. May be repeated for credit up to a total of 4 credits.

**ECE 694 - Professional Principles of Engineering****Credits:** 1.00

Provides background for the capstone design experience (ECE 791/792). Topics include creativity, design methodology, specification development, project management, ethics, safety, reliability and preparation for oral and written reports. Includes initial capstone project selection. Prereq: ECE junior standing. Cr/F.

## **ECE #704 - Electromagnetic Fields and Waves II**

**Credits:** 4.00

Loop antennas; aperture and cylindrical antennas; self and mutual impedance; receiving antennas and antenna arrays; bounded plane waves; rectangular and cylindrical waveguides; waveguide discontinuities and impedance matching; solid state microwave sources. Prereq: ECE 603.

## **ECE 711 - Digital Systems**

**Credits:** 4.00

Principles, procedures and tools related to the design, implementation and testing of microprocessor-based embedded systems. Students prototype a complete embedded system using CAD tools, application specific integrated circuits, printed circuit board technology, and modern diagnostic/testing procedures and tools. Projects are designed to introduce diverse digital technologies. Lab.

## **ECE 714 - Introduction to Digital Signal Processing**

**Credits:** 4.00

Introduction to digital signal processing theory and practice, including coverage of discrete time signals and systems, frequency domain transforms and practical spectral analysis, digital filter terminology and design, and sampling and reconstruction of continuous time signals. Laboratory component providing an introduction to DSP design tools and real-time algorithm implementation. Prereq: ECE 633. Lab.

## **ECE 715 - Introduction to VLSI**

**Credits:** 4.00

Principles of VLSI (Very Large Scale Integration) systems at the physical level. CMOS circuit and logic design, CAD tools, CMOS system case studies. Students exercise the whole development cycle of a VLSI chip: design and layout performed during semester I. The chips are fabricated off campus and returned during semester II, when they are tested by students. An IA (continuous grading) grade is given at the end of semester I. Lab.

## **ECE 717 - Introduction to Digital Image Processing**

**Credits:** 4.00

Digital image representation; elements of digital processing systems; multidimensional sampling and quantization; image perception by humans, image transformations including the Fourier, the Walsh, and the Hough Transforms; image enhancement techniques including image smoothing, sharpening, histogram equalization, and pseudo color processing; image restoration fundamentals; image compression techniques, image segmentation and use of descriptors for image representation and classification. Prereq: ECE 633; ECE 647. Lab.

## **ECE 734 - Network Data Communications**

**Credits:** 4.00

Introduces basic concepts related to data transmission equipment and physical interfaces, data communication protocols, and the Open System Interconnection (OSI) Reference Model. Includes physical layer hardware, signaling schemes, protocol packets, computer interfaces, error detection, signal integrity, and data transmission protocols relative to both wired and wireless networks. Introduces both logical and wide-area networks, and how a networking system is constructed, tested, and managed. Network design and testing exercises. Prereq: ECE 633; ECE 649. Lab.

## **ECE 757 - Fundamentals of Communication Systems**

**Credits:** 4.00

Spectra of deterministic and random signals; baseband and bandpass digital and analog signaling techniques; transmitter and receiver architectures; performance analysis of digital and analog signaling in additive noise channels; carrier and symbol timing synchronization methods. Prereq: ECE 633; ECE 647.

Lab.

### **ECE 758 - Communication System Design**

**Credits:** 4.00

System- and circuit-level design and implementation of communication hardware including: mixers, RF amplifiers, filters, oscillators and frequency synthesizers, modulators and detectors, carrier and symbol timing recovery subsystems. Issues in software-defined radio transmitter and receiver implementation. Communication link engineering including antenna selection and channel impairment effects. Prereq: ECE 651; ECE 757. Lab.

### **ECE 760 - Introduction to Fiber Optics**

**Credits:** 4.00

Basic physical and geometric optics; solution of Maxwell's equations for slab waveguides and cylindrical waveguides, of both step index and graded index profiles; modes of propagation and cutoff; polarization effects; ground and phase velocity; ray analysis; losses; fabrication; sources; detectors; couplers; splicing; cabling; applications; system design. Prereq: ECE 603. Lab.

### **ECE 772 - Control Systems**

**Credits:** 4.00

Development of advanced control system design concepts such as Nyquist analysis; lead-lag compensation; state feedback; parameter sensitivity; controllability; observability; introduction to non-linear and modern control. Includes interactive computer-aided design and real-time digital control. Prereq: ECE 634. Lab. (Also offered as ME 772.)

### **ECE 774 - Introduction to Neural Networks**

**Credits:** 4.00

Introduces theory and application of artificial neural networks. Single-layer and multi-layer feed-forward and recurrent network architectures. Supervised, unsupervised, and reinforcement learning principles. Applications to control and signal processing.

### **ECE 775 - Applications of Integrated Circuits**

**Credits:** 4.00

Design and construction of linear and nonlinear electronic circuits using existing integrated circuits. Limitations and use of operational amplifiers. Laboratory course in practical applications of non-digital integrated circuit devices. Prereq: ECE 651. Lab.

### **ECE 777 - Collaborative Engineering**

**Credits:** 4.00

Study of processes in which engineers from diverse disciplines cooperate to specify, design, manufacture, test, market, and maintain a product. Classes are organized in both technical and nontechnical flexible modules. Technical topics are advanced and relevant to project being developed, such as related research, technology, design methodology, and CAD tools. Nontechnical topics include ISO 9000 quality system, engineering management, budget considerations, building, communication and leadership skills, and concurrent engineering principles. The course utilizes collaborative engineering by team development of an engineering project, often a research oriented proof-of-concept prototype. Prereq: permission. Lab.

### **ECE 781 - Physical Instrumentation**

**Credits:** 4.00

Analysis and design of instrumentation systems. Sensors, circuits, and devices for measurement and control. Elements of probability and statistics as applied to instrument design and data analysis. Transmission, display, storage, and processing of information. The design, implementation, testing, and evaluation of a relevant instrument system is an integral part of the course. Prereq: ECE 651. Lab.

### **ECE 784 - Biomedical Instrumentation**

**Credits:** 4.00

Principles of physiological and biological instrumentation design including transducers, signal conditioning, recording equipment, and patient safety. Laboratory includes the design and use of instrumentation for monitoring of electrocardiogram, electromyogram, electroencephalogram, pulse, and temperature. Current research topics, such as biotelemetry, ultrasonic diagnosis, and computer applications. Prereq: ECE 651. Lab.

### **ECE 791 - Senior Project I**

**Credits:** 2.00

First semester of the capstone design experience. Students develop project plans, and prepare and present written and oral project proposals. The project plans must include aspects of design, implementation and evaluation. At the end of the semester, students prepare a written progress report. Prereq: ECE 694; ECE senior standing.

### **ECE 791H - Senior Honors Project I**

**Credits:** 4.00

First semester of the capstone honors senior thesis research. Students develop research plans, prepare and present written and oral research proposals. The research plans must include aspects of design, implementation and evaluation, similar to ECE 791. However, honors thesis research must also include independent research beyond the normal scope of ECE 791. At the end of the semester students prepare a written progress report. Prereq: ECE 694; ECE senior standing. Writing intensive.

### **ECE 792 - Senior Project II**

**Credits:** 2.00

This course requires the completion of the capstone design experience begun in ECE 791. At the end of the semester students prepare written final project reports, and present their results in a research poster session. Prereq: ECE 791. Writing intensive.

### **ECE 792H - Senior Honors Project II**

**Credits:** 4.00

This course requires the completion of the capstone honors thesis research begun in ECE 791H. At the end of the semester students prepare honors theses, and present their research results in a research poster session. ECE 791H/792H fulfills the requirement of one professional elective. Prereq: ECE 791H. Writing intensive.

### **ECE 795 - Electrical and Computer Engineering Projects**

**Credits:** 1.00 to 4.00

Laboratory course. Student undertakes a project of mutual interest with an ECE faculty advisor. A written final report must be filed with the ECE Department. Prereq: permission.

### **ECE 796 - Special Topics**

**Credits:** 1.00 to 4.00

New or specialized courses and/or independent study. Prereq: permission. 1 to 4 credits some sections may use credit/fail grading.

## Engineering Technology

### **ET 601 - Data Structures and Data Bases**

**Credits:** 4.00

A brief review of fundamental container classes; stacks, queues and link lists followed by more advanced data structures and concepts using search algorithms, iterators, and efficiency indicators. The second part of the course will include the development and use of relational databases using a commercial database engine. Java console applications and minimal Graphic User Interface applications will be used throughout the course to develop and test concepts.

### **ET 625 - Technical Communications**

**Credits:** 4.00

Designed to improve students' capabilities to prepare and present technical information in written and oral form and through electronic means. ET majors should take this course early in their program of study so that proficiencies developed can be utilized in later courses. (Also listed as ENGL 502.) Writing intensive.

### **ET 630 - Analytical Methods in Engineering Technology**

**Credits:** 4.00

Review of college-level mathematics including differential and integral calculus with applications and advanced topics, e.g., Fourier analysis, Laplace transform technique, and probability and statistics. Prereq: engineering technology majors only.

### **ET 639 - Heating, Ventilation and Air Conditioning I**

**Credits:** 4.00

First in a two course sequence designed to familiarize the student with the design and operation of fluid thermal systems with specific applications in the heating, ventilating, and air conditioning of occupied spaces and some reference to industrial process control. Prereq: thermodynamics, calculus, or permission. Lab. Special fee.

### **ET 640 - Heating, Ventilation and Air Conditioning II**

**Credits:** 4.00

Second in a two course series designed to acquaint the student with the fundamentals of fluid thermal system design with specific topics in solar loads on buildings, air conditioning system requirements, pump and fan selection, piping and duct system design, and an introduction to controls. Prereq: ET 639 or permission. Lab. Special fee.

### **ET 641 - Production Systems**

**Credits:** 4.00

Market forecasting; waiting line theory; manufacturing inventories and their control; production scheduling; quality control. Prereq: differential and integral calculus.

### **ET 644 - Mechanical Engineering Technology Concepts in Analysis and Design**

**Credits:** 4.00

Kinematics, kinetics, work and energy, fluids, heat transfer; application of these concepts to problems in mechanical design. Prereq: strength of materials and dynamics and ET 637.

### **ET 647 - Advanced Perspectives on Programming**

**Credits:** 4.00

Several programming languages will be selected for study and analysis. Students will gain knowledge

regarding the languages studied and conduct analysis related to comparisons and divergence in capabilities. Prereq: intermediate programming skills in three or more programming languages. Major suggested languages of interest are: Java, C++, Visual Basic, Visual C++ Windows, Visual Basic.Net and C# or permission.

### **ET 655 - Engineering Tech Seminar Series**

**Credits:** 1.00

Five talks will be given that introduce the ET student to the softer issues of technology. Talks will be given in the areas of Ethics, Diversity, Lifelong Learning, Functioning in technical teams, and the importance of timeliness, scheduling and product improvement. For the most part talks are given by outside industrial personnel dealing in these specific areas. Students are required to write a short paper on three of the five topic areas. Class discussion of each talk takes place during regular class time. No prerequisites.

### **ET 671 - Digital Systems**

**Credits:** 4.00

Digital systems design and application using TTL and CMOS devices, design of systems, and interfacing. Digital design project required. Prereq: introductory digital design. Special fee. Lab.

### **ET 674 - Control Systems and Components**

**Credits:** 4.00

Topics include linear systems analysis, the Laplace transform and its properties, controllers, root locus technique, transient response analysis, first- and second-order systems, error analysis, and control system design. Prereq: differential and integral calculus. Lab.

### **ET 675 - Electrical Technology**

**Credits:** 4.00

Electrical circuits: DC and AC network analysis, power factors, transformers, power supplies. Electronic circuits--diodes, transistors and operational amplifiers. Digital circuits and introduction to computer-aided engineering. Prereq: differential and integral calculus. Lab

### **ET 677 - Analog Systems**

**Credits:** 4.00

Operational amplifiers. Transducers and measurement systems. Frequency response. Grounding and shielding. Signal and power interfacing techniques. Design project. Prereq: intro. analog design. Special fee. Lab.

### **ET 680 - Communications and Fields**

**Credits:** 4.00

Topics include Fourier series analysis; the Fourier transform and its properties; convolution; correlation including PN sequences; modulation theory; encoding and decoding of digital data (NRZ-M, NRZ-S, RZ, Biphase-L, and Manchester); antennas and antenna pattern; Radar Range Equation; and an introduction to information theory. Prereq: differential and integral calculus. Lab.

### **ET 695 - Independent Study**

**Credits:** 1.00 to 4.00

Individual reading, writing, or laboratory work carried out under the tutelage of a faculty member. Prereq: approval of the adviser. May be repeated up to a maximum of 4 credits.

### **ET 696 - Topics in Mechanical Engineering**

**Credits:** 1.00 to 4.00

New or specialized courses not covered in regular course offerings. Prereq: permission. May be repeated to a maximum of 4 credits.

### **ET 697 - Topics in Electrical Engineering Technology**

**Credits:** 1.00 to 4.00

New or specialized courses not covered in regular course offerings. Prereq: permission. May be repeated for a maximum of 4 credits.

### **ET 706 - Internship**

**Credits:** 1.00 to 4.00

On-the-job skill development through fieldwork in industry. Normally, supervision is provided by a qualified individual in the organization with consultation by a faculty sponsor. Written report required. Internships may be part or full time, with course credits assigned accordingly. May be repeated to a maximum of 4 credits. Credit/Fail.

### **ET 707 - Object Oriented Design and Documentation**

**Credits:** 4.00

Current design techniques and strategies, including State Transition Diagrams (STD) and United Modeling Language (UML), provide the core of the course. Case studies of large programming projects will be developed. Group programming projects will be completed based upon case studies. Prereq: intermediate programming skills in one or more of the following OOP language: Java, C\_, Visual C++ Windows, Visual Basic.Net and C# or by permission.

### **ET 717 - Network Security**

**Credits:** 4.00

The technical, operational, and managerial issues of computer systems and network security in an operational environment. Addresses the threats to computer security including schemes for breaking security, and techniques for detecting and preventing security violations. Emphasis on instituting safeguards, examining different types of security systems, and applying the appropriate level of security for the perceived risk. Prereq: Java programming.

### **ET 733 - Business Organization and Law**

**Credits:** 4.00

Corporations; proprietorships; product liability; contracts; federal agencies; commercial paper; conditions of employment; business ethics; bankruptcy; U.C.C. Special fee. Writing intensive.

### **ET 734 - Economics of Business Activities**

**Credits:** 4.00

Elementary financial accounting; compound interest and time value of money; sources of capital; cost estimating; depreciation; risk and insurance; personal finance. Prereq: differential and integral calculus. Special fee.

### **ET 751 - Mechanical Engineering Technology Project**

**Credits:** 4.00 or 8.00

Students are required to find solutions to actual technological problems in design, fabrication, and testing as posed by industry. Students define the problem, prepare a budget, and work with the client company to research, design, build, and test the software and/or hardware needed. Prereq: senior standing in E.T. A year-long course: 4 credits per semester; an IA grade (continuous course) given at the end of first semester. Withdrawal from course results in loss of credit.

### **ET 762 - Illumination Engineering**

**Credits:** 4.00

Radiation; spectra, wave, and particle nature of light; physics of light production, light sources and circuits, luminaries; science of seeing, color theory, control of light, measurements, light and health, lighting calculations. Prereq: MATH 426, PHYS 408 or equivalent. Lab.



### **ET 777 - Advanced Distributed Programming Trends**

**Credits:** 4.00

Distributed applications use a network or the Internet in a multi-tier architecture to distribute their presentation services, business logic, and data services. These applications often access many different data sources. The components contained in these applications typically participate in transactions and they can be shared by multiple users and multiple applications. Prereq: ET 647 or by permission.

### **ET #787 - Artificial Intelligence and Expert Systems**

**Credits:** 4.00

How to identify what an expert system is, and what an artificially intelligent system would be, if AI (artificial intelligence) actually existed beyond theory. Course explores some of the pitfalls that have plagued the AI community, such as why parallel processing has not provided the solution to bring theory to reality. Includes history behind AI, including connections to the human brain. Students create a mini expert system. Prereq: senior standing or by permission.

### **ET 788 - Introduction to Digital Signal Processing**

**Credits:** 4.00

This course will deal with the topics of spectral representation of periodic and non-periodic analog signals followed by discrete sampling and aliasing and how it relates to Nyquist sampling theorem. The z-transform will be introduced as the required mathematical tool along with an introduction to MATLAB and its associated DSP tool box. Spectral analysis of digital signal will be accomplished using these tools. Convolution and digital filtering will also be covered. Lab. Prereq: ET 680 Communications and Fields or equivalent.

### **ET 790 - Microcomputer Technology**

**Credits:** 4.00

Microcomputer systems design, including assembly language, interfacing, processor timing and loading, and inter-processor communications via local area networks. Hardware, software, and architecture of both Intel 80X86 and Motorola 68XX0 microprocessors. Microcomputer applications with emphasis on lab work using Motorola HClI microcontroller. Prereq: ET 671. Special fee. Lab.

### **ET 791 - Electrical Engineering Technology Project**

**Credits:** 4.00 or 8.00

Students are required to find solutions to actual technological problems in design, fabrication, and testing, as posed by industry. Students define the problem, prepare a budget, and work with the client company to research, design, build, and test the software and/or hardware needed. Prereq: senior standing in E.T. Special fee. A year-long course: an IA grade (continuous course) given at end of first semester. Withdrawal from course results in loss of credit.

## UNHM Associate Degree English

### **ENG 301 - Introduction to College Composition and Reading**

**Credits:** 4.00

Introduces students to academic standards of writing and reading at the college level through a variety of reading and writing tasks utilizing reflection, review and revision. Designed as a preparatory course for ENGL 401. Students are required to meet individually with instructors outside of class. May not be taken for credit toward a Bachelor's Degree. Special fee.

### **ENG 301A - Introduction to College Composition and Reading for ESL Students**

**Credits:** 4.00

Introduces ESL/ESOL students to standards of academic English in listening, speaking, reading, and writing. Strengthens vocabulary and grammar skills. Designed as a preparatory course for ENGL 400. May not be taken for credit toward a Bachelor's Degree.

## English

### **ENGL 400 - English as a Second Language**

**Credits:** 1.00 to 16.00

Improves the competence of foreign students in listening comprehension, speaking, reading, and writing. Recommended as preparation for ENGL 401. May be repeated up to a total of 16 credits. Writing intensive. Cr/F.

### **ENGL 400A - Academic English for ESL**

**Credits:** 4.00

Preparation for the reading, writing, and speaking assignments that students encounter in academic courses. Students complete reading, writing, and speaking assignments every week, with close guidance from the instructor. In addition to the time they spend in class, students also have frequent individual conferences with the instructor. No more than 16 combined credits for ENGL 400 and ENGL 400A may be counted toward a UNH degree. Special fee. Writing intensive.

### **ENGL 401 - First-Year Writing**

**Credits:** 4.00

Training to write more skillfully and to read with more appreciation and discernment. Frequent individual conferences for every student. Special fee. Writing intensive.

### **ENGL 401A - First-Year Writing for English as a Second Language Students**

**Credits:** 4.00

A special section of first-year writing for students whose native language is not English. Training to write more skillfully and to read with more appreciation and discernment, with special attention to the problems of non-native speakers of English. Supplemental work on listening and speaking as necessary. Frequent individual conferences for every student. Students may not take both ENGL 401 and ENGL 401A for credit. Special fee. Writing intensive.

### **ENGL 401H - Honors/First-Year Writing**

**Credits:** 4.00

Training to write more skillfully and to read with more appreciation and discernment. Frequent individual conferences for every student. Special fee. Writing intensive.

### **ENGL 402 - Introduction to Literature for English as a Second Language**

**Credits:** 4.00

The art of thoughtfully enjoying major literary works. This course is intended for students who are participating in the ESL program. Permission required of instructor.

### **ENGL 403 - Exploring Literature**

**Credits:** 4.00

The art of thoughtfully enjoying major literary works.

### **ENGL 403A - Introduction to the Study of Literature for ESL**

**Credits:** 4.00

The art of thoughtfully enjoying major literary works. This course is intended for students who are participating in the ESL program. Permission required of instructor.

### **ENGL 403W - Exploring Literature**

**Credits:** 4.00

The art of thoughtfully enjoying major literary works. Writing intensive.

### **ENGL 405 - Introduction to Linguistics**

**Credits:** 4.00

Overview of the study of language: universal properties of human language, Chomsky's innateness of hypothesis, language acquisition in children, dialects and language variation, language change. Includes introduction to modern grammar (phonology, syntax, semantics) and to scientific linguistic methodology. (Also offered as LING 405.)

### **ENGL 405H - Honors/Introduction to Linguistics**

**Credits:** 4.00

Overview of the study of language: universal properties of human language, Chomsky's innateness of hypothesis, language acquisition in children, dialects and language variation, language change. Includes introduction to modern grammar (phonology, syntax, semantics) and to scientific linguistic methodology. (Also offered as LING 405.)

### **ENGL 419 - Introduction to Literary Analysis**

**Credits:** 4.00

Critical analysis of fiction, poetry, and drama. Frequent short papers. This course is a prerequisite with a minimum grade of C for those intending to declare one of the four majors offered in the English Department. Writing intensive.

### **ENGL 419H - Honors/Introduction to Literary Analysis**

**Credits:** 4.00

Critical analysis of fiction, poetry, and drama. Frequent short papers. This course is a prerequisite with a minimum grade of C for those intending to declare one of the four majors offered in the English Department. Writing intensive.

### **ENGL 444D - Irish Identity**

**Credits:** 4.00

Explores the historical causes and literary effects of emigration from Ireland to other regions in the North and South Atlantic. Considers the political and economic conditions of Ireland itself and asks how Irish identities are first formed dialectically through contact with indigenous others and then nostalgically constituted through the experience of migration. Writing intensive.

### **ENGL #444E - Lions and Tigers and Books**

**Credits:** 4.00

Course asks students to consider their personal experience of the relationship between humans and animals in the light of theoretical investigations from the fields of biology, psychology, philosophy, literature, and the arts. Students read fundamental cultural texts (Darwin, Freud, the Bible) and great literary works (Moby Dick, "The Metamorphosis"), in combination with influential contemporary works (Peter Singer, Animal Liberation) and popular nonfiction works that offer a multidisciplinary view of human history and identity. Appropriate for students with ambitions in scientific fields who maintain a strong interest in the liberal arts. Writing intensive.

### **ENGL 444F - Language Matters in America**

**Credits:** 4.00

Students engage in active research to understand how we use language to construct and interpret identity. Linguistic patterns typical of groups of various types (regional, ethnic, gender, age, communities of shared practice, etc.) are explored as are issues related to education, language use in politics and marketing, ESL, ASL, and African-American English. Course engages students in inquiry-based learning: determining what questions are important in the field, figuring out how to find answers, pursuing these answers, and

interpreting what you find out, following established practices in the social sciences. Writing intensive. (Also listed as LING 444F.)

### **ENGL 444G - Ethnic America: Readings in African American, Asian American, Native American, and Latino/a Litera**

**Credits:** 4.00

This course introduces students to literature by and about African Americans, Asian Americans, Natives, and Latino/as. It introduces approaches in American Studies that will guide students in understanding and appreciating what we call ethnic literature. Secondary sources might include readings in and about ideological criticism, historical analysis, race and ethnic studies, multicultural education, formal narrative, and genre analysis. Writing intensive.

### **ENGL #444J - America on Film**

**Credits:** 4.00

Explores cinematic images of American culture, in particular that of Hollywood cinema, looking closely at representations of race, class, gender, sexuality, and nation. Also examines the medium of cinema itself, particularly aspects of film form, apparatus/technology, economy, and spectatorship. Students are required to attend weekly film screening labs in addition to classes. This course is Blackboard intensive. Special fee. Writing intensive.

### **ENGL 444K - People Stories: Investigating Identity as Literary Construction**

**Credits:** 4.00

Plato's Republic, Shakespeare's As You Like It, Thoreau's Walden, Narrative of Frederick Douglass, Austen's Mansfield Park, Palahniuk's Fight Club, Eugenides' Middlesex, Satrapi's Persepolis, Hall's Without a Map, poetry, and seminar texts in criticism are read as we complicate our notions of what shapes identity across time, race, cultures, genders, economic statuses, and through the media of dialogue, novel, drama, poetry, graphic novel, and memoir. Writing intensive.

### **ENGL 444M - Food and Class: America's Food Industry and the (Im)migrant Worker**

**Credits:** 4.00

Students explore the implications of food production and labor in the US through the stories artists and writers have given us, specifically, those of migrant and immigrant food workers. Texts include Fast Food Nation, The Jungle, The Grapes of Wrath and Diary of an Undocumented Immigrant. Through writing, close reading, and collaboration, students map a path of inquiry for their study, culminating in one research and one multi-media project. Field trips to a local farm, the Dreams of Freedom Museum, and New York over spring break. Writing intensive.

### **ENGL 501 - Introduction to Creative Nonfiction**

**Credits:** 4.00

A writing course that explores types of creative nonfiction such as nature writing, the profile, the memoir, and the personal essay. Extensive reading of contemporary authors to study the sources and techniques used in creative nonfiction. Regular papers, conferences, and workshops. Special fee. Writing intensive.

### **ENGL 501H - Honors/Introduction to Creative Nonfiction**

**Credits:** 4.00

A writing course that explores types of creative nonfiction such as nature writing, the profile, the memoir, and the personal essay. Extensive reading of contemporary authors to study the sources and techniques used in creative nonfiction. Regular papers, conferences, and workshops. Special fee. Writing intensive.

### **ENGL 502 - Professional and Technical Writing**

**Credits:** 4.00

A writing course introducing students to the effective communication of technical information through

various workplace documents including resumes, memos, business letters, reports, brochures, etc. Special emphasis on an introduction to professional conventions and genres and to the transferable skills of rhetorical and audience analysis, document design and collaborative work. Special fee. Writing intensive.

### **ENGL 502H - Honors/Technical Writing**

**Credits:** 4.00

A writing course introducing students to the effective communication of technical information through various workplace documents including resumes, memos, business letters, reports, brochures, etc. Special emphasis on an introduction to professional conventions and genres and to the transferable skills of rhetorical and audience analysis, document design and collaborative work. Special fee. Prereq: permission. Writing intensive.

### **ENGL 503 - Persuasive Writing**

**Credits:** 4.00

Writing of all types of persuasive nonfiction prose, including argumentative essays and position papers. Special attention to argumentative structures and analysis of audiences. Weekly papers of varying lengths and formats, frequent conferences. Special fee. Writing intensive.

### **ENGL 511 - Major Writers in English**

**Credits:** 4.00

In-depth study and discussion of a few American and/or British writers. Topics and approaches vary depending on instructors. May be repeated for credit, barring duplication of topic. Writing intensive.

### **ENGL 512 - Survey of British Literature I**

**Credits:** 4.00

Selected works in poetry and prose considered in chronological order and historical context. Attention to the works and to the ideas and tastes of their periods. Anglo-Saxons to the Elizabethans. Writing intensive.

### **ENGL 513 - Survey of British Literature II**

**Credits:** 4.00

Selected works in poetry and prose considered in chronological order and historical context. Attention to the works and to the ideas and tastes of their periods. The Stuart Monarchy to the Age of Enlightenment. Writing intensive.

### **ENGL 513H - Honors/Survey of British Literature II**

**Credits:** 4.00

Selected works in poetry and prose considered in chronological order and historical context. Attention to the works and to the ideas and tastes of their periods. The Stuart Monarchy to the Age of Enlightenment. Writing intensive.

### **ENGL 514 - Survey of British Literature**

**Credits:** 4.00

Selected works in poetry and prose considered in chronological order and historical context. Attention to the works and to the ideas and tastes of their periods. 1800 to the present.

### **ENGL 514H - Honors/Survey of British Literature**

**Credits:** 4.00

Selected works in poetry and prose considered in chronological order and historical context. Attention to the works and to the ideas and tastes of their periods. 1800 to the present. Writing intensive.

### **ENGL 514W - Survey of British Literature**

**Credits:** 4.00

Selected works in poetry and prose considered in chronological order and historical context. Attention to the works and to the ideas and tastes of their periods. 1800 to the present. Writing intensive.

**ENGL 515 - Survey of American Literature**

**Credits:** 4.00

From the beginning of American literature to the Civil War.

**ENGL 515H - Honors/Survey of American Literature**

**Credits:** 4.00

From the beginning of American literature to the Civil War. Writing intensive.

**ENGL 515W - Survey of American Literature**

**Credits:** 4.00

From the beginning of American literature to the Civil War. Writing intensive.

**ENGL 516 - Survey of American Literature**

**Credits:** 4.00

From the Civil War to the present. Writing intensive.

**ENGL 516H - Honors/Survey of American Literature**

**Credits:** 4.00

From the Civil War to the present. Writing intensive.

**ENGL 517 - Introduction to African American Literature and Culture**

**Credits:** 4.00

An introduction to African American literature in the context of a variety of cultural perspectives. Course topics may include major writers, literary genres, historical periods, Harlem Renaissance, Black Arts Movement, fine and folk arts, religion, music, and film. (Also offered as AMST 502.) Writing intensive.

**ENGL 517H - Honors/Introduction to African American Literature and Culture**

**Credits:** 4.00

An introduction to African American literature in the context of a variety of cultural perspectives. Course topics may include major writers, literary genres, historical periods, Harlem Renaissance, Black Arts Movement, fine and folk arts, religion, music, and film. (Also offered as AMST 502.) Writing intensive.

**ENGL 518 - Bible as Literature**

**Credits:** 4.00

Literature of the Old and New Testaments and the Apocrypha, primarily in the King James version.

**ENGL 518H - Honors/Bible as Literature**

**Credits:** 4.00

Literature of the Old and New Testaments and the Apocrypha, primarily in the King James version. Writing intensive.

**ENGL 518W - Bible as Literature**

**Credits:** 4.00

Literature of the Old and New Testaments and the Apocrypha, primarily in the King James version. Writing intensive.

**ENGL 520 - Literature and the History of Ideas**

**Credits:** 4.00

This online course highlights an array of distinguished achievement in short fiction. Our survey of short stories and novellas spans historical periods and national literatures. Together these stories offer a

context for literary terms, subgenres, and historical contexts, as well as diverse opportunities for close-reading. Writing assignments (blog posts and a range of analytical and creative writing options) will enable further investigations of these perennial and new classics.

### **ENGL 521 - Nature Writers**

**Credits:** 4.00

Fiction, poetry, and nonfiction books on the natural environment. Such books as Thoreau's *Walden* or *Maine Woods*, Leopold's *Sand County Almanac*, Boston's *Outermost House*, Dillard's *Pilgrim at Tinker Creek*--books by naturalists who observe nature vividly and knowingly and who write out of their concern for the environment. Writing intensive.

### **ENGL 521H - Honors/Nature Writers**

**Credits:** 4.00

Fiction, poetry, and nonfiction books on the natural environment. Such books as Thoreau's *Walden* or *Maine Woods*, Leopold's *Sand County Almanac*, Boston's *Outermost House*, Dillard's *Pilgrim at Tinker Creek*--books by naturalists who observe nature vividly and knowingly and who write out of their concern for the environment. Writing intensive.

### **ENGL 522 - American Literary Folklore**

**Credits:** 4.00

Folktales, songs, proverbs, beliefs, superstitions, and their use by such American authors as Irving, Hawthorne, Longfellow, Melville, Thoreau, Twain, Frost, and Faulkner; some emphasis on oral folk culture of New Hampshire. Writing intensive.

### **ENGL 524 - Heroes and Scoundrels: Journalism in the Movies and Print**

**Credits:** 4.00

*Heroes and Scoundrels: The Image of the Journalist in Popular Culture* - This course considers how journalists have been portrayed in popular films and/or TV shows and/or novels, examining how these portrayals reflect society's expectations of and concerns about the media. Course introduces students to ethical dilemmas journalists face and discuss the role of a free press in a democracy.

### **ENGL #525 - Popular Culture in America**

**Credits:** 4.00

Cultural expression in popular media. Verbal acts (best sellers, magazines, newspapers, speeches); some attention to television, film, comics, popular music. The multidisciplinary approach deals with historical context, cultural institutions, and distinction between "popular arts" and "great literature." Recurrent images, situations, and themes are investigated to see what values are celebrated and what fears revealed. Writing intensive.

### **ENGL 526 - Beginning Fiction Writing: From Personal Experience to Fiction**

**Credits:** 4.00

Introduction to aspects of fiction writing.: Specific detail, description, point of view, tense, dialogue, the arc of the story, showing versus telling, structure, and an understanding of how voice and language can be powerful tools in constructing a story. As writers learn to shape their personal experiences into narratives, fictional aspects will be nudged forward. Frequent in class exercises, reading responses and revisions. Prereq: ENGL 401. Special fee. Writing intensive.

### **ENGL 527 - Introduction to Poetry Writing**

**Credits:** 4.00

Workshop in the fundamental techniques of poetry writing. Class discussion and criticism of poems written by students. Individual conferences with instructor. Prereq: ENGL 401 with a grade of B or better, or equivalent. Special fee. Writing intensive.



### **ENGL 530 - Introduction to Poetry**

**Credits:** 4.00

American and British poetry. Various poetic techniques and their demonstration. See course descriptions available in department office for further information. (Not offered each semester.) Writing intensive.

### **ENGL 531 - Introduction to Drama**

**Credits:** 4.00

Introduction to the art of drama, through study of British and American plays, as well as plays translated from other languages. How to read a play. Live and filmed performances studied as available. See course descriptions available in department office for further information. (Not offered each semester.) Writing intensive.

### **ENGL #532 - Introduction to Fiction**

**Credits:** 4.00

Introduction to the art of fiction, through the study of British and American novels and/or short stories, as well as prose fiction translated from other languages. Exploration of the ways in which fiction communicates its meanings. See course descriptions available in department office for further information. (Not offered each semester.) Writing intensive.

### **ENGL 533 - Introduction to Film Studies**

**Credits:** 4.00

A survey of the international development of the motion picture from the silent period to the present, emphasizing film's narrative practices. Introduces students to the study of the art, history, technology, economics, and theory of cinema. Films and film makers of various nations, periods, movements, and genres examined. Mandatory weekly screenings in addition to class. Students cannot receive credit for both ENGL 533 and CMN 550. Special fee.

### **ENGL 533H - Honors/Introduction to Film Studies**

**Credits:** 4.00

A survey of the international development of the motion picture from the silent period to the present, emphasizing film's narrative practices. Introduces students to the study of the art, history, technology, economics, and theory of cinema. Films and film makers of various nations, periods, movements, and genres examined. Mandatory weekly screenings in addition to class. Students cannot receive credit for both ENGL 533 and CMN 550. Special fee. Writing intensive.

### **ENGL 533W - Introduction to Film Studies**

**Credits:** 4.00

A survey of the international development of the motion picture from the silent period to the present, emphasizing film's narrative practices. Introduces students to the study of the art, history, technology, economics, and theory of cinema. Films and film makers of various nations, periods, movements, and genres examined. Mandatory weekly screenings in addition to class. Students cannot receive credit for both ENGL 533 and CMN 550. Special fee. Writing intensive.

### **ENGL 535 - Introduction to Drama (C)**

**Credits:** 4.00

Introduction to the art of drama, through study of British and American plays, as well as plays translated from other languages. How to read a play. Live and filmed performances studied as available. See course descriptions available in department office for further information. This course is not Writing intensive. Summer only.

### **ENGL #540 - Introduction to Native American Studies**

**Credits: 4.00**

Introduces the major critical and research methods in Native American literature, history, and culture. Course topics may include literary genres, historical periods, a focus on one particular tribe or culture area, art, and film. (Also offered as AMST 503.)

**ENGL 550 - Introduction to the Literature and Culture of Race****Credits: 4.00**

This course introduces students to readings across the field of ethnic literature and culture in order to form their capacity to speak and think critically about race relations in America. Readings will include those in race theory, racial construction and authenticity, histories of raced subjects in America, the rise of ethnic studies, white ignorance and whiteness studies, the intersectionality of race with gender, sexual orientation, economic class, religion, and faith. Includes Asian American, African American, Native, and Latino/a literature. Writing intensive.

**ENGL 555 - Introduction to Irish Studies****Credits: 4.00**

Introduces the history, literature, and politics of Modern Ireland from the perspective of the central problem in Irish culture: the legacy of both British and Gaelic traditions in the construction of Irish identity. Events covered include the Great Famine, the Irish Revival, and the "Troubles" in Northern Ireland. Authors studied may include Gaelic bards in translation, Swift, Goldsmith, Burke, Edgewood, Stoker, Wilde, Yeats, Joyce, Lady Gregory, Heaney, Friel, McCourt, and Ni Dhomhnaill. Writing intensive

**ENGL 555H - Honors/Intro to Irish Studies****Credits: 4.00**

Introduces the history, literature, and politics of Modern Ireland from the perspective of the central problem in Irish culture: the legacy of both British and Gaelic traditions in the construction of Irish identity. Events covered include the Great Famine, the Irish Revival, and the "Troubles" in Northern Ireland. Authors studied may include Gaelic bards in translation, Swift, Goldsmith, Burke, Edgewood, Stoker, Wilde, Yeats, Joyce, Lady Gregory, Heaney, Friel, McCourt, and Ni Dhomhnaill. Writing intensive

**ENGL 575 - Sex and Sensibility: The Rise of Chick Lit from Jane Austen to Bridget Jones****Credits: 4.00**

This course focuses on the novel of manners, a literary tradition that began in the nineteenth century, but enjoys widespread popularity in the contemporary phenomenon dubbed as "chick lit". We will survey how this qualitative sociology negotiates the interplay between romantic and economic concerns. Texts may include works by major writers of this subgenre, e.g. Jane Austen, Edith Wharton, and Evelyn Waugh, as well as new incarnations like 'Bridget Jones Diary' and 'Sex and the City'.

**ENGL 581 - Introduction to Postcolonial Literatures in English****Credits: 4.00**

Survey of contemporary Asian, African, and Caribbean fiction, drama, travelogues, essays, and poetry from the 1950s to the present. Introduces political, historical, and cultural contexts within which these forms are produced. Writing intensive.

**ENGL 581H - Honors/Introduction to Postcolonial Literatures in English****Credits: 4.00**

Survey of contemporary Asian, African, and Caribbean fiction, drama, travelogues, essays, and poetry from the 1950s to the present. Introduces political, historical, and cultural contexts within which these forms are produced. Writing intensive.

**ENGL 585 - Introduction to Women in Literature****Credits: 4.00**

Survey of images of women in literature. Context and approach vary depending on instructor. Writing intensive.

### **ENGL 585H - Honors/Introduction to Women in Literature**

**Credits:** 4.00

Survey of images of women in literature. Context and approach vary depending on instructor. Writing intensive.

### **ENGL 586 - Introduction to Women Writers**

**Credits:** 4.00

Survey of women writers. Content and approach vary depending on instructor. Writing intensive.

### **ENGL 586H - Honors/Introduction to Women Writers**

**Credits:** 4.00

Survey of women writers. Content and approach vary depending on instructor. Writing intensive.

### **ENGL 595 - Literary Topics**

**Credits:** 1.00 to 4.00

Various faculty members investigate topics of special interest at a level appropriate for non-majors. Past topics have included Irish literature, animals in literature, and literature of the Vietnam War. See department for details of current offerings. May be repeated for credit, barring duplication of topic. Writing intensive.

### **ENGL 595H - Honors/Literary Topics**

**Credits:** 1.00 to 4.00

Various faculty members investigate topics of special interest at a level appropriate for non-majors. Past topics have included Irish literature, animals in literature, and literature of the Vietnam War. See department for details of current offerings. May be repeated for credit, barring duplication of topic. Writing intensive.

### **ENGL 600 - English as a Second Language**

**Credits:** 1.00 to 16.00

Designed for foreign graduate students in their first semester at UNH to give them English language skills necessary for effective graduate work at the university. Includes work on listening skills (understanding lectures, note-taking, etc.), reading skills, the writing of research papers, the making of oral reports, and general study skills, with work on grammar and pronunciation for those who need it. Credits may not be used to fulfill minimum degree requirements of a graduate program. Prereq: graduate students only. May be repeated for a maximum of 16 credits. Cr/F.

### **ENGL 602 - Advanced Professional and Technical Writing**

**Credits:** 4.00

An advanced writing course focusing on writing in a global and technological workplace. In addition to fluency in the documents of the workplace, students focus on visual rhetoric in a technological environment through web design and usability while studying the issues of globalism, ethics, and the environment that affect all professional writing today. Writing intensive.

### **ENGL 605 - Intermediate Linguistic Analysis**

**Credits:** 4.00

Introduces analysis methods and problem solving in phonology, morphology, and syntax using data from many languages. Emphasis will be both practical (learning how to describe the grammar and sound system of a language) and theoretical (understanding languages' behavior). Prereq: ENGL/LING 405, or permission. (Also offered as LING 605.)

## **ENGL 609 - Ethnicity in America: The African American Experience in the 20th Century**

**Credits:** 4.00

Investigation of the music, literature, and social history of African American America in the period of the Harlem Renaissance, in the Great Depression, World War II, and in the 1960s. Special attention to the theme of accommodation with and rejection of dominant white culture. (Also offered as AMST 609, HUMA 609.) Writing intensive.

## **ENGL 610 - Regional Studies in America: New England Culture in Changing Times**

**Credits:** 4.00

Team-taught course investigating some of the major contributions New England has made to American life. Focusing on three periods: the Puritan era, 1620-90; the Transcendental period, 1830-60; and the period of emerging industrialism in the late 19th century. (Also offered as AMST 610, ARTS 610, HIST 610, and HUMA 610.) Not for art studio major credit. Writing intensive.

## **ENGL 610H - Honors/Regional Studies in America: New England Culture in Changing Times**

**Credits:** 4.00

Team-taught course investigating some of the major contributions New England has made to American life. Focusing on three periods: the Puritan era, 1620-90; the Transcendental period, 1830-60; and the period of emerging industrialism in the late 19th century. (Also offered as AMST 610, ARTS 610, HIST 610, and HUMA 610.) Not for art studio major credit. Writing intensive.

## **ENGL 616 - Studies in Film**

**Credits:** 4.00

Advanced, focused study of the narrative, dramatic, and poetic practices of cinema, within one of four possible subject areas: A) Genre; B) Authorship; C) Culture and Ideology; D) Narrative and Style. Precise issues and methods may vary, ranging from general and specific considerations of how a given subject area involves film theory, criticism, and history, to its use in diverse analyses of selected national cinemas, periods, movements, and filmmakers. Barring duplication of any four of the subject areas, and/or duplication of material taken for credit in CMN 650, course may be repeated for credit. Detailed course descriptions available in English department office during pre-registration. Prereq: ENGL 533, or CMN 550. Special fee. Writing intensive.

## **ENGL 616A - Studies in Film/Genre**

**Credits:** 4.00

Advanced, focused study of the narrative, dramatic, and poetic practices of cinema, within one of four possible subject areas: A) Genre; B) Authorship; C) Culture and Ideology; D) Narrative and Style. Precise issues and methods may vary, ranging from general and specific considerations of how a given subject area involves film theory, criticism, and history, to its use in diverse analyses of selected national cinemas, periods, movements, and filmmakers. Barring duplication of any four of the subject areas, and/or duplication of material taken for credit in CMN 650, course may be repeated for credit. Detailed course descriptions available in English department office during pre-registration. Special fee. Writing intensive.

## **ENGL 616B - Studies in Film/Authorship**

**Credits:** 4.00

Advanced, focused study of the narrative, dramatic, and poetic practices of cinema, within one of four possible subject areas: A) Genre; B) Authorship; C) Culture and Ideology; D) Narrative and Style. Precise issues and methods may vary, ranging from general and specific considerations of how a given subject area involves film theory, criticism, and history, to its use in diverse analyses of selected national cinemas, periods, movements, and filmmakers. Barring duplication of any four of the subject areas, and/or duplication of material taken for credit in CMN 650, course may be repeated for credit. Detailed course descriptions available in English department office during pre-registration. Special fee. Writing intensive.

### **ENGL 616C - Studies in Film/Culture and Ideology**

**Credits:** 4.00

Advanced, focused study of the narrative, dramatic, and poetic practices of cinema, within one of four possible subject areas: A) Genre; B) Authorship; C) Culture and Ideology; D) Narrative and Style. Precise issues and methods may vary, ranging from general and specific considerations of how a given subject area involves film theory, criticism, and history, to its use in diverse analyses of selected national cinemas, periods, movements, and filmmakers. Barring duplication of any four of the subject areas, and/or duplication of material taken for credit in CMN 650, course may be repeated for credit. Detailed course descriptions available in English department office during pre-registration. Special fee. Writing intensive.

### **ENGL 616D - Studies in Film/Narrative and Style**

**Credits:** 4.00

Advanced, focused study of the narrative, dramatic, and poetic practices of cinema, within one of four possible subject areas: A) Genre; B) Authorship; C) Culture and Ideology; D) Narrative and Style. Precise issues and methods may vary, ranging from general and specific considerations of how a given subject area involves film theory, criticism, and history, to its use in diverse analyses of selected national cinemas, periods, movements, and filmmakers. Barring duplication of any four of the subject areas, and/or duplication of material taken for credit in CMN 650, course may be repeated for credit. Detailed course descriptions available in English department office during pre-registration. Special fee. Writing intensive.

### **ENGL 618 - Film Theory**

**Credits:** 4.00

Examines basic theories of film and their relationship to the practice of close analysis of film. Theories are meant to provide students with a vocabulary for critical analysis and stress the many ways of seeing film. Prereq: ENGL 533 or CMN 550.

### **ENGL 619 - Critical Approaches to Literature**

**Credits:** 4.00

Selected methods of literary criticism applied to fiction, poetry, and/or drama with critical approaches varying from year to year. A follow-up of 419 (previously 519), course provides a second semester of training in critical reading and writing, and examining such major modern strategies as formalist, biographical, archetypal, psychological, sociological, historical, feminist, and structuralist criticism. Prereq: ENGL 419 (previously 519) or equivalent. Writing intensive.

### **ENGL 620 - Applied Experience**

**Credits:** 1.00 to 4.00

English department majors who have an opportunity for appropriate career-oriented work experience may arrange with a faculty sponsor to add an academic component. The work must be related to the English major, and the employer must be an established organization approved by Career Services. Research and writing will be required in addition to the job experience. Registration requires permission of employer, faculty sponsor, major advisor, and department chairperson. This course does not count toward the English major. May be repeated with permission to a maximum of 8 credits. Cr/F.

### **ENGL 621 - Newswriting**

**Credits:** 4.00

Workshops to develop reporting and writing skills. Prereq: B or better in ENGL 501 or equivalent, and written permission of instructor. May be repeated for credit with approval of journalism director. Special fee. Writing intensive.

### **ENGL 622 - Advanced Newswriting**

**Credits:** 4.00

An intermediate-level workshop on alternative methods of newswriting and the basics of feature writing.

Students develop reporting skills while experimenting with styles and forms beyond the inverted pyramid. Prereq: B or better in ENGL 621 and written permission of instructor. Special fee. Writing intensive.

### **ENGL 623 - Creative Nonfiction**

**Credits:** 4.00

Intensive writing course emphasizing the blend of basic elements that constitute creative nonfiction: research, observation, and personal experience. Also readings and discussion of some of the best published creative nonfiction. Prereq: B or better in ENGL 501 and written permission of the instructor. May be repeated for credit with approval of the journalism director. Special fee. Writing intensive.

### **ENGL 625 - Intermediate Fiction Writing Workshop**

**Credits:** 4.00

Students continue to explore the aspects of fiction writing. Through short exercises students learn to create visual scenes, integrate exposition with dramatic scene, and construct convincing characters in believable situations. We'll continue to explore the basic elements of what makes a short story, such as point of view, dialogue, dramatization, voice, meaning, language. Students write short stories and significantly revise them. Through discussion of student writing in a workshop format, as well as reading and responding to short stories by published authors, we'll address the questions: What is a short story? How do we create a world in which the reader is fully involved? Where does the story evoke emotion or meaning? Prereq: ENGL 501 or ENGL 526 with a grade of B or better and instructor's permission. Note: ENGL 625 may be taken more than once for credit, especially with two different instructors. Students may repeat ENGL 625 up to a maximum of 8 credits. Special fee. Writing intensive.

### **ENGL 627 - Intermediate Poetry Writing Workshop**

**Credits:** 4.00

Workshop discussion of poems written by students, with focus on more complex techniques and forms. Individual conferences with instructor. Prereq: ENGL 527 with a B or better, or equivalent. Written permission of instructor required for registration. May be repeated for credit with the approval of the department chairperson. Special fee. Writing intensive.

### **ENGL 649 - Studies in British Literature and Culture**

**Credits:** 4.00

Special topics in British studies, varying from year to year. May be repeated for credit, barring duplication of topic. (Not offered every year.) Writing intensive.

### **ENGL 650 - Studies in American Literature and Culture**

**Credits:** 4.00

Special topics in American studies, varying from year to year. May be repeated for credit, barring duplication of topic. (Not offered every year.) Writing intensive.

### **ENGL 651 - Comparative Literature**

**Credits:** 4.00

Comparative studies of major authors representative of important periods of world literary achievement. Homer to Dante; common themes and the development of the epic tradition in early Western literature. Topics and approaches vary from semester to semester. Writing intensive

### **ENGL 652 - Comparative Literature**

**Credits:** 4.00

Comparative studies of major authors representative of important periods of world literary achievement. Renaissance to modern. Topics and approaches vary from semester to semester. Writing intensive.

### **ENGL 657 - Shakespeare**

**Credits: 4.00**

Ten major plays representative of the main periods of Shakespeare's career and the main types of drama which he wrote (tragedy, comedy, history). Live and filmed performances included as available. Restricted to undergraduates and designed for both English majors and students majoring in other fields. Writing intensive.

**ENGL 657H - Honors/Shakespeare****Credits: 4.00**

Ten major plays representative of the main periods of Shakespeare's career and the main types of drama which he wrote (tragedy, comedy, history). Live and filmed performances included as available. Restricted to undergraduates and designed for both English majors and students majoring in other fields. Writing intensive.

**ENGL 680 - Early British Drama****Credits: 4.00**

A survey of the development of British drama from the Middle Ages to the closing of the theatres in 1642.

**ENGL 681 - Introduction to African Literatures in English****Credits: 4.00**

In-depth study of writers, literary movements, political contexts, and historical pressures that have shaped and continue to shape African literatures in the colonial and postcolonial periods. Primary focus on Anglophone texts but possibly some literature in translation. Writing intensive.

**ENGL 685 - Women's Literary Traditions****Credits: 4.00**

Intensive study of themes, topics, and techniques in women's literature. Topics vary from year to year. May be repeated for credit, barring duplication of topic.

**ENGL 685W - Women's Literary Traditions****Credits: 4.00**

Intensive study of themes, topics, and techniques in women's literature. Topics vary from year to year. May be repeated for credit, barring duplication of topic. Writing intensive.

**ENGL 690 - Introduction to African American Literature in America****Credits: 4.00**

Selected prose, fiction, drama, and poetry. Individual works and historical-cultural background. Course varies from year to year. Writing intensive.

**ENGL 693 - Special Topics in Literature****Credits: 4.00**

A) Old English Literature, B) Medieval Literature, C) 16th Century, D) 17th Century, E) 18th Century, F) English Romantic Period, G) Victorian Period, H) 20th Century, I) Drama, J) Novel, K) Poetry, L) Nonfiction, M) American Literature, N) A Literary Problem, O) Literature of the Renaissance, R) Race and Racial Theories. The precise topics and methods of each section vary. Barring duplication of subject, course may be repeated for credit. For details, see course descriptions available in the English department. (Not offered every year.) Special fee on some topics. Writing intensive.

**ENGL 694 - Special Topics in Creative Writing****Credits: 4.00**

Courses offered under this number feature a variety of topics having to do with creative writing. Barring duplication of subject, course may be repeated for credit. For details, see the course descriptions available in the English Department. Writing intensive.

### **ENGL 701 - Advanced Fiction Writing Workshop**

**Credits:** 4.00

Students come to this course with a firm grasp of all the elements of fiction, ready to write short stories that construct convincing characters in believable situations. In a workshop format, students give and receive critiques on classmate's work. Significant revisions of short stories and thorough discussions of work by published authors will round out the course as students continue to explore the art of writing the short story. Students are responsible for leading discussion of published stories. Prereq: ENGL 625 with a grade of B or better and instructor's permission. Special fee. Writing intensive.

### **ENGL 703 - Advanced Nonfiction Writing**

**Credits:** 4.00

Workshop course for students intending to write publishable magazine articles or nonfiction books. Equal stress on research and writing techniques. Prereq: B or better in ENGL 722 and written permission of instructor. May be repeated for credit with approval of journalism director. Special fee. Writing intensive.

### **ENGL #704 - Advanced Nonfiction Writing**

**Credits:** 4.00

See description for ENGL 703. Special fee. Writing intensive.

### **ENGL 705 - Advanced Poetry Writing Workshop**

**Credits:** 4.00

Workshop discussion of advanced writing problems and submitted poems. Individual conferences with instructor. Prereq: ENGL 627, 628, or equivalent with a grade of B or better and written permission of the instructor. May be repeated for credit with the approval of the department chairperson. Special fee. Writing intensive.

### **ENGL #707 - Fiction: Form and Technique**

**Credits:** 4.00

A writer's view of the forms, techniques, and theories of fiction. The novels, short stories, and works of criticism studied vary, depending on the instructor. Writing intensive

### **ENGL #708 - Nonfiction: Form and Technique**

**Credits:** 4.00

A writer's view of contemporary nonfiction, emphasizing the choices the writer faces in the process of research writing. (Not offered every year.) Writing intensive.

### **ENGL #709 - Poetry: Form and Technique**

**Credits:** 4.00

A writer's view of the problems, traditions, and structures of poetry. Writing intensive.

### **ENGL 710 - Teaching Writing**

**Credits:** 1.00 to 6.00

This course will introduce you both to the theories and practices of teaching writing in middle and high school at a time of increased accountability. The course is designed for students who are interested in exploring teaching as a possible career. In the course we will try out varied literacy activities and study teaching writing using a process approach. We discuss different approaches to planning instruction and various forms of writing assessment, including state-wide tests. Open to juniors and seniors only. Writing intensive.

### **ENGL 711 - Editing**

**Credits:** 4.00

Emphasis on newspaper editing but principles applicable to magazine and book editing are also covered.



Prereq: B or better in ENGL 621 and written permission of instructor. Special fee. Writing intensive.

### **ENGL 715 - Teaching English as a Second Language: Theory and Methods**

**Credits:** 4.00

How linguistic, psychological, sociological, and neurological theory influence or even determine the choice methods of language teaching. Research on second language acquisition and bilingualism, language aptitude, and the cultural context of language acquisition. Introduction to standard and exotic methods of language teaching. Writing intensive.

### **ENGL 716 - Curriculum, Materials and Assessment in English as a Second Language**

**Credits:** 4.00

Study of the problems in designing an effective teaching program for various types of ESL students. Competence and aptitude testing; choosing and adapting materials for ESL classes. Writing intensive.

### **ENGL #717 - World Englishes**

**Credits:** 4.00

Study of the forms and functions of Englishes in various parts of the world and the linguistic, sociolinguistic, literary, pedagogical, and political implications of the worldwide spread of the language. Topics include language change, language policies, language and power, language and culture, language and identity, literary creativity, and linguistic imperialism. (Also listed as LING 717.) Writing intensive.

### **ENGL 718 - English Linguistics and Literature**

**Credits:** 4.00

Introduction to linguistics for students of literature. Includes a survey of the grammar of English (phonology, morphology, syntax, dialect variation, historical change) with applications to the analysis of the language of poetry and prose. (Not offered every year.) Writing intensive.

### **ENGL 719 - Sociolinguistics Survey**

**Credits:** 4.00

How language varies according to the characteristics of its speakers: age, sex, ethnicity, attitude, time, and class. Quantitative analysis methods; relationship to theoretical linguistics. Focus is on English, but some other languages are examined. Prereq: ENGL or LING 405 (previously numbered 505) or permission.

### **ENGL 720 - Journalism Internship**

**Credits:** 1.00 to 16.00

Students intending to pursue careers in journalism spend a semester working full or part time for a daily newspaper under close supervision of editors. Reporting is stressed, but students may do some editing as well. The number of internships is very limited. Prereq: ENGL 622 required; ENGL 722 recommended; permission. Writing intensive.

### **ENGL 721 - Advanced Reporting**

**Credits:** 4.00

While the theme of this course is teaching students advanced techniques of writing and reporting, each semester the course is offered it focuses on different areas of journalism. One semester, students may learn multimedia reporting - storytelling across multiple platforms, including video and audio - and in other semesters the course may focus on sportswriting. Yet in others, students will develop their news reporting skills. The course may be taken multiple times for credit with the approval of the Journalism Program Director. Prereq: 'B' or better in ENGL 621 and written permission of instructor. Special fee. Writing intensive.

### **ENGL 722 - Feature Writing**

**Credits:** 4.00

Students refine interviewing, reporting, and writing techniques. Emphasis on in-depth features. Prereq: B or better in ENGL 621 and 622, and written permission of instructor. Special fee. Writing intensive.

### **ENGL 723 - Issues in Journalism**

**Credits:** 4.00

This upper-level seminar focuses on the shifts in technology and public perception that are changing the definition of excellence in journalism. Special attention to legal and ethical issues reshaping journalism's public service role. Prereq: Grade of B in ENGL 621 and written permission. May be repeated once for credit with permission of the journalism director. Special fee. Writing intensive.

### **ENGL 724 - Sports Writing**

**Credits:** 4.00

This class immerses students in all aspects of professional sports writing. Using in-class and real-world assignments, the class exposes students to such practical applications as covering live events; feature writing; covering breaking news; column writing/blogging; and writing a running game story on a real-time deadline. Prereq: ENGL 621 Newswriting with a 'B' or better.

### **ENGL 725 - Seminar in English Teaching**

**Credits:** 4.00

In this seminar on teaching English at the middle- and secondary-school levels, students meet the requirements for both English 710, Teaching Writing and English 792, Teaching Secondary School English. The two-semester course integrates the teaching of reading, writing, speaking, and listening, addressing both theoretical and practical issues. Through the study of different approaches, students develop their own philosophies of instruction. Writing intensive.

### **ENGL 726 - Seminar in English Teaching**

**Credits:** 4.00

In this seminar on teaching English at the middle- and secondary-school levels, students meet the requirements for both English 710, Teaching Writing and English 792, Teaching Secondary School English. The two-semester course integrates the teaching of reading, writing, speaking, and listening, addressing both theoretical and practical issues. Through the study of different approaches, students develop their own philosophies of instruction. Writing intensive.

### **ENGL 727 - Issues in Second Language Writing**

**Credits:** 4.00

Study of various issues in second language writing theory, research, instruction and administration. Topics include the characteristics and needs of second language writers, second language writing processes, contrastive rhetoric, grammar instruction, teacher and peer feedback, assessment, course design and placement. Writing intensive.

### **ENGL 729 - Special Topics in Composition Studies**

**Credits:** 4.00

Advanced course on a topic chosen by the instructor. Precise topics and methods of each section vary. Possible topics include alternative discourses and rhetorics, contrastive rhetoric, electronic discourse and digital rhetoric, women's rhetorics and feminist pedagogies, Montaigne and the essay tradition, theories of literacy, theories of persuasive writing, theories of transactional writing, and written discourse analysis. Barring duplication of subject, may be repeated for credit. For details see descriptions available in the English Department. Writing intensive when topic is studies in rhetoric and composition.

### **ENGL 730 - Practicum in Teaching English and the Language Arts**

**Credits:** 1.00 to 6.00

A site-based course for practicing teachers that features in-class observations and demonstrations,

individual consultation, and group meetings in the schools. Prereq: permission. May be repeated to a maximum of 8 credits.

### **ENGL 732 - Folklore and Folklife**

**Credits:** 4.00

Examines the materials and methods used to study folklife, emphasizing the historical context and development of folklore studies in North America and Europe, field research, performance theory, and other topics. (Also offered as ANTH 698.) Writing intensive.

### **ENGL 733 - Special Studies in Film**

**Credits:** 4.00

Specialized and advanced study in film and cinema studies. Topics vary and may include literature and film, Asian-American film, film genres, and advanced film theory. May be repeated once for credit as long as topics are different. Special fee.

### **ENGL 733W - Special Studies in Film**

**Credits:** 4.00

Specialized and advanced study in film and cinema studies. Topics vary and may include literature and film, Asian-American film, film genres, and advanced film theory. May be repeated once for credit as long as topics are different. Special fee. Writing intensive.

### **ENGL 734 - Special Topics in Literary Theory**

**Credits:** 4.00

Covers various topics dealing with diverse issues in literary and cultural theory. Prerequisite ENGL 619 or equivalent theory/philosophy class. Offered irregularly. For a specific description see English course offerings.

### **ENGL 738 - Topics in Asian American Studies**

**Credits:** 4.00

Study of the literature, history, scholarship, and current thought by and about Asian America. Representative works from among Japanese Americans, Chinese Americans, Korean Americans, Southeast Asian Americans, and South Asian Americans. (Also listed as AMST 615.) Writing intensive.

### **ENGL 739 - American Indian Literature**

**Credits:** 4.00

Close study of traditional and/or contemporary American Indian literature and folklore with historical and cultural background. Writing intensive.

### **ENGL 740 - Indigenous New England**

**Credits:** 4.00

An interdisciplinary introduction to the literatures, histories, and cultures of indigenous people located in what is now called New England. Course topics may include U.S. American Indian policy, tribal government structures and resistance, the history and forms of indigenous literacy, contemporary sovereignty struggles, popular culture, and film. Curricular activity with regional Native people required such as a visit to a Native community, work with tribal guest speakers, participation in a lecture or film series. (Also offered as AMST 611.) Writing intensive.

### **ENGL 741 - Literature of Early America**

**Credits:** 4.00

Prose and poetry of the periods of exploration, colonization, early nationalism, Puritanism, Enlightenment. Individual works and historical-cultural background. (Not offered every year.) Writing intensive.

**ENGL 742 - American Literature, 1815-1865****Credits:** 4.00

Fiction, nonfiction, and poetry in the period of romanticism, transcendentalism, nationalism. Individual works and cultural background. (Not offered every year.) Writing intensive.

**ENGL 743 - American Literature, 1865-1915****Credits:** 4.00

Fiction, nonfiction, and poetry in the period of realism, naturalism, industrialism, big money. Individual works and background. Writing intensive.

**ENGL 744 - American Literature, 1915-1945****Credits:** 4.00

Fiction, poetry, and drama in the period of avant-garde and leftism, jazz age, and Depression. Individual works and cultural background. Writing intensive.

**ENGL 745 - Contemporary American Literature****Credits:** 4.00

A gathering of forms, figures, and movements since 1945. Individual works and cultural background. Writing intensive

**ENGL 746 - Studies in American Drama****Credits:** 4.00

Topics vary from year to year. Examples: 20th-century American drama; contemporary playwrights; theatricality in American life. May be repeated for credit, barring duplication of topic. (Not offered every year.) Writing intensive.

**ENGL 747 - Studies in American Poetry****Credits:** 4.00

Topics vary from year to year. Examples: poets of the open road, Pound and his followers, major American poets, contemporary American poetry. May be repeated for credit, barring duplication of topic. (Not offered every year.) Writing intensive.

**ENGL 748 - Studies in American Fiction****Credits:** 4.00

Topics vary from year to year. Examples: the romance in America, the short story, realism and naturalism, the city novel, fiction of the thirties. May be repeated for credit, barring duplication of topic. Writing intensive.

**ENGL 749 - Major American Authors****Credits:** 4.00

Intensive study of two or three writers. Examples: Melville and Faulkner; Fuller, Emerson, and Thoreau; James and Wharton; Dickinson and Frost. May be repeated for credit, barring duplication of topic. Writing intensive.

**ENGL 750 - Special Studies in American Literature****Credits:** 4.00

Topics vary from year to year. Examples: the Puritan heritage, ethnic literatures in America, landscape in American literature, five American lives, pragmatism, American humor, transcendentalism, women regionalists. May be repeated for credit, barring duplication of topic. Writing intensive.

**ENGL 751 - Medieval Epic and Romance****Credits:** 4.00

The two major types of medieval narrative; comparative study of works from England, France, Germany, and Iceland, including Beowulf, Song of Roland, the Nibelungenlied, Njal's Saga, and Malory's Morte d'Arthur. All works read in modern English translations. (Not offered every year.) Writing intensive.

### **ENGL 752 - History of the English Language**

**Credits:** 4.00

Evolution of English from the Anglo-Saxon period to the present day. Relations between linguistic change and literary style. (Not offered every year.) Writing intensive.

### **ENGL 753 - Old English**

**Credits:** 4.00

Introduction to Old English language and literature through the reading of selected poetry and prose.

### **ENGL 754 - Beowulf**

**Credits:** 4.00

A reading of the poem and an introduction to the scholarship. Prereq: ENGL 753. Writing intensive.

### **ENGL 756 - Chaucer**

**Credits:** 4.00

The Canterbury Tales in its original language. Writing intensive.

### **ENGL 758 - Shakespeare**

**Credits:** 4.00

A few plays studied intensively. Live and filmed performances included as available. Special fee. Writing intensive.

### **ENGL 759 - Milton**

**Credits:** 4.00

Milton and his age. Generous selection of Milton's prose and poetry, with secondary readings of his sources and contemporaries. (Not offered every year.) Writing intensive.

### **ENGL 764 - Prose and Poetry of the Elizabethans**

**Credits:** 4.00

Shakespeare and his contemporaries. Major works, including Spenser's Faerie Queene, Sidney's Astrophel and Stella, and Shakespeare's Sonnets: their literary and intellectual backgrounds. (Not offered every year.) Writing intensive.

### **ENGL 765 - English Literature in the 17th Century**

**Credits:** 4.00

Major writers of the 17th century, including Donne, Jonson, Herbert, Bacon, and Hobbes. (Not offered every year.) Writing intensive.

### **ENGL 767 - Literature of the Restoration and Early 18th Century**

**Credits:** 4.00

Poetry, drama, fiction, letters, journals, and essays from the period following the restoration of Charles II to the throne of England after the English Civil War. Works by such figures as John Dryden, Aphra Behn, Daniel Defoe, Jonathan Swift, Alexander Pope, and Lady Mary Wortley Montagu studied in the historical context. Examples from the colonial world and the continent (in translation) when appropriate. Writing intensive.

### **ENGL 768 - Literature of the Later 18th Century**

**Credits:** 4.00

Poetry, drama, fiction, letters, journals, essays, and biography from the period that culminated in the American and French Revolutions. Works by such figures as Henry Fielding, Samuel Johnson, Frances Burney, Laurence Sterne, William Blake, and Mary Wallstonecraft studied in historical context. Examples from the colonial world and the continent (in translation) when appropriate. Writing intensive.

### **ENGL 769 - English Romantic Period**

**Credits:** 4.00

Major literary trends and authors, 1798 to 1832. Focus on poetry but attention also to prose works and critical theories. Wordsworth, Coleridge, Lamb, Hazlitt, DeQuincey. (Not offered every year.) Writing intensive.

### **ENGL 770 - English Romantic Period**

**Credits:** 4.00

Major literary trends and authors, 1798 to 1832. Focus on poetry but attention also to prose works and critical theories. Byron, Shelley, Keats. (Not offered every year.) Writing intensive.

### **ENGL 771 - English Victorian Period**

**Credits:** 4.00

Fiction, nonfiction, and poetry from 1832-1870. The growth of the city and middle-class life, with particular emphasis on money and love. Authors include Charlotte and Emily Bronte, Charles Dickens, E.B. Browning, A.L. Tennyson. (Not offered every year.) Writing intensive.

### **ENGL 772 - English Victorian Period**

**Credits:** 4.00

Fiction, nonfiction, and poetry from 1870-1900. The social conflicts created by gender politics and imperial expansion, with particular emphasis on aesthetics and gothic horror. Thomas Hardy, Oscar Wilde, R.L. Stevenson, Bram Stoker. (Not offered every year.) Writing intensive.

### **ENGL 773 - British Literature of the 20th Century**

**Credits:** 4.00

Poets and novelists of the modernist and postmodernist periods. W.B. Yeats, James Joyce, Virginia Woolf, E.M. Forester, D.H. Lawrence, and other modernists. Writing intensive.

### **ENGL 774 - British Literature of the 20th Century**

**Credits:** 4.00

Poets and novelists of the modernist and postmodernist periods. A selection of postmodernist or contemporary writers, such as William Golding, Doris Lessing, John Fowles, Philip Larkin, Seamus Heaney, Margaret Drabble, and others. Writing intensive.

### **ENGL 775 - Irish Literature**

**Credits:** 4.00

Survey from the beginnings to present; works in Irish (read in translation) such as *The Cattle Raid of Cooley*, medieval lyrics, and *Mad Sweeney*; and works in English from Swift to the present. 20th-century authors: Joyce, Yeats, Synge, O'Casey, Beckett, and Flann O'Brien. (Not offered every year.)

### **ENGL 777 - Postcolonial Novel**

**Credits:** 4.00

Representative novels from writers such as Salman Rushdie, Amitava Ghosh, Bapsi Sidhwa, R. K. Narayan, Raja Rao, Romesh Gunasekara, Arundati Roy, Mahasweta Devi, U.R. Anantamoorthy, and others. Study of the development of the novel in English in South Asia from the mid-nineteenth century to the present day, Focus is on novels originally written in English; English translations from other South Asian languages when appropriate. Writing intensive.

### **ENGL 779 - Linguistic Field Methods**

**Credits:** 4.00

Study of a non-Indo-European language by eliciting examples from an informant, rather than from written descriptions of the language. Students learn how to figure out the grammar of a language from raw data. Prereq: ENGL/LING 505. (Also offered as LING 779.) Special fee. (Not offered every year.) Writing intensive.

### **ENGL 780 - Drama of Shakespeare's Contemporaries**

**Credits:** 4.00

Study of the drama of Renaissance England, emphasizing Tudor and Stuart drama. Special attention to dramatic forms, acting conventions, theatre architecture, women as patrons, writers, and subjects of drama, and the politics and social significance of theatre in the period. Writing intensive.

### **ENGL 781 - English Drama, 1660-1800**

**Credits:** 4.00

Study of the selected plays, their performance and their publication. Works by such figures as William Wycherley, Thomas Otway, Mary Pix, George Lillo, Susanna Centlivre, Richard Sheridan, and Elizabeth Inchbald. Special attention to the new prominence of women in the drama of this period, changes in theatre architecture, forms of non-dramatic spectacle, and the political and social significance of drama. Writing intensive.

### **ENGL 782 - Modern Drama**

**Credits:** 4.00

Major English, American, and (translated) European plays of the modern period by such playwrights as Shaw, Ibsen, Chekhov, Strindberg, Pirandello, O'Neill, Brecht, Beckett, Williams, Miller, Pinter. Live and filmed performances studied as available. (Not offered every year.) Writing intensive.

### **ENGL 783 - English Novel of the 18th Century**

**Credits:** 4.00

Study of the rise and development of the novel in the eighteenth century. Works by such figures as Daniel Defoe, Eliza Haywood, Samuel Richardson, Henry Fielding, Charlotte Lennox, Laurence Sterne, Frances Burney, and Jane Austen. Focus on writers who published their work in England but with examples from the colonial world and the continent (in translation) when appropriate. Writing intensive.

### **ENGL 784 - English Novel of the 19th Century**

**Credits:** 4.00

Representative novels from among Austen, Scott, Dickens, Thackeray, Emily Bronte, Charlotte Bronte, Trollope, George Eliot, Hardy, and Conrad. Writing intensive.

### **ENGL 785 - Major Women Writers**

**Credits:** 4.00

Intensive study of one or more women writers. Selections vary from year to year. May be repeated for credit, barring duplication of topic. Writing intensive.

### **ENGL 786 - 20th Century British Fiction**

**Credits:** 4.00

Traces the development of the novel from the turn of the century to the present day. Representative novels by Lawrence, Joyce, Conrad, Woolf, West, Forster, Huxley, Waugh, Murdoch, Burgess, and Lessing. Writing intensive.

### **ENGL 787 - English Major Seminar**

**Credits:** 4.00

Intensive study of specialized topics that vary from year to year. Enrollment in each seminar is limited to 15 so that all students can take an active part in discussion and work closely with the instructor on their papers. Prereq: ENGL 419 with a grade of B or better. For details, see course description available in the department office. Writing intensive.

### **ENGL 788 - Senior Honors**

**Credits:** 4.00

Open to senior English majors who, in the opinion of the department, have demonstrated the capacity to do superior work; permission required. An honors project consists of supervised research leading to a substantial thesis or writing of poetry or fiction portfolio. Required of students in the honors in major program. (Not offered every year.) Writing intensive.

### **ENGL 790 - Special Topics in Linguistics**

**Credits:** 4.00

Advanced course on a topic chosen by the instructor. Inquire at the English department office for a full course description each time the course is offered. Topics such as word formation, dialectology, linguistic theory and language acquisition, history of linguistics, language and culture, cross-disciplinary studies relating to linguistics. Barring duplication of subject, may be repeated for credit. (Also offered as LING 790.) Writing intensive.

### **ENGL 791 - English Grammar**

**Credits:** 4.00

Survey of the grammar of English (pronunciation, vocabulary, sentence structure, punctuation, dialect variation, historical change) with special attention to the distinction between descriptive and prescriptive grammar and to the problems students have with formal expository writing. Writing intensive.

### **ENGL 792 - Teaching Literature and Literacy**

**Credits:** 4.00

This course introduces theories and practices of teaching literature and literacy, including teaching reading and writing as well as teaching literary analysis at the secondary level. Students also learn to plan lessons, choose texts, and create learning activities for speaking, listening, and viewing in grade five through twelve. The course is designed for students who are interested in teaching as a possible career.

### **ENGL 793 - Phonetics and Phonology**

**Credits:** 4.00

The sound system of English and other languages as viewed from the standpoint of modern linguistic theory, including the following topics: the acoustic and articulatory properties of speech sounds, the phonemic repertoires of particular languages, phonological derivations, and prosodic phenomena such as stress and intonation. (Also offered as LING 793.) Prereq: a basic linguistics course or permission.

### **ENGL 794 - Syntax and Semantic Theory**

**Credits:** 4.00

Relationship of grammar and meaning as viewed from the standpoint of modern linguistic theory. Emphasizes the syntax and semantics of English, with special attention to the construction of arguments for or against particular analyses. (Also offered as LING 794.) Prereq: a basic linguistics course or permission. Writing intensive.

### **ENGL 795 - Independent Study**

**Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with permission of the department chairperson and of the supervising faculty member or members. Barring duplication of subject, may be repeated for credit up to a maximum of 8 credits. Writing intensive.



### **ENGL 797 - Special Studies in Literature**

**Credits:** 4.00

A) Old English Literature, B) Medieval Literature, C) 16th Century, D) 17th Century, E) 18th Century, f) English Romantic Period, G) Victorian Period, H) 20th Century, I) Drama, J) Novel, K) Poetry, L) Non-fiction, M) American Literature, N) A Literary Problem, O) Literature of the Renaissance, R) Race and Racial Theories. The precise topics and methods of each section vary. Barring duplication of subject, may be repeated for credit. For details, see the course descriptions available in the English department. Special fee on some topics. Writing intensive.

### **ENGL 798 - Special Studies in Literature**

**Credits:** 2.00 to 6.00

A) Old English Literature, B) Medieval Literature, C) 16th Century, D) 17th Century, E) 18th Century, f) English Romantic Period, G) Victorian Period, H) 20th Century, I) Drama, J) Novel, K) Poetry, L) Non-fiction, M) American Literature, N) A Literary Problem, O) Literature of the Renaissance, R) Race and Racial Theories. The precise topics and methods of each section vary. Barring duplication of subject, may be repeated for credit. For details, see the course descriptions available in the English department. Special fee on some topics. Writing intensive.

### **ENGL 799 - Study Abroad in Cambridge England**

**Credits:**

UNH Cambridge Summer Program at Gonville & Caius College of Cambridge University in Cambridge, England. This course number is a place-holder. Students register for both this administrative course number and two of the courses being offered through the program. These courses will vary from year to year. To view the courses offered visit <http://www.unh.edu/cambridge>. Permission required. Special fee. Cr/F.

### **ENGL 799A - Study Abroad in Cambridge England Bonus Weekend**

**Credits:**

UNH Cambridge Summer Program Bonus Weekend excursion. This course is a place-holder. Location may change from year to year. To view Bonus Weekend description and location visit <http://www.unh.edu/cambridge>. Permission required. Special fee.

**Co-requisites:** ENGL 799

## **Environmental&Resource Econ**

### **EREC 409 - Catastrophe and Terrorism**

**Credits:** 4.00

Impacts of terrorism and natural and non-natural catastrophes on infrastructure, public and private policy, and the economy. Analysis of case studies and research data is emphasized. Invited speakers complement lectures and assignments.

### **EREC 411 - Environmental and Resource Economics Perspectives**

**Credits:** 4.00

Microeconomic theory and analysis in resource management and use decisions. Survey of significant resource problems from an economic perspective and the application of economic analysis. Cannot be taken for credit after ECON 402 or equivalent. Special fee.

### **EREC 444 - The New Pirates of the Caribbean**

**Credits:** 4.00

Inquiry into many facets of tourism from the standpoint of tourists and tour destination. Economic and institutional factors affecting human well-being from the use of land and water resources; discussions of distributional aspects of benefits from tourism activities.; environmental impacts; ownership patterns and uses; cultural attributes; and local economies in small Caribbean island nations. Cruise ships, time-shares, all-inclusive resorts, hurricanes, casinos, bars, rum, sex, and drugs are investigated through extensive readings and web surfing. Writing intensive.

### **EREC 501 - Agriculture and Natural Resource Product Marketing**

**Credits:** 4.00

Structure, organization, strategies and performance of the business sector in agriculture, forestry, and other local natural resource-based industries; commodity marketing systems; demand estimation, pricing policies, consumer characteristics, and related topics. Prereq: EREC 411 or equivalent;/or permission. (Offered every other semester.)

### **EREC 504 - Business Management for Natural Resource Firms**

**Credits:** 4.00

Planning, operation, and control of natural resource-based firms with direct application to agriculture, aquaculture, forestry, and recreational businesses. Emphasis on decision making, problem solving, and operational strategies. Prereq: EREC 411 or equivalent. Lab.

### **EREC 525 - Statistical Methods and Applications**

**Credits:** 4.00

Applications of elementary statistical concepts and methods including probability, descriptive techniques, statistical inference and bivariate and multivariate statistical analysis. Orientation is toward analysis and interpretation of data commonly encountered in social science disciplines. No credit for students who have completed ADM 430; BIOL 528; ADMN 420; HHS 540; MATH 439; MATH 539; MATH 644; PSYC 402; SOC 502.

### **EREC 572 - Introduction to Natural Resource Economics**

**Credits:** 4.00

Introduces theory, methods of analysis, and current literature of natural resource economics and policy. Topics include multiple use, taxation, optimal harvest scheduling, market failure, property rights, public goods, benefit-cost analysis, amenity values, non-market resource services and natural resource policy.

Topics applied to forests and forestry, wildlife management, outdoor recreation, public lands, agriculture, fisheries, water, energy and mining/nonrenewable resources.

### **EREC 595 - Problems in Natural and Agricultural Resources**

**Credits:** 2.00 to 4.00

Students pursue field, laboratory, or library problems in natural and environmental resources that are not covered by other courses. Faculty consultant and study topic must be chosen before registration. In consultation with the faculty adviser, students select the problem area, create a bibliography for reflection, and pursue the topic. A professionally written paper is expected at termination of the study. May be repeated once for credit. Prereq: permission.

### **EREC 595W - Problems in Natural and Agricultural Resources**

**Credits:** 2.00 to 4.00

Students pursue field, laboratory, or library problems in natural and environmental resources that are not covered by other courses. Faculty consultant and study topic must be chosen before registration. In consultation with the faculty adviser, students select the problem area, create a bibliography for reflection, and pursue the topic. A professionally written paper is expected at termination of the study. May be repeated once for credit. Prereq: permission. Writing intensive.

### **EREC 596 - Problems in Natural and Agricultural Resources**

**Credits:** 2.00 to 4.00

Students pursue field, laboratory, or library problems in natural and environmental resources that are not covered by other courses. Faculty consultant and study topic must be chosen before registration. In consultation with the faculty adviser, students select the problem area, create a bibliography for reflection, and pursue the topic. A professionally written paper is expected at termination of the study. May be repeated once for credit. Prereq: permission.

### **EREC 596W - Problems in Natural and Agricultural Resources**

**Credits:** 2.00 to 4.00

Students pursue field, laboratory, or library problems in natural and environmental resources that are not covered by other courses. Faculty consultant and study topic must be chosen before registration. In consultation with the faculty adviser, students select the problem area, create a bibliography for reflection, and pursue the topic. A professionally written paper is expected at termination of the study. May be repeated once for credit. Prereq: permission. Writing intensive.

### **EREC 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F.

### **EREC 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F. Writing intensive.

### **EREC 606 - Land Economics Perspectives: Uses, Policies, and Taxes**

**Credits:** 4.00

Economic and institutional perspectives affecting human use of land resources; discussion of land

ownership patterns and uses; land rent, location, and resource use; institutional constraints; partial ownership policies; and local planning for more efficient use of land. Real estate markets, transfers, valuation, and taxation. Prereq: EREC 411 or equivalent or permission. Special fee.

### **EREC 627 - Community Economics**

**Credits:** 4.00

Economic factors affecting community and local government decisions. Emphasizes use of economic theory for decision making and community problem solving. Prereq: EREC 411 or equivalent.

### **EREC 633 - Economics of Travel and Tourism**

**Credits:** 4.00

Provides an understanding of both the microeconomic and macroeconomic aspects of travel and tourism. Using economics as a theory base, the course attempts to identify what is significant or special about travel and tourism compared with other activities. Special attention is given to issues such as resource immobility, capacity constraints, seasonality, and consumers' inability to experience the product before purchase. Prereq: EREC 411 or equivalent. (Also offered as TOUR 633.)

### **EREC 680 - Agricultural and Food Policy**

**Credits:** 4.00

Analysis of issues that led to government involvement in the agricultural and food sector. Application of economic concepts and tools to the evaluation of public policies affecting agriculture and food.

### **EREC 708 - Environmental Economics**

**Credits:** 4.00

Environmental pollution, the market economy, and optimal resource allocation; alternative control procedures; levels of environmental protection and public policy; property right issues. Prereq: intermediate microeconomic theory; permission. Writing intensive.

### **EREC 710 - Seminar**

**Credits:** 2.00 to 4.00

Seminars arranged to students' needs and offered as demand warrants: A) Rural Development, B) Marine Economics, C) Community Economics, D) Land and Water Economics, E) Quantitative Methods, F) Recreation Economics, G) Small Business Economic and Managerial Issues. In-depth treatment of area, including classic works. May be repeated.

### **EREC 756 - Rural and Regional Economic Development**

**Credits:** 4.00

Concepts and methods of delineating regional economies, methods of measuring activity, regional development, and public policies. Emphasizes empirical research studies. Prereq: intermediate economic theory or permission. Writing intensive.

### **EREC 775 - Research Methods**

**Credits:** 4.00

Study of the process, methods, and techniques of conducting scientific research in the social sciences. Includes problem identification, data collection and management, qualitative quantitative data analyses, and communicating scientific research. Prereq: EREC 411 or equivalent; EREC 525 or equivalent; junior/senior standing.

### **EREC 795 - Investigations**

**Credits:** 2.00 to 4.00

Special assignments in readings, investigations, or field problems. Topics may include agricultural marketing, agricultural production and farm management, community development, economics of human

resources, economics of population and food, land economics, marine economics, rural economic development, regional economics, water economics, or teaching experience. Prereq: permission. May be repeated.

### **EREC 795W - Investigations**

**Credits:** 2.00 to 4.00

Special assignments in readings, investigations, or field problems. Topics may include agricultural marketing, agricultural production and farm management, community development, economics of human resources, economics of population and food, land economics, marine economics, rural economic development, regional economics, water economics, or teaching experience. Prereq: permission. May be repeated. Writing intensive.

### **EREC 799 - Honors Senior Thesis**

**Credits:** 4.00

Students develop and conduct individual research projects related to applied resource economics under the direction of a senior thesis committee. The resulting written thesis is defended in an oral presentation before departmental faculty and students. Prereq: permission, majors only, senior standing. Writing intensive.

## **Environmental Engineering**

### **ENE 400 - Environmental Engineering Lectures I**

**Credits:** 1.00

Introduces the profession, the environmental engineer as planner, designer, problem solver, and interdisciplinary team player; and the goals of the environmental engineering curriculum. Lectures by faculty and practitioners. Introduction to computer skills required for environmental engineering. Engineering ethics. Cr/F.

### **ENE 401 - Environmental Engineering Lectures II**

**Credits:** 1.00

Introduces the concept of integrated design and project planning and management in environmental engineering. Field trips to environmental engineering sites and projects. Prereq: ENE 400. Cr/F.

### **ENE 520 - Environmental Pollution and Protection: A Global Context**

**Credits:** 4.00

Introduces environmental science and engineering and the anthropogenic causes of environmental change. Emphasizes the causes, effects, and controls of air, water, and land pollution. The political, ecological, economic, ethical, and engineering aspects of environmental pollution and control are discussed. Field trips. Writing intensive.

### **ENE 521 - Seminar**

**Credits:** 1.00

Introduces the fundamentals of environmental and occupational health, water quality modeling, and atmospheric systems and air pollution control. Prereq: ENE 520, MATH 426, CHEM 404, PHYS 407.

### **ENE 612 - Unit Operations Laboratory I**

**Credits:** 3.00

Selected experiments in fluid mechanics, heat transfer, and unit operations, with emphasis on environmental engineering. Writing intensive.

### **ENE 645 - Fundamental Aspects of Environmental Engineering**

**Credits:** 4.00

Application of fundamental concepts of mass balance in treatment processes. Physical, chemical, and biological aspects of pollution control, and design concepts for operations and processes used in environmental engineering are discussed. Concepts of engineering ethics are presented. Students participate in a design project that involves an oral presentation and written report. Prereq: CHEM 404, CIE 642, ENE 520; or permission. Writing intensive

### **ENE 696 - Field Experience**

**Credits:** 1.00

Based on appropriate career-oriented work experience in environmental engineering. Student can get one credit for field experience. A written final report is required as well as permission of student's adviser.

### **ENE 697 - Internship**

**Credits:** 2.00

Off-campus work in the environmental engineering field for on-the-job skill development. Needs to be supervised by an environmental engineering faculty member; and a proposal for the internship must be submitted and have permission of the ENE faculty prior to the start of the internship. Prereq: permission. IA

(continuous grading).

### **ENE 708 - Industrial Process and Design**

**Credits:** 4.00

Introduces cost engineering. Application of acquired skills to design of chemical processes. Individual major design project required. Safety for industrial processes. Lab. (Also offered as CHE 708.) Writing intensive.

### **ENE 709 - Fundamentals of Air Pollution and Its Control**

**Credits:** 4.00

The origin and fate of air pollutants. Fundamentals of atmospheric meteorology, chemistry, and dispersion phenomena. Control of air pollutants and the related equipment. Current issues. Lab.

### **ENE 713 - Unit Operations Laboratory II**

**Credits:** 3.00

Selected experiments in mass transfer, stagewise operations, thermodynamics, and kinetics with emphasis on environmental engineering. Writing intensive.

### **ENE 742 - Solid and Hazardous Waste Engineering**

**Credits:** 3.00

A thorough examination of the problems that exist in hazardous and solid waste management are presented in terms of the current regulations and engineering approaches used to develop solutions. Topics include risk-based decision making, transport and fate of contaminants, and the fundamental physical, chemical, and biological concepts, which make up the basis for technological solutions to these waste management problems. Case studies are used throughout the course to highlight key concepts and provide real-world examples. Pre- or Coreq: ENE 645 or permission.

### **ENE 743 - Environmental Sampling and Analysis**

**Credits:** 4.00

Theory of analytical and sampling techniques used in environmental engineering. Topics include potentiometry, spectroscopy, chromatography, automated analysis, quality control, sampling design, and collection methods. Methods discussed in lecture are demonstrated in labs. Prereq: CHEM 404 and ENE 645 or permission. Lab. Writing intensive.

### **ENE 744 - Physicochemical Treatment Design**

**Credits:** 4.00

Selection, design, and evaluation of advanced unit processes employed in physicochemical treatment of waters, wastewaters, and hazardous wastes. Discusses preparation of alternative designs and economic analysis. Emphasizes treatment schemes based on experimental laboratory or pilot studies. Prereq: ENE 645, 749 or permission. Lab.

### **ENE 746 - Bioenvironmental Engineering Design**

**Credits:** 4.00

Selection, design, and evaluation of unit processes employed in biological treatment of waters, wastewaters, and hazardous wastes. Preparation of engineering reports, including developing design alternatives and economic analysis, is required. Prereq: ENE 645 and ENE 756 or permission. Writing intensive.

### **ENE #747 - Introduction to Marine Pollution and Control**

**Credits:** 4.00

Introduces the sources, effects, and control of pollutants in the marine environment. Dynamic and kinetic modeling; ocean disposal of on-shore wastes, shipboard wastes, solid wastes, dredge spoils, and

radioactive wastes; and oil spills. Prereq: ENE 645 or permission.

### **ENE #748 - Solid and Hazardous Waste Design**

**Credits:** 4.00

Selection, design, and evaluation of unit processes employed in the treatment of solid wastes and hazardous wastes will be studied. Topics include design of materials recovery facilities, landfills, waste-to-energy facilities and hazardous waste site remedial technologies. A group term project taken from a real-world project will be required. An oral presentation by the group and preparation of a final written engineering report including alternative evaluation, permits, scheduling and economic analysis will be required from each group. Prereq: ENE 742 or permission. Writing intensive.

### **ENE 749 - Water Chemistry**

**Credits:** 4.00

Emphasizes the use of chemical equilibrium principles and theory, calculations, and applications of ionic equilibrium stresses. Topics include thermodynamics, kinetics, acid/base, complexation, precipitation/dissolution, and redox equilibria. Computer equilibrium modeling is presented. Prereq: CHEM 404 or CHEM 405.

### **ENE 751 - Introduction to Sustainable Engineering**

**Credits:** 3.00

This course begins with exploration of the precept that we live in, and must design engineering works for, a world with a finite supply of natural resources and with limited life support capacity. Tools for sustainability engineering are the focus of the course, which includes life cycle analysis and life cycle impact analysis, the metrics and mass and energy flow analyses used in the field of industrial ecology, and environmental management systems.

### **ENE 752 - Process Dynamics and Control**

**Credits:** 4.00

Dynamic behavior of chemical engineering processes described by differential equations, feedback control concepts and techniques, stability analysis, application in pollution control. Lab. (Also listed as CHE 752.)

### **ENE 756 - Environmental Engineering Microbiology**

**Credits:** 4.00

Concepts of environmental engineering microbiology. Topics include taxonomy of species important in environmental engineering processes; microbial metabolism, interaction, and growth kinetics in environmental treatment processes; biogeochemical cycling in water; and effects of environmental parameters on environmental engineering microbial processes. Laboratories focus on microbiological methods and laboratory-scale biological treatment experiments. Prereq: ENE 520 and CIE 642 or permission. Lab. Writing intensive.

### **ENE 784 - Introduction to Project Planning and Design**

**Credits:** 1.00

Part one of a two part sequence. Student groups develop a project statement to address a significant environmental engineering system design. Each team prepares a project plan to be executed in ENE 788, part two of this sequence. Cr/F.

### **ENE 788 - Project Planning and Design**

**Credits:** 3.00

Student groups formed in multidisciplinary design teams to prepare a design plan for a large-scale environmental engineering system including consideration of budgetary constraints, regulatory requirements, and environmental impacts. Each team prepares a final written report and gives a formal presentation. Prereq: senior environmental engineering major or permission. Writing intensive.



**ENE 795 - Independent Study****Credits:** 1.00 to 4.00

A limited number of qualified seniors is permitted to pursue independent studies under ENE faculty guidance. Seniors write terminal thesis reporting the results of their investigations. May be repeated to a maximum of 4 credits. Prereq: permission of ENE faculty member involved.

**ENE 797 - Special Topics****Credits:** 1.00 to 4.00

Advanced or specialized topics not normally covered in the regular course offerings. May be repeated to a maximum of 4 credits, but not in duplicate areas. Prereq: permission.

**ENE 799H - Senior Honors Thesis****Credits:** 4.00

Students in the honors program in environmental engineering complete a project under the direction of a faculty sponsor resulting in a written thesis which must be accepted by the sponsor by the end of the second semester, senior year. Four credits total during senior year; 3 of which may be used to fulfill an ENE non-design elective.

## European Cultural Studies

### **ECS 500 - Proseminar**

**Credits:** 4.00

The Proseminar aims to expose students to a variety of approaches in the Cultural Studies field, drawing on different disciplines and focusing on representative themes within cultural studies.

### **ECS 550 - Critical Methods in Cultural Studies**

**Credits:** 4.00

Critical analysis of works in Cultural Studies. Focus on major texts, evaluation of secondary texts, research writing, criticism. Required of all ECS majors. (Also listed as HUMA 500.) Writing intensive.

### **ECS 798 - Thesis Research**

**Credits:** 1.00

Part of a two-semester capstone experience for the ECS major. Students work with their advisors and peers to formulate their topic, consider appropriate approaches, locate relevant resources, and prepare a bibliography for a thesis paper on a topic related to European Cultural Studies. During the course of the semester, students meet regularly with their advisor to discuss research materials. If time permits, students also plan the outline of the thesis.

### **ECS 799 - Senior Thesis**

**Credits:** 3.00 to 4.00

Part of a two-course capstone experience for the ECS major. Students work with their advisors and peers to formulate their topic and write a major research paper, between 25 and 50 pages long, on a topic related to European Cultural Studies. During the course of the semester, students meet regularly with their advisor to discuss the outline and rough draft of the thesis, and to go over revisions to the paper. The course culminates in the defense of the thesis before a committee of three ECS faculty members. If student schedules permit it, we also hold meetings of all seniors who are currently writing an ECS thesis so that students may exchange ideas and offer peer feedback to each other. Pre - or Coreq: ECS 798. Writing intensive.

## Family Studies

### **FS 444 - We Don't All Play the Violin: Stories and Stereotypes of Asians in America**

**Credits:** 4.00

An interdisciplinary course that examines perceptions of difference and foreign culture through and exploration of the process of emigration of Chinese, Japanese, Cambodian, and Vietnamese families from Asia to America and their experiences here. Class considers history, economics, state and national legislation and regulations, politics, art, gender and generational differences, and family relationships, as well as North American American reactions to the presence of Asians, how stereotypes by both Asians and Americans were developed, and their impact on family members. Writing intensive.

### **FS 444A - Suffer the Little Children: Sexual Molestation Outside the Home**

**Credits:** 4.00

This course considers child sexual molestation in the Boy Scouts, YMCA's, and churches. Child pornography, prostitution, trafficking, and slavery are also explored. Together we will try to answer the following six questions: Who is at risk of molestation,? How are children molested? Where are they molested? Who molests children and why do they molest them? What are the impacts on children and society? What responsibilities do adults and institutions have to protect children?

### **FS 525 - Human Development**

**Credits:** 4.00

Developmental information from conception through death; theoretical perspectives and research methods in human development; emphasis on student's communication and analytical skills.

### **FS 525H - Honors/Human Development**

**Credits:** 4.00

Developmental information from conception through death; theoretical perspectives and research methods in human development; emphasis on student's communication and analytical skills.

### **FS 545 - Family Relations**

**Credits:** 4.00

Theories and research relating to the family and its role in individual development.

### **FS 553 - Personal and Family Finance for Family Life Professionals**

**Credits:** 4.00

Applied financial management emphasizing teaching financial issues to a variety of audiences. Topics include savings, credit, insurance and retirement, and programs and resources available to facilitate financial education.

### **FS 565 - Introduction to Child Life**

**Credits:** 4.00

When facing acute, chronic, or life-threatening illness and traumatic injuries, children and families have unique needs within the medical system. The purpose of this course is to provide an introduction to the theory and practice of the child life profession and family centered care. Topics include children's emotional reactions to hospitalization, use of play, preparation, and family support, designing healing environments, and specializations within the field. Permission required. (Also listed as RMP 565).

### **FS 586 - Families at Risk**

**Credits:** 4.00

This course is designed to look at the biological, cultural and situational factors that affect parenting in the twenty-first century. Concerns such as terrorism, disease, and media influences are discussed. Paradigms for positive parenting in a negative world are developed. The current problems of global warming, war, gangs, alcohol and drug abuse, and a depressed economy have an effect on daily life and how families cope. Possible remedies, solutions, and support networks that help families are discussed. Prereq: Fs 545 or permission.

### **FS 605 - Child Study and Development Center Field Experience**

**Credits:** 2.00 to 6.00

Supervised experience in the UNH Child Study and Development Center with children infancy-kindergarten, intended for students interested in early education and development. Weekly 3 hours per credit on site engaged in classroom activities as contracted with supervisor. Regular journaling and a final integrative paper on a classroom topic of interest are required. Not open to FS majors. Prereq: a minimum of 12 credits in child development and education (3 credits may be taken concurrently with FS 605), and permission. Materials fee. May be repeated up to a total of 8 credits. Cr/F.

### **FS 623 - Developmental Perspectives on Infancy and Early Childhood**

**Credits:** 4.00

Integrative view of the developing child from conception through childhood within the family context. Prereq: FS 525

### **FS 624 - Developmental Perspectives on Adolescence and Early Adulthood**

**Credits:** 4.00

Developmental information from pubescence through early adulthood; the concept of identity and influences on identity formation.

### **FS 635 - Teaching and Learning in Early Childhood Settings**

**Credits:** 4.00

Current theoretical approaches to communicating with children and influencing their behavior. Weekly four-hour laboratory experience working with preschool children is required at UNH Child and Family Center. Weekly three-hour seminar. Prereq: FS 525, FS 623; permission. Special fee.

### **FS 641 - Parenting Across the Life Span**

**Credits:** 4.00

Examination of parent-child relations across a range of developmental time periods and situations. Explores issues affecting parent-child relationships. Prereq: FS 525, 545, permission.

### **FS 653 - Family Economics**

**Credits:** 4.00

Exploration of family economics and well being; public policy and family structure influences on the economic well being of families. Prereq: FS 545. Writing intensive.

### **FS 695 - Independent Study**

**Credits:** 1.00 to 6.00

Scholarly project in the area of child, family, and consumer studies. Regular conferences with supervising faculty required. Prereq: approval of departmental faculty.

### **FS 697 - Special Topics**

**Credits:** 1.00 to 6.00

Focused examination of a particular theoretical, methodological, or policy issue. May be repeated to a maximum of 8 credits. Prereq: permission. Writing intensive.

**FS 707 - Practicum****Credits:** 1.00 to 6.00

Supervised in-depth experience in teaching, research, or advocacy in a professional setting to increase the student's understanding of children, families, or consumer issues. A) Child, B) Family, C) Consumer Studies. Prereq: FS major; permission. Special fee. Cr/F.

**FS 708 - Nursery Program Internship****Credits:** 3.00 to 6.00

Supervised internship in the UNH Child Study and Development Center part-time nursery programs with children 2-5 years of age. 1) 2-3 year-olds Intern, 2) Preschool Intern. In the role of Assistant Teacher, weekly three hours per credit on site engaged in planning, documentation, teaching, and assessment. For section 1) 2-3 year-olds intern, must be taken concurrently with FS 709A. Child Development Internship Seminar (1cr) unless completed previously. Prereq: FS 525; FS 623; FS 635; and permission. Materials fee. Cr/F; may be repeated up to a total of 8 credits. Special fee.

**FS 709A - Child Development Internship Seminar****Credits:** 1.00

On-site weekly one hour seminar for in-depth reflection and analysis of internship experience with young children at the UNH Child Study and Development Center. Reading and projects required. Must be taken concurrently with either FS 708 or FS 709B internships. Cr/F; may be repeated up to a total of 2 credits. Special fee.

**FS 709B - Child Development Internship****Credits:** 3.00 to 6.00

Supervised internship in the UNH Child Study and Development Center full-day programs with children infancy-6 years of age: 1) Infant/Toddler Intern, 2) Preschool Intern and 3) Kindergarten Intern. Weekly three hours per credit on-site engaged in planning, documentation, teaching, and assessment. Must be taken concurrently with FS 709A. Child Development Internship Seminar (1cr) unless completed previously. Prereq: FS 525; FS 623; FS 635; and permission. Materials fee. Cr/F; may be repeated up to a total of 8 credits. Special fee.

**FS 710 - Community Internship****Credits:** 1.00 to 12.00

Supervised position in community early childhood settings. A) Infant-toddler assistant; B) Preschool-child care assistant; C) Kindergarten assistant; D) Child Life. May be repeated up to a total of 12 credits. Prereq: permission. Cr/F.

**FS 712 - Child Advocacy and Family Policy Internship****Credits:** 4.00 to 8.00

Supervised experience working in state, federal, international, or state-wide advocacy organization or agency that advocates for children and/or families. Students spend a required number of hours per week in their selected program, based on the number of credit hours. (Spring semester, possibly Summer). Prereq: FS major; senior status; FS 525; 545; 28 credit hours of family studies coursework; permission. May be taken for 4 to 8 credits. Cr/F.

**Co-requisites:** FS 714**FS 714 - Seminar for Child Advocacy and Family Policy Interns****Credits:** 2.00

This biweekly seminar focuses on issues of concern to child advocacy and family policy internship students, and develops students' professional skills. Prereq: FS major, senior status; permission. (Spring semester, possibly Summer).

**Co-requisites:** FS 712

### **FS 733 - Supervising Programs for Young Children**

**Credits:** 4.00

Philosophical bases and theoretical rationales of various programs for young children; program alternatives and resources; issues in administration including supervision, finances, and regulations. Prereq: permission. (Fall semester only.) Writing intensive.

### **FS 734 - Curriculum for Young Children**

**Credits:** 4.00

Designing and implementing developmentally appropriate activities for young children; assessing the effectiveness of activities; evaluating materials and equipment. Prereq: FS 525; 623; 635. (Spring semester only.) Writing intensive.

### **FS 743 - Families, Schools, and Community**

**Credits:** 4.00

Emphasizes the critical value of effective family-school-community partnerships in enhancing the education of young children. The literature assessing the interactive nature of parent and school resources with cultural influences is examined. Current models of family-school-community partnerships are explored. Students participate in parent/school/community activities within early childhood education centers and schools. Prereq: permission. Writing intensive.

### **FS 746 - Human Sexuality**

**Credits:** 4.00

Investigation of physiological, psychological, and sociological aspects of human sexuality. Particular attention to various social practices, policies, and programs that affect sexual attitudes and behaviors.

### **FS 757 - Race, Class, Gender, and Families**

**Credits:** 4.00

Explores the intersection of race, class, and gender in family life in the U.S. Theory, research, and other relevant literature is used to examine the variety of family configurations in our society today and the diverse experiences that families have as a result of existing social, political, and economic institutions. The strengths of various family types are considered, as well as the particular challenges these families may encounter in contemporary society. Prereq: seniors or graduate students only; permission. Writing intensive.

### **FS 760 - Family Programs and Policies**

**Credits:** 4.00

Analyzes the connection between family support programs and family policy. Stresses program planning, implementation, and evaluation. Examines the research, theory, history, and current status of model family programs. Prereq: FS 545; permission. Writing intensive.

### **FS 771 - Observation and Assessment of Young Children**

**Credits:** 4.00

Comprehensive view of various observation techniques for determining children's strengths and emerging skills. Exploration of issues regarding the use of formal assessments and testing with young children, retention and transitional placements, and the parent's role in testing. Prereq: FS 525; 623; 635. (Fall semester only.)

### **FS 772 - International Approaches to Child Advocacy**

**Credits:** 4.00

An investigation into the rationales for advocacy, types of advocacy, advocacy techniques and strategies, and current domestic and international advocacy issues and approaches. Prereq: seniors only; permission.

Writing intensive.

### **FS 773 - International Perspectives on Children and Families**

**Credits:** 4.00

An investigation of historical and modern conceptions of children and families in selected African, Asian, European, and Latin countries. Emphasis is placed on the contribution of these populations to the changing ethnic portrait of America. Prereq: seniors only. Writing intensive

### **FS 776 - Children, Adolescents and the Law**

**Credits:** 4.00

This course is designed to familiarize students with the specialized laws and adjudicative systems that govern children, adolescents and families and reflect society's effort to balance competing interests and goals. It provides the chance to explore laws and processes that affect children and adolescents as they interact with their caregivers, families and society at large. Prereq: FS 525, 545 and FS 623 or 624; permission of instructor.

### **FS 782 - Family Internship**

**Credits:** 6.00

Supervised experience working in social, legal, and marketplace settings that offer services to families. Students spend a minimum of 15 hours per week in a selected community program. Admission by application only. Applications due prior to registration spring semester of the junior year. A senior-level course with 6 credits being taken each semester. Prereq: FS major; senior status; FS 525; 545; 20 credit hours of family studies course work; permission. Pre- or Coreq: FS 760. IA (continuous grading). Cr/F.

**Co-requisites:** FS 792

### **FS 785 - Seminar for Student Teachers**

**Credits:** 2.00

Supplements the student teaching experience and effects a transition to the profession of teaching for those students admitted to the early childhood certification option.

### **FS 786 - Seminar for Student Teachers**

**Credits:** 2.00

Supplements the student teaching experience and effects a transition to the profession of teaching for those students admitted to the early childhood certification option.

### **FS 788 - Student Teaching Young Children**

**Credits:** 8.00

Supervised teaching experience. Students spend a minimum of 20 hours per week in a selected program for young children working with a cooperating teacher. Students must apply during the fall semester of their junior year. Prereq: FS major; FS 525; 545; 623; 635; 733; 734; 743; EDUC 706; KIN 675; MATH 601; THDA 520; permission. Coreq: FS 785-786. (Spring semester only.) Special fee. Cr/F.

### **FS 792 - Family Internship Seminar**

**Credits:** 2.00

This biweekly seminar focuses on issues of concern to family internship students, provides advanced training in educational strategies for working with families, and develops students' professional skills. This is a two-semester course with 2 credits being taken each semester. Prereq: FS major; admission to family internship program; permission. (Fall and spring semester.) IA (continuous grading). Writing intensive.

**Co-requisites:** FS 782

### **FS 794 - Families and the Law**

**Credits:** 4.00

Exploration of laws effecting families and the interaction of family members with each other and with society. Prereq: FS 545. Writing intensive.

**FS 797 - Advanced Special Topics**

**Credits:** 1.00 to 6.00

Highly focused examination of a particular theoretical, methodological, or policy issue. Prereq: permission.

**FS 799 - Honors Senior Thesis**

**Credits:** 2.00 to 4.00

Under direction of a faculty sponsor, students plan and carry out an independent investigative effort in an area of family, child, and/or consumer studies, resulting in a written thesis and an oral presentation before students and faculty. Prereq: majors only; senior standing; permission. Two-semester sequence as continuing course.



## Forest Technology

### **FORT 260 - Forest Mapping**

**Credits:** 2.00

Skill and efficiency is developed in analyzing field survey data, plotting, lettering and finishing topographic and planimetric maps and road plans, both manually and by Computer Assisted Drafting. Mapping work is closely coordinated with field work accomplished in Forest Surveying (FORT 266.) 1 lec/1 3-hr lab.

### **FORT 261 - Dendrology**

**Credits:** 3.00

Identification and nomenclature of forest trees and shrubs which are important to the ecology and economy of the Northeastern forest. The identification of plant relationships with other plants, animals, soil, and site regimes. 1 lec/1 2-hr lab.

### **FORT 263 - Forest Ecology**

**Credits:** 2.00

The interactions of forest trees with their environment, both as individuals and as tree communities; environmental problems affecting plant communities; the history and classification of North American forests. Study of soils as they affect forest distribution and tree growth. 2 lec.

### **FORT 263A - Forest Ecology Lab**

**Credits:** 1.00

A series of field-based exercises used to reinforce the principles of forest ecology introduced in FORT 263. Includes forest individuals and communities, classification of forest and soils as they affect tree growth. 2 hour lab. Pre- or Coreq: FORT 263.

### **FORT 265 - Forest Orientation Seminar**

**Credits:** 1.00

Seminar to prepare freshmen for study and placement in the broad area of forest technology. 1 lec. Cr/F.

### **FORT 266 - Forest Surveying**

**Credits:** 4.00

Provides instruction and experience in running cruise lines and in the survey and identification of rural property lines. The focus is on field surveying techniques and problem solving of special importance to foresters. Use of magnetic survey data in rural property measurement. Elementary office computations are taught. 2 lec/1 4-hr lab.

### **FORT 267 - Leadership, Supervision and Safety**

**Credits:** 2.00

Fundamentals of leadership and supervision including effective communication in the workplace and public sector are explored. Project management, personnel training and motivation, plus problem-solving and conflict resolution applied through a practical community service forestry project. Accident prevention, first aid, and CPR instruction also included. 2 lec.

### **FORT 269 - Wildlife Ecology and Conservation**

**Credits:** 3.00

Foresters directly influence wildlife by manipulating habitat through silvicultural operations. Course focuses on the ecology of New England wildlife species with emphasis on their habitat requirements and the enhancement of habitat through silviculture and the use of best management practices. 1 lec/1 4-hr lab.

### **FORT 270 - Applied Silviculture**

**Credits:** 4.00

Silvicultural practices in the U.S. including reforestation systems. Improvement of forest stands, employing the basic tending practices of weeding, thinning, and pruning. Marking of stands prior to logging operations. Prereq: permission of instructor or FORT 261 and 263. 2 lec/1 4-hr lab.

### **FORT 272 - Mensuration**

**Credits:** 4.00

Field application of forest inventory and timber cruising techniques. Measurement of tree form, volume, quality, and defect. Growth prediction of individual trees and stands. Use of basic statistical methods as a tool in cruising. Prereq: FORT 261 or instructor permission. 2 lec/1 4-hr lab.

### **FORT 273 - Management Operations and Analysis**

**Credits:** 3.00

Forest appraisal and valuation methods, timber sale contracts, depreciation and depletion calculations, forest taxation. Essentials of forest regulation and management planning. 2 lec/1 2-hr lab.

### **FORT 274 - Industrial Forest Management Tour**

**Credits:** 1.00

Concentrated field experience and intensive observations of industrial, private, and federal forest holdings; emphasizing forest management operations as currently practiced in New England. One week of concentrated field study. Cr/F.

### **FORT 275 - Forestry Field Practices**

**Credits:** 1.00

A week long introduction to the various components of the forest industry of the northeast. Students visit with members of the forest industry in the work-place and learn how they are interrelated. Students gain background experience that will prove beneficial in understanding their studies during their second year in the Forest Technology curriculum. One week of concentrated field study.

### **FORT 278 - Forest Insects and Diseases**

**Credits:** 2.00

An introduction to the role of forest insects and microorganisms in the context of managing woodlands. Students learn to recognize the signs and symptoms of insect and disease damage in forest trees and products. They study the life cycles and identify common forest insect and disease pests impacting North American tree species. Pest management methods are introduced. 1 lec/3-hr lab.

### **FORT 280 - Aerial Photography Interpretation**

**Credits:** 2.00

The use of aerial photographic interpretation as it applies to the identification and measurement of forest resources and applications in forest mapping. 1 lec/1 2-hr lab.

### **FORT 281 - GIS For Foresters**

**Credits:** 2.00

Students learn the use of geographic information systems software for a variety of natural resource uses. GIS mapping skills are used in subsequent courses. 1lec/2-hr lab

### **FORT 291 - Independent Studies in Forest Technology/Urban Tree Care**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in

greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Examples include forest management, forest products, forest protection, wildlife management, or urban tree care. Permission required. Course may be repeated up to a maximum of 8 credits.

### **FORT 292 - Independent Studies in Forest Technology/Urban Tree Care**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Examples include forest management, forest products, forest protection, wildlife management, or urban tree care. Permission required. Course may be repeated up to a maximum of 8 credits.

### **FORT 297 - Work Experience**

**Credits:**

Career-related employment (10 weeks, generally in the summer following freshman year) in a forestry, urban tree care, or other department-approved natural resources area. Cr/F.

### **FORT 464 - Arboriculture**

**Credits:** 3.00

Tree selection, care, and maintenance in the urban environment. Includes climbing, safety practices, pruning, transplanting, and removals. Prereq: FORT 263 or permission. 1 lec/1 4-hr lab.

### **FORT 476 - Forest Products**

**Credits:** 4.00

Basics of structure and properties of wood as a raw material. Conversion of logs to lumber at Thompson School sawmill (student operated). Lumber and log grading and measuring. Studies in processing efficiency, lumber drying, and physical plant operations. Introduction to paper, veneer, and chip products. Marketing of forest products. 2 lec/1 4-hr lab.

### **FORT 477 - Logging**

**Credits:** 4.00

A study in harvesting methods and their relation of forest management and silviculture of the state and region. Theory and practice of conventional harvesting systems including hands-on application of techniques with a strong emphasis on protection of the environment and the safety and health of workers. Department permission for non-majors. 2 lec/4-hr lab.

### **FORT 579 - Forest Fire Control and Use**

**Credits:** 2.00

Instruction in forest fire suppression methods. Interactions of forest fuels, topography, and weather as they affect forest fire behavior. Use of controlled fire as a tool in forest and wildlife management. 1 lec/1 2-hr lab.

## French

### **FREN 401 - Elementary French I**

**Credits:** 4.00

Conducted in French, the course introduces students to French language and culture through speaking, listening, reading, writing, labs and films. Designed for students without previous training in French. Credit only for students who have had less than two years of French in secondary school. 401-402 taken together satisfies the foreign language requirement. Special fee.

### **FREN 402 - Elementary French II**

**Credits:** 4.00

See description for FREN 401. FREN 401 is a prerequisite for this course. Cannot be taken separately except with permission of instructor.

### **FREN 403 - Review of French**

**Credits:** 4.00

Conducted in French. Course emphasizes the active use of French through speaking, listening, reading, writing, labs, and films while providing a review of basic grammar. Designed for those students whose study of French has been interrupted for a significant amount of time or who have had two or more years of high school French. Special fee. FREN 403 does not satisfy the foreign language requirement.

### **FREN 500 - Selected Topics in World Literature**

**Credits:** 4.00

Topics will be chosen that introduce students to major themes and genres. (Also offered as CLAS 500, GERM 500, ITAL 500, PORT 500, RUSS 500, SPAN 500.) May be repeated for credit. Credit/Fail. Writing intensive.

### **FREN 503 - Intermediate French I**

**Credits:** 4.00

Conducted in French. Review of grammar with emphasis on the development of reading, writing, speaking, and listening skills, and on culture. Discussion in French of literary and cultural readings. Labs and films. Special fee. Writing intensive.

### **FREN 503H - Honors/Intermediate French I**

**Credits:** 4.00

Conducted in French. Review of grammar with emphasis on the development of reading, writing, speaking, and listening skills, and on culture. Discussion in French of literary and cultural readings. Labs and films. Special fee. Writing intensive.

### **FREN 503Q - Intermediate French I - Quebec**

**Credits:** 4.00

This course is the same course as 503 on campus with the addition of 9 hours of conversation with a native speaker, 20 hours of field trips, and a home stay for full immersion. Conducted in French. Review of grammar with emphasis on the development of reading, writing, speaking, and listening skills, and on culture. Discussion in French of literary and cultural readings. Labs and films. Special fee. Writing intensive. (3 weeks in January)

### **FREN 504 - Intermediate French II**

**Credits:** 4.00

Conducted in French. Review of grammar with emphasis on the development of reading, writing, speaking, and listening skills, and on culture. Discussion in French of literary and cultural readings. Labs and films. Special fee. Writing intensive.

### **FREN 504H - Honors/Intermediate French II**

**Credits:** 4.00

Conducted in French. Review of grammar with emphasis on the development of reading, writing, speaking, and listening skills, and on culture. Discussion in French of literary and cultural readings. Labs and films. Special fee. Writing intensive.

### **FREN 522 - French Drama in Translation**

**Credits:** 4.00

Taught in English, major works of comedy, tragedy, and drama. Moliere and Racine to the present day. Not for major credit. Special fee. (Not offered every year.)

### **FREN 525 - Introduction to French Civilization and Culture**

**Credits:** 4.00

Taught in English. French civilization from a variety of perspectives and topics. Includes historical, geographical, and artistic expressions of French culture. Not for major credit. May be repeated for credit barring duplication of materials. Special fee. (Not offered every year.) Writing intensive.

### **FREN 526 - Introduction to Francophone Cultures**

**Credits:** 4.00

Taught in English. Focus on French-speaking cultures other than France. Includes historical, geographical, and artistic expressions of these cultures. Not for major credit. May be repeated for credit barring duplication of materials. Special fee. (Not offered every year.) Writing intensive.

### **FREN 582 - Study Abroad in Paris**

**Credits:** 1.00 to 16.00

Study with the University of Delaware program in Paris, France. For students who have completed 503 with a grade of B- or better. Students take one language course (equivalent to FREN 503 or 504) and courses taught in English (topics include Art History, History, Literature, and Political Science). Special fee. Prereq: FREN 501 or FREN 503. Cr/F.

### **FREN 585 - Intermediate Language Study in France**

**Credits:** 4.00

Equivalent to FREN 503, requires four weeks of intensive study of French language and culture at the Centre International d'Etudes Francaises (CIEF) in Dijon, France. Prereq: FREN 403 or French 4 in a U.S. high school, with a GPA of 2.5 or better and permission. Special UNH fee. Student responsible for personal and travel expenses. (Offered summers only.)

### **FREN 586 - Intermediate Language Study in France**

**Credits:** 4.00

Equivalent to FREN 504, requires four weeks of intensive study of French language and culture at the Centre International d'Etudes Francaises (CIEF) in Dijon, France. Prereq: FREN 503 or 585 with a GPA 2.5 or better and permission. Special UNH fee. Student responsible for personal and travel expenses. (Offered summers only.)

### **FREN 595 - French Practicum**

**Credits:** 2.00

Practical use of French language or cultural skills outside the classroom through special projects. May be repeated up to 4 credits. Prereq: Permission. Cr/F.

### **FREN 599 - Readings in Current Periodicals of Quebec**

**Credits:** 4.00

French 599 is part of the January Term immersion program in Montreal, Canada. This course is taught in French only and as part of the immersion program you are required to speak French at all times. You will improve your linguistic and cultural proficiency by exploring identity of Quebec through news articles, audio, movies and other multimedia resources. By building upon your language skills in French, you will apply new grammatical structures and vocabulary to examine the historical, social, and political contexts of contemporary Quebec. In addition to language skills and cultural proficiency, you will be developing critical and analytic tools, with a focus on expressing your ideas through effective writing and speaking. Prereq: FREN 504. Special fee.

### **FREN 631 - Advanced French Conversation and Composition I**

**Credits:** 4.00

Rapid review of basic grammatical structures and in-depth study of more complex linguistic patterns. Vocabulary building. Frequent written compositions and oral presentations using materials on contemporary culture taken from various media. Students develop phonetics and oral/aural skills in lab and class. Prereq: C or better in FREN 504. Required for majors. Special fee. Writing intensive.

### **FREN 632 - Advanced French Conversation and Composition II**

**Credits:** 4.00

Rapid review of basic grammatical structures and in-depth study of more complex linguistic patterns. Vocabulary building. Frequent written compositions and oral presentations using materials on contemporary culture taken from various media. Students develop phonetics and oral/aural skills in lab and class. Prereq: C or better in FREN 504. Required for majors. Special fee. Writing intensive.

### **FREN 635 - Introduction to Business French - Brest**

**Credits:** 4.00

This course requires four weeks of intensive study of French language at the Centre International D'Etudes des Langues (CIEL) in Brest, France. Prereq: FREN 632 or equivalent with a GPA of 2.5 or better and permission. Special UNH fees. Student responsible for personal and travel expenses. At the end of this course, students may take the level one Paris Chamber of Commerce test in business French for an additional fee. (Offered summers only.)

### **FREN 651 - Readings in French Literature**

**Credits:** 4.00

Reading and rigorous oral and written analysis of texts selected to illustrate important themes/genres in French literature. May be taken before or after FREN 652. Pre- or Co-Req: FREN 631-632. Required for majors. Special fee. Writing intensive.

### **FREN 651H - Honors/Readings in French Literature**

**Credits:** 4.00

Reading and rigorous oral and written analysis of texts selected to illustrate important themes/genres in French literature. May be taken before or after FREN 652. Pre- or Co-Req: FREN 631-632. Required for majors. Special fee. Writing intensive.

### **FREN 652 - Readings in French Literature**

**Credits:** 4.00

Reading and rigorous oral and written analysis of texts selected to illustrate important themes/genres in French literature. May be taken before or after FREN 652. Pre- or Co-Req: FREN 631-632. Required for majors. Special fee. Writing intensive. May be taken before or after FREN 651. Writing intensive.

### **FREN 652H - Honors/Readings in French Literature**

**Credits:** 4.00

Reading and rigorous oral and written analysis of texts selected to illustrate important themes/genres in French literature. May be taken before or after FREN 652. Pre- or Co-Req: FREN 631-632. Required for majors. Special fee. Writing intensive. May be taken before or after FREN 651. Writing intensive.

**FREN 675 - Topics in French Civilization****Credits:** 4.00

Topics drawn from all aspects and periods of French civilization. Prereq: FREN 631, 632, and 651 or 652. May be repeated for credit barring duplication of materials. Special fee. (Not offered every year.) Writing intensive.

**FREN 676 - Topics in Francophone Culture****Credits:** 4.00

Topics drawn from all aspects and periods of French civilization. Prereq: FREN 631, 632 and 651 or 652. May be repeated for credit barring duplication of materials. Special fee. (Not offered every year.) Writing intensive.

**FREN 677 - France in the European Union****Credits:** 4.00

Topics drawn from all aspects of contemporary French culture in its relationship with the fifteen member states of the European Union, with emphasis on the role of France in the building of the European Union. Special fee. Prereq: FREN 631-632. Coreq: FREN 651 or 652. (Not offered every year.) Writing intensive.

**FREN 682 - Study Abroad in Paris****Credits:** 1.00 to 16.00

Study with the University of Delaware program in Paris, France. For students who have completed FREN 504 or 631 with a grade of B- or better. Students take one language course (equivalent to FREN 631 or 632) and courses taught in English (topics include Art History, History, Literature, and Political Science). Special fee. Prereq: FREN 504 or FREN 631. Cr/F.

**FREN 683 - Advanced Language Study in France****Credits:** 4.00

Equivalent to FREN 631, this course requires four weeks of intensive study of French language at the Centre International d'Etudes Francaises (CIEF) in Dijon, France. Prereq FREN 504 with a GPA of 2.5 or better and permission. Special UNH fee. Student responsible for personal and travel expenses. Offered summers only.

**FREN 684 - Advanced Language Study in France****Credits:** 4.00

Equivalent to FREN 632, this course requires four weeks of intensive study of French language at the Centre International d'Etudes Francaises (CIEF) in Dijon, France. . Prereq: FREN 504 or FREN 683, with a GPA of 2.5 or better and permission. Special UNH fee. Student responsible for personal and travel expenses. (Offered summers only.)

**FREN 690 - Study Abroad in Dijon France****Credits:** 16.00

Spring semester at the University of Burgundy (Dijon, France) for juniors. This one-semester program is open to majors who have completed with a B- or better FREN 631-632 and FREN 651 or 652, or equivalent. Non-majors need to speak with the program director to determine their eligibility. Non-credit orientation meetings are required during the fall semester prior to departure. The normal UNH requirements for studying abroad apply to this program. For further information, interested students should consult with the director in the French program. Special fee. Prereq: FREN 504 with a C or better and

permission. Non-majors FREN 631, 632; FREN 651 or 652 for majors. Special fee. May be repeated. Cr/F.

### **FREN 691 - Summer in Dijon Program**

**Credits:** 8.00

Eight weeks of intensive French literature, culture and civilization courses at the CIEF (Centre International des Etudes Francaises) at the Universite de Bourgogne in Dijon, France. The course is only open to French double majors who cannot spend a semester abroad for documented reasons. By petition only, with a minimum GPA of 2.5. Prereq: FREN 631, 632, 651, and 652. Offered during the Summer only. Special fee.

### **FREN 695 - Special Advanced Language Study in France**

**Credits:** 4.00

Four weeks of intensive language study at the Centre International d'Etudes Francaises (CIELF) in Dijon, France. Prereq: FREN 631 and 632 with grade of B- or better and permission. Special UNH fee and DCE administrative fee. Student responsible for personal and travel expenses as well as tuition and other costs at CIELF. (Offered summer only.) Special fee.

### **FREN 762 - 17th Century French Literature**

**Credits:** 4.00

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered fall semester in alternate years.) Writing intensive.

### **FREN 765 - 18th Century French Literature**

**Credits:** 4.00

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered spring semester in alternate years.) Writing intensive.

### **FREN 775 - 19th Century French Literature**

**Credits:** 4.00

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered fall semester in alternate years.) Writing intensive.

### **FREN 782 - 20th Century French Literature**

**Credits:** 4.00

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered spring semester in alternate years.) Writing intensive.

### **FREN 785 - Topics in Francophone Literatures**

**Credits:** 4.00

Readings in French literatures from outside of France (e.g., Quebec, Africa, the Caribbean). Taught in French. Prereq: FREN 651 and 652. Special fee. (Not offered every year.) Writing intensive.

### **FREN 790 - Advanced Language and Style**

**Credits:** 4.00

Translation of contemporary texts, intensive study of major writing techniques (such as narration, explication de texte, compte rendu, dissertation). Required for major. Prereq: at least two literature courses in French numbered above 652. Special fee. (Fall semester only.) Writing intensive.

### **FREN 795 - Special Studies in French Language and Literature**

**Credits:** 1.00 to 4.00

Individual guided study of the work of a major author, a genre, or specific topics in literature. Training in bibliography and organization of material. Prereq: permission. (Not offered every year.)



### **FREN 796 - Special Studies in French Language and Literature**

**Credits:** 1.00 to 4.00

See description for FREN 795.

### **FREN 798 - Seminar in French Literature**

**Credits:** 4.00

Topics chosen by the instructor. May be repeated for credit barring duplication of material. Prereq: FREN 651, 652; permission. (Not offered every year.)

### **FREN 799 - Honors Senior Thesis**

**Credits:** 2.00

Yearlong course leading to an honors senior thesis. Open only to seniors seeking honors in major whose individually designed research projects have been approved by the department honors committee and who have been assigned an adviser. Students must enroll for both fall and spring semesters. Students defend the resulting written thesis in an oral presentation before department members and others. Prereq: permission.

## Genetics

### **GEN 401 - Professional Perspectives in Genetics**

**Credits:** 1.00

Introduction to the fields of genetics and genomics and to the genetics faculty and their research. Invited speakers provide a sampling of careers available to genetic majors. Emphasis on skills needed for academic success and strategies for achieving professional goals. Required for first-year genetics majors; open to others. Fall semester only. Cr/F.

### **GEN 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. Prereq: permission. Cr/F.

### **GEN 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. Prereq: permission. Writing intensive. Cr/F.

### **GEN 604 - Principles of Genetics**

**Credits:** 4.00

Chemical structure of genetic material, Mendelism, gene recombination, and chromosome mapping. Mutation, gene expression and regulation, recombinant DNA. Quantitative inheritance and population genetics. Prereq: BIOL 411 and 412; CHEM 403 and 404. College math or statistics suggested. Offered each semester. Special fee.

### **GEN 606 - Genetics Lab**

**Credits:** 4.00

Hands-on experience with some of the important organisms used for research in genetics (*Drosophila*, *E. coli*, yeast, *C. elegans*, and plants). Investigation of fundamental genetic concepts in the laboratory, experience with transmission and molecular genetic techniques, introduction to bioinformatics, and analysis and interpretation of data. Prereq: GEN 604. Special fee.

### **GEN 704 - Genetics of Prokaryotic Microbes**

**Credits:** 5.00

Study of the maintenance, exchange, and expression of genetic material in bacteria and their viruses. Combines a historical overview on the important role microbial genetics played in the development of modern molecular biology with a contemporary perspective on the methods used to understand the function of genes. Particular emphasis is placed on current experimental applications to basic science, biomedical research, and biotechnology. Prereq: BMCB 658 and BMS 503. Lab. Special fee.

### **GEN 705 - Population and Quantitative Genetics**

**Credits:** 4.00

An introduction to the theory and application of population and quantitative genetics. Exploration of the forces (mutation, selection, random drift, inbreeding, assortative mating) affecting the frequency and distribution of allelic variation in natural populations. Quantifying the structure of populations. Analysis of continuous variation in populations simultaneously at multiple loci, interactions between genes and their

environment underlying phenotypic variation. Methods of analysis for theoretical and practical applications. Prereq: GEN 604; one semester of statistics and calculus recommended. Lab. (Not offered every year.)

### **GEN 706 - Human Genetics**

**Credits:** 3.00

The genetic basis of human traits and diseases. New understanding added by molecular genetic approaches. Human genome project, gene therapy. Discussion of genetic components of quantitative and behavioral traits in human evolution. (Not offered every year.) Prereq: GEN 604 or ANSC 612.

### **GEN 711 - Genomics and Bioinformatics**

**Credits:** 4.00

The methods, applications, and implications of genomics--the analysis of whole genomes. Microbial, plant and animal genomics are addressed, as well as medical, ethical and legal implications. The lab provides exposure and experience on a range of bioinformatics approaches--the computer applications used in genome analysis. Prereq: GEN 604. Lab.

### **GEN 712 - Introduction to Perl programming for Bioinformatics**

**Credits:** 4.00

Introductory course in PERL programming designed to enable students in the life sciences to solve fundamental biological questions of simple to moderate complexity that require the use of computers to automate repetitive tasks and handle query results efficiently, including: computer values of important parameters of biological sequence data, writing pattern search and motif discovery scripts, accessing, querying, manipulating, retrieving, parsing, analyzing, and saving data from local and remote databases. Prereq: GEN 604 or permission. Lab.

### **GEN 713 - Microbial Ecology and Evolution**

**Credits:** 4.00

Functional roles of microorganisms, their population dynamics and interactions, and their mechanisms of evolutionary change in natural communities, laboratory experiments, and simple mathematical models. Special emphasis on the tempo and mode of prokaryotic adaptation, the evolution of virulence, and the origin of new pathogens. Prereq: BMS 503. Special fee. Writing intensive.

### **GEN 715 - Molecular Evolution**

**Credits:** 4.00

Rates and patterns of evolutionary change in biomolecules. Forces affecting the size and structure of genomes. Molecular mechanisms of organismal evolution. Emphasizes integrating evidence from biochemistry, molecular genetics and organismal studies. Methods for reconstructing phylogeny from molecular sequences. Prereq: GEN 604. Some knowledge of statistics is recommended. Special fee. Lab. (Not offered every year.)

### **GEN 717 - Molecular Microbiology**

**Credits:** 5.00

Fundamental physiological and metabolic processes of archaea, bacteria and fungi with a strong emphasis on prokaryotes. Literature-based course. Topics include regulation of and coordination of microbial metabolism, bacterial cell cycle, global control of gene expression, signal transduction, and microbial cell differentiation. Prereq: BMS 503; GEN 604; BMCB 658 or 751 recommended; or permission. Special fee. Lab. Writing intensive.

### **GEN 728 - Statistical Genomics**

**Credits:** 4.00

Provide a strong foundation in fundamental statistical concepts, particularly as they relate to genomics. Topics will include: linkage disequilibrium, haplotypes, statistical tests used for evolutionary genetic and

genomic analysis, recombination, selective sweeps, detecting gene variants in common diseases, modeling methods used in genomics, quantitative trait loci, Bayesian methodology, Markov Chain Monte Carlo methods, epistasis, and analysis of microarray databases. Prereq: BIOL 528; GEN 604; or permission.

### **GEN 771 - Molecular Genetics**

**Credits:** 4.00

Structure, organization, replication, dynamics, and expression of genetic information in eukaryotes. Focus on molecular genetic mechanisms of gene expression and its control; molecular genetics methods; molecular genetic control of cell division and differentiation during development. Prereq: BMCB 658 or 751; GEN 604; or permission.

### **GEN 772 - Evolutionary Genetics of Plants**

**Credits:** 4.00

Mechanisms of genetic change in plant evolution, domestication, breeding, and genetic engineering. Topics include Darwinian theory; speciation and hybridization; origins and co-evolution of nuclear and organelle genomes; gene and genome evolution; transposable elements, chromosome rearrangements, polyploidy. Lab: bioinformatics, phylogenetics, writing and presentation skills. Prereq: GEN 604 or equivalent; or BIOL 411/412 or equivalent. Lab. Special fee. (Not offered every year.) Writing intensive.

### **GEN 774 - Plant Biotechnology and Genetic Engineering**

**Credits:** 3.00

Plant transformation and regeneration, gene isolation and identification, structure and regulation of plant genes, current applications, and environmental and social implications of plant genetic engineering. Prereq: GEN 604 or permission. (Not offered every year.)

### **GEN 775 - Plant Biotechnology and Genetic Engineering Lab**

**Credits:** 2.00

Techniques for genetic transformation and selection of plants, analysis of foreign gene expression, and plant cell and tissue culture. Coreq: GEN 774. Special fee. (Not offered every year.)

**Co-requisites:** GEN 774

### **GEN 790 - Undergraduate Teaching Experience**

**Credits:** 1.00 to 4.00

Students assist Graduate Teaching Assistants in preparing, presenting, and executing Genetics courses/laboratories. May be repeated up to a maximum of 4 credits.

### **GEN 795 - Investigations**

**Credits:** 1.00 to 4.00

Independent study/research in various areas of genetics. Prereq: permission. May be repeated to a maximum of 4 credits.

### **GEN 795W - Investigations**

**Credits:** 1.00 to 4.00

See description for GEN 795. Writing intensive.

### **GEN 799 - Senior Thesis**

**Credits:** 1.00 to 4.00

Writing intensive.

### **GEN 799H - Honors Senior Thesis**

**Credits:** 1.00 to 4.00

Writing intensive.



## Geography

### **GEOG 401 - Regional Geography of the Western World**

**Credits:** 4.00

An introduction to the people, places, and problems of six Westernized regions of the world -- Europe, Russia, Latin America, the Caribbean, North America, and Australia and Oceania. The course emphasizes five themes: environmental geography, population and settlement, cultural coherence and diversity, geopolitical framework, and economic and social development.

### **GEOG 401H - Honors/Regional Geography of the Western World**

**Credits:** 4.00

An introduction to the people, places, and problems of six Westernized regions of the world -- Europe, Russia, Latin America, the Caribbean, North America, and Australia and Oceania. The course emphasizes five themes: environmental geography, population and settlement, cultural coherence and diversity, geopolitical framework, and economic and social development.

### **GEOG 402 - Regional Geography of the Non-Western World**

**Credits:** 4.00

Major culture areas of the non-Western world and the unique interaction of human and physical phenomena that produces the distinctive character of these areas. Emphasizes the manner in which people of different cultures have made use of opportunities and solved problems existing in the major regions occupied by non-Western cultures: the Middle East and North Africa, Africa south of the Sahara, Oriental Asia and the Pacific Islands.

### **GEOG 402H - Honors/Regional Geography of the Non-Western World**

**Credits:** 4.00

Major culture areas of the non-Western world and the unique interaction of human and physical phenomena that produces the distinctive character of these areas. Emphasizes the manner in which people of different cultures have made use of opportunities and solved problems existing in the major regions occupied by non-Western cultures: the Middle East and North Africa, Africa south of the Sahara, Oriental Asia and the Pacific Islands.

### **GEOG 473 - Elements of Weather**

**Credits:** 4.00

Basic principles of weather phenomena and the physical processes underlying these phenomena. Emphasis on weather patterns of New England. Lab.

### **GEOG #510 - Geography of New England**

**Credits:** 4.00

An introduction to the physical and human geography of New England, including landforms, climate and vegetation, population and settlement, urban patterns, culture and identity, political geography, natural resources, and economic development.

### **GEOG 514 - Geography of the United States and Canada**

**Credits:** 4.00

An introduction to the physical and human geography of the United States and Canada, including landforms, climate and biogeography, environmental issues, population and settlement, culture and identity, political geography, urban patterns, natural resources and economic development. Course content alternates between topics that are large in scope and scale, and others that are more narrowly focused.

### **GEOG 540 - Geography of the Middle East**

**Credits:** 4.00

Environmental, cultural, political-geographic, and ecological foundations of the Middle East. Selected regional problems and issues, e.g., geographical dimensions of the Arab-Israeli conflict, oil, urbanization, population growth, and nomadism. (Not offered every year.)

### **GEOG 541 - Geography of Japan**

**Credits:** 4.00

Examination of Japan's environmental setting, historical geographic evolution, distinctive cultural geographic patterns, population and settlement characteristics, internal spatial differentiation, economic growth, political geographic structure, and global importance. (Not offered every year.) Writing intensive.

### **GEOG 550 - Geography of Sub-Saharan Africa**

**Credits:** 4.00

Overview of major physical features and human patterns, with an emphasis on the interaction between people and place and the dynamic issues and challenges facing contemporary African societies. Environmental and resource issues, historical impacts on development, culture and social characteristics, rural and urban organization, industrialization and trade, and prospects for the future.

### **GEOG 560 - Geography of Natural Hazards**

**Credits:** 4.00

A survey of natural hazards with a focus on what makes them hazardous to humans and how humans respond to those risks. Hazards that are considered include earthquakes, volcanoes, tsunamis, floods, hurricanes and other severe weather events. The geography of community vulnerability to natural hazards is also examined.

### **GEOG 572 - Geography of the Natural Environment**

**Credits:** 4.00

Provides an introduction to geography of the natural environment, including landforms, weather and climate, water resources, and biogeography. Examines the processes that shape the different elements of the environment and the relationships between them.

### **GEOG 573 - Biogeography**

**Credits:** 4.00

Explores the introductory concepts of plant geography and biogeography, two interconnected disciplines that document and explain the changing distributions of plants and animals from both a spatial and temporal context. Gives equal emphasis to ecology (biomes, climates, soils), evolution (migration, speciation, dispersal), and applied biogeography and plant geography.

### **GEOG 574 - Geography of Landforms**

**Credits:** 4.00

Explores the geography of earth's major landforms and the geographic factors that influence their development, distribution, and morphology. Topics include mountain building, river systems, desert migration and expansion, glacial and periglacial environments, shoreline evolution, and how these processes interact to form surface features that are unique to their geographic environment. Students analyze geographic information in class and in the field using air photos, topographic maps, and spatial data.

### **GEOG 581 - Human Geography**

**Credits:** 4.00

Differentiation of the world in terms of population, race, language, religion, political territory, and economic life. Collection and critical use of empirical data; emphasis on spatial and ecological analysis.

### **GEOG 582 - Economic Geography**

**Credits:** 4.00

Investigates the manner in which resources and space have been organized for the production of goods and services: agriculture, the extractive industries, manufacturing, and the tertiary sector. Empirical studies, theories of location, and location models. Major contemporary problems and issues in agriculture and food supply, energy sources, industrial readjustment, and the global economy. (Not offered every year.) Writing intensive.

### **GEOG 583 - Urban Geography**

**Credits:** 4.00

Spatial structure of cities and the city system. Emphasizes the North American city and its problems: land use, transportation, political fragmentation, physical environment, and residential patterns. Trends in urbanization in the developed and developing worlds. Global cities. (Not offered every year.)

### **GEOG 584 - Political Geography**

**Credits:** 4.00

Interactions between geographic and political phenomena at the sub-national, national, and international levels. Emphasis on geographical aspects of current political problems within and between states. (Not offered every year.) Writing intensive.

### **GEOG 588 - Geography of Food**

**Credits:** 4.00

Explores the geography of what people eat around the world. Examines the factors that shape food traditions in particular places and regions, including geographical differences in the environment, population patterns, cultural characteristics, political processes, economic conditions, and history. Considers how diets are changing today in response to globalization and other forces. Emphasis will be on common, everyday foods eaten by regular people. Organized regionally. Special fee.

### **GEOG 595 - Statistics for Geographers**

**Credits:** 4.00

Introduces statistics to geographers. Utilizes facts, such as population, vegetation patterns, and policy differences in terms of spatio-temporal focus. Students learn concepts from lectures and statistical tools for analysis during labs and homework assignments.

### **GEOG 650 - Field Methods in Geography**

**Credits:** 4.00

a survey of selected geographical field methods and the application of these methods - both qualitative and quantitative. It is designed around a series of field techniques, research and lab exercises, and the classroom setting which will introduce students to techniques widely used in gathering and analyzing spatial data in the geographical context. Special fee.

### **GEOG 658 - Introduction to Geographic Information Systems**

**Credits:** 4.00

An introduction to the use of geographic information systems (GIS) for natural resources and related fields. Data models/structures, map projections, data input/output/storage, data analysis/modeling, interpolation, and data/quality standards. Hands-on using ArcView 3.x GIS software. Students are strongly encouraged to complete an introductory course in statistics before enrolling in course. Permission. (Also offered as NR 658.)

### **GEOG 670 - Climatology**

**Credits:** 4.00



An introduction to the study of the Earth's climate. Examines the influences on long-term global and regional average temperature and precipitation through climate data interpretation and analysis. Such analysis serves as the basis for climate classification and characterization of climate variability.

### **GEOG 671 - Advanced Weather Analysis**

**Credits:** 4.00

Examines in depth, the physical processes that govern the development and movement of weather systems and the principles that drive the lowest layer of the atmosphere. Topics include the relationship between surface and upper-level, tropospheric air flow, vertical motion, mesoscale storm development, and techniques used in weather analysis and forecasting. Prereq: GEOG 473.

### **GEOG 673 - Issues in Environmental Geography**

**Credits:** 4.00

Examines a sample of contemporary environmental issues from a geographic perspective. Emphasizes the importance of scale, human influences, and impacts on resources. Analyzes issues of regional, national, and global interest. Writing intensive.

### **GEOG 680 - Historical Geography**

**Credits:** 4.00

An introduction to major themes, important scholars, and commonly used research techniques in historical geography. Course is reading and research oriented. Focus will be on North America. (Also listed as HIST 680.) Writing intensive.

### **GEOG 685 - Geography of Population and Development**

**Credits:** 4.00

A regional approach to the study of population geography with concern for the interaction between the focus of economic growth and the components of population change and development. Considers the environmental impact of developing trends in the developed and developing worlds and the relationship of these trends to sustainable growth and population patterns. Writing intensive.

### **GEOG 690 - Geography of Third World Development**

**Credits:** 4.00

Explores the geography of development in the Third World (Africa, Asia, Latin America, and Oceania). Addresses factors that affect development spatially and temporally. Emphasis on geographic scale (local, national, regional, and global). Students write and present critical thinking papers that address the interactions of development factors at different scales.

### **GEOG 695 - Internship**

**Credits:** 1.00 to 4.00

Internships provide an opportunity for on-the-job skill development and practical experience in a closely supervised work setting. The student must provide a written proposal to a supervising faculty member before an internship program is approved. At the end of the semester, the student must make a presentation, provide work samples, or submit a detailed report, log, or portfolio describing the internship experience. May be repeated for up to 8 hours of credit. Cr/F.

### **GEOG 757 - Remote Sensing of the Environment**

**Credits:** 4.00

Practical and conceptual presentation of the use of remote sensing and other geospatial technologies for mapping the environment. The course begins with the use of aerial photographs (Photogrammetry and photo interpretation) and includes measures of photo scale and area, parallax and stereo viewing, object heights, flight planning, photo geometry, the electromagnetic spectrum, camera image analysis, global positioning systems (GPS), and geographic information systems (GIS). Conceptual lectures are

augmented with practical homework assignments and hands-on lab exercises. Prereq: Algebra. Special fee. Lab. (Also offered as NR 757).

### **GEOG 759 - Digital Image Processing for Natural Resources**

**Credits:** 4.00

Introduction to digital remote sensing, including multispectral scanners (Landsat and SPOT), radar, and thermal imagery. Hands-on image processing including filtering, image display, ratios, classification, registration, and accuracy assessment. GIS as it applies to image processing. Discussion of practical applications. Use of ERDAS image-processing software. Knowledge of PCs required. Prereq: GEOG 757 or equivalent and permission. (Also offered as NR 759).

### **GEOG 760 - Geographic Information Systems in Natural Resources**

**Credits:** 4.00

Introduces the use of geographic information systems (GIS) for use with natural resources including data input, manipulation, storage, analysis, and display. Accuracy of spatial data and use of digital elevation models. Discussion of practical applications. Use of PC Arc/Info software. Prereq: permission. Lab. (Also listed as NR 760.)

### **GEOG 795 - Special Project**

**Credits:** 2.00 or 4.00

Readings, library, archival, and fieldwork. Primarily for geography seniors. Prereq: permission. Writing intensive.

### **GEOG 796 - Special Topics**

**Credits:** 4.00

Special Topics in Geography: A) Climatology, B) Environmental Geography, C) Urban Geography, D) Political Geography, E) Population Geography, F) Economic Geography, G) Cultural Geography. Prereq: permission

### **GEOG 797 - Seminar**

**Credits:** 2.00

Exploration of geography as a research discipline. Definition and investigation of research problems. Primarily for geography seniors. May be repeated up to a maximum of 4 credits.

### **GEOG 799 - Honors Thesis**

**Credits:** 4.00

Independent research project conducted under supervision of a faculty sponsor culminating in a written thesis. Students must also make a public presentation of their thesis. Required for all honors students. Open only to geography majors who are part of the honors program. Before registering for the course, students must secure a faculty sponsor, obtain approval for a thesis topic, and complete an honors thesis student/sponsor agreement.

## German

### **GERM 401 - Elementary German I**

**Credits:** 4.00

For students without previous training in German. Aural comprehension, speaking, writing, reading, language labs. No credit for those with two or more years of German in secondary school. Special fee.

### **GERM 402 - Elementary German II**

**Credits:** 4.00

See description for GERM 401.

### **GERM 500 - Selected Topics in World Literature**

**Credits:** 4.00

Topics are chosen that introduce students to major themes and genres. (Also offered as CLAS 500, FREN 500, ITAL 500, PORT 500, RUSS 500, SPAN 500.) May be repeated for credit. Credit/Fail. Writing intensive.

### **GERM 503 - Intermediate German I**

**Credits:** 4.00

Review of grammar; practice in oral and written expression; readings and cultural material. Prereq: GERM 401-402 or equivalent. Labs. Special fee.

### **GERM 504 - Intermediate German II**

**Credits:** 4.00

See description for GERM 503.

### **GERM 521 - Major German Authors in English**

**Credits:** 4.00

Selected masterpieces of the 18th, 19th, and 20th centuries by authors such as Goethe, Mann, Kafka, Hesse, Bachmann, Koeppen, Brecht, Frisch, Wolf, and Durrenmatt. Readings and discussions in English. May be taken for major credit. Special fee.

### **GERM 524 - German Cinema**

**Credits:** 4.00

Aquaints students with major German film texts. Using analytical and critical tools, students read film texts as aesthetic works (with a form and a narrative) and as historical works (with a social function). Through cinema the course explores German society and history. The course is conducted in English. Special fee.

### **GERM 524H - Honors/Special Topics in German Film**

**Credits:** 4.00

Using analytical and critical tools, students read film texts as aesthetic works (with a form and a narrative) and as historical works (with a social function). Culminates in an investigation of a distinct historical period of German film or of a particular theme through the history of German film. Special fee.

### **GERM 525 - Introduction to German Culture and Civilization**

**Credits:** 4.00

Aspects of the political, social, and cultural life of Germany, Austria, and Switzerland. Conducted in English. Required of German majors; strongly recommended for any students planning study abroad in a German-speaking country. Special fee.

### **GERM 525H - Honors/Introduction to German Culture and Civilization**

**Credits:** 4.00

Aspects of the political, social, and cultural life of Germany, Austria, and Switzerland. Conducted in English. Required of German majors; strongly recommended for any students planning study abroad in a German-speaking country. Special fee.

### **GERM 585 - Rosenheim Summer Program: A Review of German**

**Credits:** 4.00

Provides an intensive, three-week review of the basic vocabulary and grammatical structures of the German language. While the reading, listening and writing skills will be practiced, this course emphasizes the speaking of the language in everyday, real-life situations. Conducted during the summer in Rosenheim, Germany. Special fee. Prereq: one year of college, elementary German or equivalent; permission.

### **GERM 586 - Study in Berlin**

**Credits:** 4.00 or 8.00

Gives students a short immersion experience in the German language and culture in Berlin, Germany. Students will study one week at UNH and 5 weeks in Berlin, where they will take an intensive language course (80 hours) at the BSI Private Language School, receive cultural instruction from the on-site UNH faculty member, and pursue an individual research project. Permission required. Special fee.

### **GERM 595 - Internship**

**Credits:** 2.00 to 4.00

The German Internship consists of unpaid placement in an approved business, social service or educational organization in a German-speaking context with on-site supervision. Student is responsible for keeping a journal to be evaluated by a UNH faculty mentor. Site supervisor evaluates intern's work on location in consultation with UNH mentor. Prereq: GERM 504. Variable credit 2 to 4 credits per unit. May count up to 4 credits toward German major or minor and an additional 4 as graduation elective. Does not replace Study Aboard requirement for major. Special fee.

### **GERM 601 - Introduction to German Literature**

**Credits:** 4.00

Reading and analysis of poems, dramas, and short prose; introduction to theory of literary forms and methods of analysis. Required of all German majors; must be taken as soon as possible after GERM 504. Prereq: knowledge of German. Special fee.

### **GERM 631 - Advanced Communications Skills I**

**Credits:** 4.00

Intensive practice in vocabulary building and developing a sense of appropriate style for various contexts of oral and written communication. Special emphasis on conversational and expository speaking. Discussion of topics of current interest, oral reports, role play, and simulation of everyday situations, reinforced by written work. Required for the German major and minor. Special fee. Prereq: GERM 504.

### **GERM 631H - Honors/Advanced Communications Skills I**

**Credits:** 4.00

Intensive practice in vocabulary building and developing a sense of appropriate style for various contexts of oral and written communication. Special emphasis on conversational and expository speaking. Discussion of topics of current interest, oral reports, role play, and simulation of everyday situations, reinforced by written work. Required for the German major and minor. Special fee. Prereq: GERM 504. Writing intensive.

### **GERM 631W - Advanced Communications Skills I**

**Credits:** 4.00

Intensive practice in vocabulary building and developing a sense of appropriate style for various contexts of

oral and written communication. Special emphasis on conversational and expository speaking. Discussion of topics of current interest, oral reports, role play, and simulation of everyday situations, reinforced by written work. Required for the German major and minor. Special fee. Prereq: GERM 504. Writing intensive.

### **GERM 632 - Advanced Communications Skills II**

**Credits:** 4.00

Intensive practice in vocabulary building and coherent expression in a variety of stylistic contexts. Special emphasis on writing skills, from expository prose to letter and resume writing, essays, journalistic reports, and creative writing, focusing on topics of current interest. Required for the German major. Special fee.

Prereq: GERM 504

### **GERM 685 - Study Abroad**

**Credits:** 16.00

A summer, semester, or year of study in one or a combination of the departmentally recognized programs such as the New England Universities Salzburg Program (UNH students as consortium members receive a discount on this program), the work-study program in Hamburg, or any other appropriate, approved programs. Open to students of any major with GERM 504 or equivalent training. Financial aid applies to all approved programs. Interested students should inquire at department for program brochures and specific requirements and should apply in consultation with a German adviser. For information on other study abroad programs, students should contact the Center for International Education. Cr/F. An IA (continuous grading) grade will be assigned until an official transcript is received from the foreign institution.

### **GERM 686 - Study Abroad**

**Credits:** 16.00

A summer, semester, or year of study in one or a combination of the departmentally recognized programs such as the New England Universities Salzburg Program (UNH students as consortium members receive a discount on this program), the work-study program in Hamburg, or any other appropriate, approved programs. Open to students of any major with GERM 504 or equivalent training. Financial aid applies to all approved programs. Interested students should inquire at department for program brochures and specific requirements and should apply in consultation with a German adviser. For information on other study abroad programs, students should contact the Center for International Education. Cr/F. An IA (continuous grading) grade will be assigned until an official transcript is received from the foreign institution.

### **GERM #721 - German Culture and Civilization**

**Credits:** 4.00

Historical, social, artistic, and folkloristic developments in German-speaking countries from the beginning to the present. Prereq: GERM 525 or permission of instructor. Special fee.

### **GERM #721H - Honors/German Culture and Civilization**

**Credits:** 4.00

Historical, social, artistic, and folkloristic developments in German-speaking countries from the beginning to the present. Prereq: GERM 525 or permission of instructor. Special fee.

### **GERM 728 - Modern German Literature**

**Credits:** 4.00

Major literary movements from 1872 to 1945. Reading and analysis of selected works. Special fee. Writing intensive.

### **GERM 728H - Honors/Modern German Literature**

**Credits:** 4.00

Major literary movements from 1872 to 1945. Reading and analysis of selected works. Special fee. Writing intensive.

**GERM 745 - Contemporary German Literature and Culture****Credits:** 4.00

Literary trends in the German-speaking countries since 1945. Analysis and interpretation of works by major authors. Special fee. Writing intensive.

**GERM 795 - Independent Study****Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with permission of the department chairperson and of the supervising faculty member or members. Barring duplication of subject, may be repeated for credit. Special fee.

**GERM 795H - Honors/Independent Study****Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with permission of the department chairperson and of the supervising faculty member or members. Barring duplication of subject, may be repeated for credit. Special fee.

**GERM 796 - Independent Study****Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with permission of the department chairperson and of the supervising faculty member or members. Barring duplication of subject, may be repeated for credit. Special fee.

**GERM 797 - Special Studies in German Language and Literature****Credits:** 2.00 or 4.00

Selected topics in language, culture, and literature.

**GERM 798 - Special Studies in German Language and Literature****Credits:** 2.00 or 4.00

Selected topics in language, culture, and literature. Special fee.

## Gerontology

### **GERO 795 - Independent Study**

**Credits:** 4.00

Practical experience with elderly populations under supervision of designated faculty.

## Greek

### **GREK 401 - Elementary Classical Greek I**

**Credits:** 4.00

Grammar, simple composition, and translation. For students without previous training in Greek. Special fee.

### **GREK 402 - Elementary Classical Greek II**

**Credits:** 4.00

Grammar, simple composition, and translation. For students without previous training in Greek. Special fee.

### **GREK 403 - Elementary Modern Greek I**

**Credits:** 4.00

Aural-oral practice and the study of fundamental speech patterns, reading, and writing to achieve a firm basis for an active command of the language. (No credit for students who have had two or more years of modern Greek in secondary school.) Special fee.

### **GREK 404 - Elementary Modern Greek II**

**Credits:** 4.00

Aural-oral practice and the study of fundamental speech patterns, reading, and writing to achieve a firm basis for an active command of the language. (No credit for students who have had two or more years of modern Greek in secondary school.) Special fee.

### **GREK 503 - Intermediate Classical Greek I**

**Credits:** 4.00

Readings from Xenophon, Plato, Herodotus, Euripides, and the New Testament. Prereq: GREK 402. Special fee.

### **GREK 504 - Intermediate Classical Greek II**

**Credits:** 4.00

Readings from Xenophon, Plato, Herodotus, Euripides, and the New Testament. Prereq: GREK 402. Special fee.

### **GREK 505 - Intermediate Modern Greek I**

**Credits:** 4.00

Short selections from modern Greek literature with grammar review and oral practice. Readings from such authors as Solomos, Cavafy, Palamas, Kazantzakis, Venezis, Myrivilis, Seferis, and Elytis. Prereq: GREK 404 or equivalent. Special fee.

### **GREK 506 - Intermediate Modern Greek II**

**Credits:** 4.00

Short selections from modern Greek literature with grammar review and oral practice. Readings from such authors as Solomos, Cavafy, Palamas, Kazantzakis, Venezis, Myrivilis, Seferis, and Elytis. Prereq: GREK 404 or equivalent. Special fee.

### **GREK 595 - Directed Reading in Greek**

**Credits:** 2.00 or 4.00

Independent study of a classical, Byzantine, or modern Greek author. May be repeated for a maximum of 8 credits. Prereq: GREK 503-506, or equivalent. Special fee.

### **GREK 596 - Directed Reading in Greek**



**Credits:** 2.00 or 4.00

Independent study of a classical, Byzantine, or modern Greek author. May be repeated for a maximum of 8 credits. Prereq: GREK 503-506, or equivalent. Special fee.

### **GREK #631 - Greek Prose Composition**

**Credits:** 4.00

Review of Attic Greek grammar, study of Greek prose style, English to Greek translation. Prereq: permission. Special fee.

### **GREK 635 - Third Year Modern Greek I**

**Credits:** 4.00

Rapid review of basic grammatical structures and in-depth study of more complex linguistic patterns. Vocabulary building. Frequent compositions and oral presentations using materials on contemporary culture and literary texts as well as various media. Students develop oral/aural skills in lab and class. Prereq: GREK 505-506; or 595-596 (if approved) with a grade of C or better. Special fee.

### **GREK 636 - Third Year Modern Greek II**

**Credits:** 4.00

Rapid review of basic grammatical structures and in-depth study of more complex linguistic patterns. Vocabulary building. Frequent compositions and oral presentations using materials on contemporary culture and literary texts as well as various media. Students develop oral/aural skills in lab and class. Prereq: GREK 505-506; or 595-596 (if approved) with a grade of C or better. Special fee.

### **GREK 751 - Homer and the Archaic Period**

**Credits:** 4.00

Readings from the Iliad, the Odyssey, the Homeric hymns, Hesiod, Pindar, and the lyric poets. Prereq: permission. Special fee.

### **GREK 753 - Advanced Study in Athenian Literature**

**Credits:** 4.00

A) Aeschylus, B) Sophocles, C) Euripides, D) Aristophanes, E) Herodotus, F) Thucydides, G) Xenophon, H) Plato, I) Aristotle, J) Lysias, K) Demosthenes, L) Isocrates. Major Attic authors from the Battle of Marathon to the death of Alexander the Great. Prereq: permission. Special fee.

### **GREK 754 - Advanced Study in Athenian Literature**

**Credits:** 4.00

A) Aeschylus, B) Sophocles, C) Euripides, D) Aristophanes, E) Herodotus, F) Thucydides, G) Xenophon, H) Plato, I) Aristotle, J) Lysias, K) Demosthenes, L) Isocrates. Major Attic authors from the Battle of Marathon to the death of Alexander the Great. Prereq: permission. Special fee.

### **GREK 795 - Special Studies**

**Credits:** 4.00

A) Pre-Socratic Philosophers; B) Hellenistic Greek Authors; C) Menander; D) Callimachus; E) Apollonius of Rhodes; F) Theocritus; G) Polybius; H) Greek Authors of the Roman Empire; I) Plutarch; J) Septuagint; K) New Testament; L) Greek Church Fathers; M) Byzantine Authors; N) Spoken Greek O) Advanced Greek Composition; P) Introduction to Classical Scholarship; Q) Greek Epigraphy; R) Greek Dialects; S) Comparative Grammar of Greek and Latin; T) Homer: A Linguistic Analysis; U) Greek Institutions; V) Paleography and Textual Criticism. Topics selected by instructor and student in conference. Prereq: permission. Special fee. Writing intensive.

### **GREK 796 - Special Studies**

**Credits:** 4.00

A) Pre-Socratic Philosophers; B) Hellenistic Greek Authors; C) Menander; D) Callimachus; E) Apollonius of Rhodes; F) Theocritus; G) Polybius; H) Greek Authors of the Roman Empire; I) Plutarch; J) Septuagint; K) New Testament; L) Greek Church Fathers; M) Byzantine Authors; N) Spoken Greek O) Advanced Greek Composition; P) Introduction to Classical Scholarship; Q) Greek Epigraphy; R) Greek Dialects; S) Comparative Grammar of Greek and Latin; T) Homer: A Linguistic Analysis; U) Greek Institutions; V) Paleography and Textual Criticism. Topics selected by instructor and student in conference. Prereq: permission. Special fee. Writing intensive.

## Health & Human Services

### **HHS 444 - The Right to be Disabled in the Extreme Makeover Society**

**Credits:** 4.00

Explores how society's view of disability, its "construction," is influenced by a variety of cultural variables and the implications of that construction on institutions such as medicine and health care, education, the arts, the legal system, architecture and engineering, etc.

### **HHS 540 - Statistics for Health and Human Service Professionals**

**Credits:** 4.00

A conceptual and analytical approach to the use of statistics in the health and human service professions. Emphasizes the logic and purpose of statistics. Attention to special problems of statistical design such as random assignment, single subject trials, and the ethics of control groups. Basic computer skills for manipulating data. No credit for students who have completed ADM 430; BIOL 528; ADMN 420; EREC 525; MATH 439; MATH 539; MATH 644; PSYC 402; SOC 502. Special fee.

### **HHS 698 - Special Topics**

**Credits:** 1.00 to 4.00

Explores areas related to specific professional health interests. May repeat but not duplicate subject areas. A) Communication Disorders, B) Health Management and Policy, C) Medical Laboratory Science, D) Nursing, E) Occupational Therapy, F) Kinesiology, G) Recreation Management and Policy, J) Family Studies, K) Social Work, L) Health Promotion, M-Z) Interdisciplinary. Prereq: permission. Cr/F.

### **HHS 798 - Special Topics**

**Credits:** 1.00 to 4.00

Explores areas related to specific professional health interests. May repeat but not duplicate subject areas. A) Communication Disorders, B) Health Management and Policy, C) Medical Laboratory Science, D) Nursing, E) Occupational Therapy, F) Kinesiology, G) Recreation Management and Policy, J) Family Studies, K) Social Work, L) Health Promotion, M-Z) Interdisciplinary. Prereq: permission. Special fee on some topics.

### **HHS 798W - Special Topics**

**Credits:** 1.00 to 4.00

Explores areas related to specific professional health interests. May repeat but not duplicate subject areas. A) Communication Disorders, B) Health Management and Policy, C) Medical Laboratory Science, D) Nursing, E) Occupational Therapy, F) Kinesiology, G) Recreation Management and Policy, J) Family Studies, K) Social Work, L) Health Promotion, M-Z) Interdisciplinary. Prereq: permission. Special fee on some topics. Writing intensive.

## Health Management & Policy

### **HMP 401 - United States Health Care Systems**

**Credits:** 4.00

Nature and functions of health care services and health professionals; impact of social, political, economic, ethical, professional, legal, and technological forces on health care systems. Current health policy issues.

### **HMP 401H - Honors/United States Health Care Systems**

**Credits:** 4.00

Nature and functions of health care services and health professionals; impact of social, political, economic, ethical, professional, legal, and technological forces on health care systems. Current health policy issues. Writing intensive.

### **HMP 401W - United States Health Care Systems**

**Credits:** 4.00

Nature and functions of health care services and health professionals; impact of social, political, economic, ethical, professional, legal, and technological forces on health care systems. Current health policy issues. Writing intensive.

### **HMP 403 - Introduction to Public Health**

**Credits:** 4.00

Course presents an overview of the structure, function, and organization of the public health system/services (governmental, proprietary, and voluntary sectors) and how they operate, emphasizing core functions and major divisions (public health administration, epidemiology and biostatistics, environmental health, social and behavioral health). Surveys contemporary problems facing society, e.g., workforce issues, bioterrorism, epidemics, and lifestyle choices contributing to obesity, tobacco and alcohol use, violence and challenges students to think critically about them. Introduces public health careers.

### **HMP 444 - From Frankenstein to Dolly, and Beyond**

**Credits:** 4.00

This course is an interdisciplinary introductory course designed specifically for first year students. It seeks to stimulate and support student inquiry and exploration of social and ethical issues associated with scientific research and advances, the value-laden questions that they often precipitate, and their impact on individuals, population groups, and society at large. (Also listed as MICR 444.)

### **HMP 444A - Global Public Health Issues**

**Credits:** 4.00

This course is designed to provide students with an introduction to and overview of the key areas of global health by addressing the major determinants of health and how health status is measured to determine the burden of disease in the developing world. Using the perspectives of public health, the course will cover factors associated with the development of health problems and efforts to prevent disease in impoverished areas. Students will also explore the role of social communication, politics, religion, economics, education and culture in contributing to global public health issues and will integrate these factors and values in developing solutions to the widespread public health issues impacting communities worldwide. Students will learn about the magnitude of disease in the developing world (e.g., communicable and non-communicable disease, women and child health, nutrition, and unintentional injuries), how health is assessed and how health systems effectively work together to improve global health.

### **HMP 501 - Epidemiology and Community Medicine**

**Credits: 4.00**

The distribution and determinants of disease, illness, and health in the community. Community health and illness measures, health status, and source of data. Development of hypotheses and study designs to reduce community health problems using epidemiological reasoning, methods, and analyses. Lab.

**HMP 501H - Honors/Epidemiology and Community Medicine****Credits: 4.00**

The distribution and determinants of disease, illness, and health in the community. Community health and illness measures, health status, and source of data. Development of hypotheses and study designs to reduce community health problems using epidemiological reasoning, methods, and analyses. Lab.

**HMP 505 - Public Health: History and Practice****Credits: 4.00**

Blends a broad overview of the historical development of public health with important areas of contemporary public health practice. Traces the history and practices of public health from classical times, through the Middle Ages, the Renaissance, and European Enlightenment. Special emphasis on the historical evolution, development, and future of public health in the U.S. The latter includes the organization of public health in the U.S., its major functions and practices, its infrastructure, its programs and services, and its future challenges.

**HMP 569 - Human Behavior and the Public Health****Credits: 4.00**

Provides a grounding in fundamental concepts of the behavioral sciences as they illuminate public health. Individual and community responses to prevention, identification of symptoms, diagnoses, treatments, chronic ailments, and rehabilitation are discussed. In each of these areas, the course explores the interaction between community, family, patient, and health care provider.

**HMP 600 - Special Topics****Credits: 1.00 to 4.00**

A) Hospital Management, B) Long-term Care Management, C) Ambulatory Care Management, D) Clinical Services Management, E) Home Care Management, F) Mental Health Management, G-Z) Interdisciplinary. May repeat, but may not duplicate subject areas. Prereq: junior major or permission. Special fee on some sections.

**HMP 621 - Pre-practicum Seminar****Credits: 2.00**

Preparation for field practicum experience, orientation to experiential learning and competency development. Prereq: major.

**HMP 622 - Field Practicum****Credits: 1.00**

Experiential learning in a health care organization; application of theories to practice. Planned learning objectives are accomplished through three distinct components. Supervision by agency personnel. Prereq: junior major; permission. Cr/F. 622A, Field Practicum Organizational Analysis: analysis of assigned health care agency, from external and internal viewpoints. Coreq: 622B; 622C. Cr/F. 622B, Field Practicum Management Skills Development: development of the basic quantitative and interpersonal skills required for a health services manager. Coreq: 622A; 622C. Cr/F. 622C, Field Practicum Project Analysis: demonstration of knowledge and analysis of specific problem-solving skills required during internship. Coreq: 622A; 622B. Credit/Fail.

**HMP 622A - Field Practicum in Organizational Analysis****Credits: 1.00**

Experiential learning in a health care organization; application of theories to practice. Planned learning objectives are accomplished through three distinct components. Supervision by agency personnel. Prereq: junior major; permission. Cr/F. 622A, Field Practicum Organizational Analysis: analysis of assigned health care agency, from external and internal viewpoints. Coreq: 622B; 622C. Cr/F. 622B, Field Practicum Management Skills Development: development of the basic quantitative and interpersonal skills required for a health services manager. Coreq: 622A; 622C. Cr/F. 622C, Field Practicum Project Analysis: demonstration of knowledge and analysis of specific problem-solving skills required during internship. Coreq: 622A; 622B. Credit/Fail.

### **HMP 622B - Field Practicum in Management Skills Development**

**Credits:** 1.00

Experiential learning in a health care organization; application of theories to practice. Planned learning objectives are accomplished through three distinct components. Supervision by agency personnel. Prereq: junior major; permission. Cr/F. 622A, Field Practicum Organizational Analysis: analysis of assigned health care agency, from external and internal viewpoints. Coreq: 622B; 622C. Cr/F. 622B, Field Practicum Management Skills Development: development of the basic quantitative and interpersonal skills required for a health services manager. Coreq: 622A; 622C. Cr/F. 622C, Field Practicum Project Analysis: demonstration of knowledge and analysis of specific problem-solving skills required during internship. Coreq: 622A; 622B. Credit/Fail.

### **HMP 622C - Field Practicum in Project Analysis**

**Credits:** 1.00

Experiential learning in a health care organization; application of theories to practice. Planned learning objectives are accomplished through three distinct components. Supervision by agency personnel. Prereq: junior major; permission. Cr/F. 622A, Field Practicum Organizational Analysis: analysis of assigned health care agency, from external and internal viewpoints. Coreq: 622B; 622C. Cr/F. 622B, Field Practicum Management Skills Development: development of the basic quantitative and interpersonal skills required for a health services manager. Coreq: 622A; 622C. Cr/F. 622C, Field Practicum Project Analysis: demonstration of knowledge and analysis of specific problem-solving skills required during internship. Coreq: 622A; 622B. Credit/Fail.

### **HMP 624 - Post Practicum Seminar**

**Credits:** 2.00

Summary and conclusion from field practicum experience. Individual analysis and panel discussions to include site assessment, project description and methodologies employed, critique of individual skills and knowledge base in relation to internship.

### **HMP 630 - Health Issues Seminar I**

**Credits:** 1.00

Discussion of current issues in the field of health management, health policy and public health. Prereq: major or permission.

### **HMP 631 - Health Issues Seminar**

**Credits:** 2.00

Discussion of current issues in the fields of health management, health policy and public health. Prereq: major or permission.

### **HMP 642 - Health Economics**

**Credits:** 4.00

Theoretical and empirical analysis of the U.S. health care delivery sector. Topics include health insurance markets and their effects on patients demand, uninsured populations and their access to health care services, breakdowns in the principal/agent relationship between patients and providers, competition in the

medical sector, technology, pharmaceuticals and the scope and effect of government involvement in the delivery of health care. Prereq: ECON 402. (Also listed as ECON 642.)

### **HMP 710 - Financial Management for Clinicians**

**Credits:** 4.00

Basics of health care financial management and cost accounting. Includes cost concepts and product costing, budgeting, and variance analysis with emphasis at the departmental level. Contains basic accounting principles: use of ratio analysis to examine balance sheets and revenue and expense statements. Explores capital project analysis and health care reimbursement. Prereq: HMP 401 or equivalent; permission.

### **HMP 711 - Health Systems Research I**

**Credits:** 4.00

Introduces intermediate techniques for data manipulation and analysis for the health care field. Also introduces methods for survey research and large data set manipulation and analysis. There is a lab section utilizing a statistical software package where students perform tasks from a large national data set. Prereq: introduction to statistics.

### **HMP 712 - Health Systems Research II**

**Credits:** 4.00

Introduces students to decision science and applies decision making to health systems. Teaches the techniques of health care management, epidemiological analysis, and policy analysis as they relate to the decision making process. There is a lab section with applied exercises. Prereq: HMP 711. Lab.

### **HMP 715 - Environmental Health**

**Credits:** 4.00

This course offers a general introduction to environmental health from the community, regional, and global perspective by addressing fundamental topics and current controversies such as air pollution, water pollution, built environment/urban sprawl, food safety, waste disposal, and occupational health. Students learn about environmental health assessment methods. Major issues in environmental health and related regulatory efforts and public health policy reform are examined. Prereq: HMP 501.

### **HMP 721 - Managing Health Care Organizations**

**Credits:** 4.00

Organizational characteristics of ambulatory, acute, and long-term care facilities. Management issues and strategies involving governance, clinical services, human and fiscal resources, and community-based services. Prereq: major or permission.

### **HMP 722 - Health Care Management II**

**Credits:** 4.00

A continuation of HMP 721 - Managing Health Care Organizations with specific lectures and assignments devoted to organizational behavior, leadership, and managerial skills. Case studies and examples will relate specifically to health care organizations. Prereq: HMP 721.

### **HMP 723 - Health Planning**

**Credits:** 4.00

Theoretical and historical foundations of health planning; the relationship of health planning and regulation; the application of planning methods; and the utilization of strategic planning and its relationships to marketing. Prereq: major or permission. Special fee.

### **HMP 735 - Social Marketing**

**Credits:** 4.00

An introduction to the vocabulary and tools of social marketing. Expanding upon the traditional principles of marketing and consumer behavior, students are exposed to the challenges of trying to effect behavior change.

### **HMP 740 - Health Care Financial Management**

**Credits:** 4.00

Techniques, principles, and practices of managing fiscal aspects of health care organizations. Exploration of concepts and techniques associated with variance analysis, cost allocation, management of working capital, and capital decision analysis. Analysis of the impact of reimbursement on health care organizations. Lab.

### **HMP 741 - Health Care Financial Management II**

**Credits:** 4.00

This course focuses on issues related to effective financial management of health care organizations and programs, building upon material covered in HMP 740, Health Care Financial Management. Topics include the time value of money, long-term debt, stocks and equity, and evaluation of capital projects. Prereq: HMP 740.

### **HMP 742 - Strategic Management for Health Care Organizations**

**Credits:** 4.00

Application of managerial methods involving financial, marketing, and operational analysis to health management. Case studies. Prereq: major or permission; HMP 740. Lab. Special fee.

### **HMP 744 - Health Ethics and Law**

**Credits:** 4.00

Ethical theories, core legal principles and cases, and decision-making models; patient's rights and professional responsibilities; social justice and resource allocation; critical ethical dilemma's facing health care managers, policy makers, and executives; managerial versus medical care conflicts. Prereq: major or permission. Writing intensive.

### **HMP 746 - Health Policy**

**Credits:** 4.00

Analysis of the public policy process, the development of health policies in the U.S., and discussion of specific health policy issues. Prereq: major or permission.

### **HMP 748 - Health Policy Analysis**

**Credits:** 4.00

Public policy outputs analyzed for effectiveness, efficiency, and equity, focusing on public policies in the United States. Prereq: major or permission. Lab. Special fee

### **HMP 796 - Independent Study**

**Credits:** 2.00 to 4.00

In-depth study with faculty supervision. Prereq: permission of major adviser and faculty in the area concerned.

### **HMP 798H - Honors Project/Research Design**

**Credits:** 2.00

Examines selected research designs and methods used in health services research/program evaluation. Establishes theoretical and methodological foundation for honors-in-major research project to be conducted during the subsequent semester under a faculty member's supervision. Prereq: senior honors-in-major status and permission.



## **HMP 799H - Honors Project/Research**

**Credits:** 4.00

In-depth research project (conducting and analysis) under supervision of faculty member. Includes scholarly presentation of findings to faculty and other interested parties and preparation of manuscript suitable for publication in peer-viewed journal. Prereq: HMP 798H and permission. Writing intensive.

## History

### **HIST 405 - History of Early America**

**Credits:** 4.00

America from the early age of European discovery to the mid-19th century. Emphasizes the interaction of European, Native American, and African peoples; on the separation of the English colonies from Great Britain; and on the establishment and early history of the United States.

### **HIST 405H - Honors/History Early America**

**Credits:** 4.00

America from the early age of European discovery to the mid-19th century. Emphasizes the interaction of European, Native American, and African peoples; on the separation of the English colonies from Great Britain; and on the establishment and early history of the United States. Writing intensive.

### **HIST 405W - History of Early America**

**Credits:** 4.00

America from the early age of European discovery to the mid-19th century. Emphasizes the interaction of European, Native American, and African peoples; on the separation of the English colonies from Great Britain; and on the establishment and early history of the United States. Writing intensive.

### **HIST 406 - History of the Modern United States**

**Credits:** 4.00

History of the United States since the mid-19th century. Political, social, and economic developments as well as relationships of the modern U.S. with other countries.

### **HIST 406H - Honors/History of the Modern United States**

**Credits:** 4.00

History of the United States since the mid-19th century. Political, social, and economic developments as well as relationships of the modern U.S. with other countries. Writing intensive.

### **HIST 406W - History of the Modern United States**

**Credits:** 4.00

History of the United States since the mid-19th century. Political, social, and economic developments as well as relationships of the modern U.S. with other countries. Writing intensive.

### **HIST 410 - Historical Survey of American Civilization**

**Credits:** 4.00

Topical survey, within broad chronological divisions, of the development of American civilization since 1600. Writing intensive.

### **HIST 410H - Honors/Historical Survey of American Civilization**

**Credits:** 4.00

Topical survey, within broad chronological divisions, of the development of American civilization since 1600. Writing intensive.

### **HIST 421 - World History to the 16th Century**

**Credits:** 4.00

The global experience of human communities with special emphasis on the development of the major civilizations and their interactions. Comparisons of social, cultural, religious, and political life and the emergence of distinctive and diverse human societies are examined.

### **HIST 422 - World History in the Modern Era**

**Credits:** 4.00

Emergence of major global human interactions due to the growth of major civilizations. The global context for the rise of the modern West. The rise and decline of Western global domination and the emergence of new states and changing societies throughout the world.

### **HIST 422H - Honors/World History in the Modern Era**

**Credits:** 4.00

Emergence of major global human interactions due to the growth of major civilizations. The global context for the rise of the modern West. The rise and decline of Western global domination and the emergence of new states and changing societies throughout the world.

### **HIST 425 - Foreign Cultures**

**Credits:** 4.00

Introduces the culture of a particular nation or region; preparation for experiencing a foreign culture. Consult department for listing of topics.

### **HIST 425H - Honors/Foreign Cultures**

**Credits:** 4.00

Introduces the culture of a particular nation or region; preparation for experiencing a foreign culture. Consult department for listing of topics. Writing intensive.

### **HIST 425W - Foreign Cultures**

**Credits:** 4.00

Introduces the culture of a particular nation or region; preparation for experiencing a foreign culture. Consult department for listing of topics. Writing intensive.

### **HIST 435 - Western Civilization**

**Credits:** 4.00

The classical origins and evolution of European civilization through the Renaissance, Reformation, and voyages of discovery. The rise of Europe to global supremacy in the 19th century and its transformation in the 20th century.

### **HIST 435H - Honors/Western Civilization**

**Credits:** 4.00

The classical origins and evolution of European civilization through the Renaissance, Reformation, and voyages of discovery. The rise of Europe to global supremacy in the 19th century and its transformation in the 20th century. Writing intensive.

### **HIST 435W - Western Civilization**

**Credits:** 4.00

The classical origins and evolution of European civilization through the Renaissance, Reformation, and voyages of discovery. The rise of Europe to global supremacy in the 19th century and its transformation in the 20th century. Writing intensive.

### **HIST 436 - Western Civilization**

**Credits:** 4.00

The classical origins and evolution of European civilization through the Renaissance, Reformation, and voyages of discovery. The rise of Europe to global supremacy in the 19th century and its transformation in the 20th century.

### **HIST 436H - Honors/Western Civilization**

**Credits:** 4.00

The classical origins and evolution of European civilization through the Renaissance, Reformation, and voyages of discovery. The rise of Europe to global supremacy in the 19th century and its transformation in the 20th century. Writing intensive.

### **HIST 436W - Western Civilization**

**Credits:** 4.00

The classical origins and evolution of European civilization through the Renaissance, Reformation, and voyages of discovery. The rise of Europe to global supremacy in the 19th century and its transformation in the 20th century. Writing intensive.

### **HIST 444 - Through Their Eyes: The American Civil War from Primary Sources**

**Credits:** 4.00

Introduces the nature of historical research through an intensive study of the Civil War era, including slavery, abolitionism, and political conflict before the war, as well as the military, social, and political history of the war itself. Use of primary sources such as newspapers, public documents, letters, and diaries, including unpublished manuscripts held in Special Collections, Dimond Library. Writing intensive.

### **HIST 444A - When is War the Answer**

**Credits:** 4.00

Examines a series of foreign policy crises that might have led, and in some cases did lead, to war between the United States and some foreign foe. Using diplomatic documents, a basic diplomatic history text book, and a range of secondary sources, we will examine several times when the United States came to the brink of war, and we will ask when and why the nation has chosen to resolve its foreign policy problems with force. Topics include neutrality during the early Napoleonic wars, the War of 1812, the War with Mexico in 1846 and the avoided war with Britain of the same year, the Spanish-American War, both World Wars, Cuba and Vietnam, and the two Iraq wars. Students are able to connect decisions about war with larger trends and developments in U.S. history. In the end, they have refined their understanding of when the nation has chosen to use force as well as their ability to apply that knowledge to future crises. Focus on policy making rather than the impact of war itself, although naturally historical lessons about war shape decision making. Writing intensive.

### **HIST 444B - Revolutions Across the Atlantic**

**Credits:** 4.00

An exploration of the Age of Revolution, 1776-1800 on both sides of the Atlantic. Beginning with Tom Paine's declaration "Tis Time to Part" that launched the American Revolution and ending with the spread of the French Revolution by bayonets into Switzerland, we investigate the clubs organized against the slave trade, we read the plays that projected imaginary revolutions onto desert islands, and we follow the rumors that spread news of Caribbean revolts to Philadelphia and Paris. This course will be primarily discussion, with some short writing assignments in the first half of the course. Students will research and write their own histories of some facet of revolutionary history in the second half of the course. Writing intensive.

### **HIST 444C - World War Propaganda in Britain and the United States**

**Credits:** 4.00

Examines multi-media propaganda in World War I and World War II Britain and the U.S. to investigate the total war experience, the relationship between these two nations, and the workings of a critical weapon. Propaganda was a bloodless weapon in an era of high-tech tools, but it was also a feared and ubiquitous one. Some of the issues addressed in this course include: Who were some of the targets of propaganda? How were posters different from films or radio broadcasts? What were the messages of propaganda? What does propaganda say about these nations as cultures and societies as well as about their war efforts? We analyze multimedia primary sources as well as use secondary ones in our discussions. Writing intensive.

### **HIST 444D - Slavery and Society in Pre-Colonial Africa**

**Credits:** 4.00

Examines the evolution and practice of the institution of slavery in Africa from the earliest times to the era of European colonialism. Using contemporary personal narratives by the slaves, the course examines specific historical contexts of various slave systems, continuity and change in the ideologies and practices of slavery, religion and slavery, race and slavery, gender and slavery, conditions of slaves, as well as the making and uses of slaves - as domestics, concubines, eunuchs, officials, soldiers, labor and capital. Using films, slide images, and a comparative approach, African slavery will be examined within the context of the early evolution of slavery in the Mediterranean and Islamic worlds as well as its later expressions in the Atlantic world of the Americas.

### **HIST 444E - American at War: Society, Culture, and the Home Front**

**Credits:** 4.00

Course will examine how the preparation for war, war itself, and the legacy of war shape American society, culture, and national identity. Students explore the relationship of war to topics such as American politics, literature, music, visual arts, popular culture, as well as gender, ethics, and race relations. Primarily discussion with short writing assignments in the first part of the course. Students research topics of their choice in the second and third parts of the course. Writing intensive.

### **HIST 444F - Collective Guilt and Collective Responsibility in History**

**Credits:** 4.00

Most Americans recognize the Holocaust as an extraordinary crime, though there is less agreement about who was responsible, whether justice was rendered and appropriate compensation awarded survivors. Things become more complicated when examining what might be considered crimes committed by Americans. This course concentrates both on the Holocaust and the *underside* of American history and poses questions about the connections between the past and the responsibilities of citizenship in the present. Writing intensive.

### **HIST 483 - History of World Religions**

**Credits:** 4.00

Introduces the religions of the world in terms of historical development, relationship to society, belief system, central texts, and ritual practices. Begins with the religions of small and tribal societies (e.g., African, Native American), moves through religions of complex societies (e.g., Hinduism), and then studies the various traditions that emanated from ancient revelations: Zoroastrianism, Buddhism, Judaism, Christianity, Islam, and certain new forms of Christianity. This initial survey of world religions prepares students for HIST 484.

### **HIST 483W - History of World Religions**

**Credits:** 4.00

Introduces the religions of the world in terms of historical development, relationship to society, belief system, central texts, and ritual practices. Begins with the religions of small and tribal societies (e.g., African, Native American), moves through religions of complex societies (e.g., Hinduism), and then studies the various traditions that emanated from ancient revelations: Zoroastrianism, Buddhism, Judaism, Christianity, Islam, and certain new forms of Christianity. This initial survey of world religions prepares students for HIST 484. Writing intensive.

### **HIST 497 - Explorations in Historical Perspectives**

**Credits:** 4.00

Seminar for freshmen and sophomores. In-depth exploration of a particular historical question or topic: for example, the French Revolution, Chaucer's England, or the New Deal. Students should consult with the Department of History for a list of topics and instructors.

### **HIST 497H - Honors/Explorations in Historical Perspectives**

**Credits:** 4.00

Seminar for freshmen and sophomores. In-depth exploration of a particular historical question or topic: for example, the French Revolution, Chaucer's England, or the New Deal. Students should consult with the Department of History for a list of topics and instructors. Writing intensive.

### **HIST 497W - Explorations in Historical Perspectives**

**Credits:** 4.00

Seminar for freshmen and sophomores. In-depth exploration of a particular historical question or topic: for example, the French Revolution, Chaucer's England, or the New Deal. Students should consult with the Department of History for a list of topics and instructors. Writing intensive.

### **HIST 498 - Expl Hist Perspectives (C)**

**Credits:** 4.00

Seminar for freshmen and sophomores. In-depth exploration of a particular historical question or topic: for example, the French Revolution, Chaucer's England, or the New Deal. Students should consult with the Department of History for a list of topics and instructors.

### **HIST 500 - Introduction to Historical Thinking**

**Credits:** 4.00

Basic skills essential to the study of history: critical reading of historical literature, improvement of written and oral analysis of historical material, and use of library resources. Intensive study of books and documents from varying historical fields and periods. Required of history majors; open to other interested students. Writing intensive.

### **HIST 501 - Medieval Military History**

**Credits:** 4.00

Western societies from the Roman Empire to the emerging nation states of early modern Europe spent an enormous proportion of their surplus wealth on war. This course introduces this crucial aspect of Western history and examines the period extending from the third century AD, to just before the extensive introduction into Europe of gunpowder weapons in the fifteenth century. Discussion of not only battlefield tactics and famous generals but also the effect that war had upon society as a whole and the economic ramifications of war, the Christianization of war, and the effect of war upon literature.

### **HIST 502 - Latin Readings in Medieval History**

**Credits:** 1.00

Provides students with an opportunity to read medieval sources in their original language. Helps students with a background in Latin improve their reading ability, and exposes them to the challenges of conducting historical research in a foreign language. Latin readings taken from many of the major medieval narrative sources from the fifth through the fourteenth century. May be repeated up to a maximum of 8 credits. Prereq: LATN 402 or equivalent.

### **HIST 503 - Soviet Dreamers, Despots, and Dissidents**

**Credits:** 4.00

Through the study of individual biographies and writings of male and female Russian revolutionaries, Soviet leaders, and prominent dissidents, course examines the question of how the combination of Russian culture and Marxism created both cruel despotism and profound advocacy for social justice and universal human rights. Lecture and discussion. Response papers and essay exams. Readings include revolutionary texts, laws, biographies, novels, films, and scholarly articles about 20th century Russia/USSR. Writing intensive.

### **HIST 505 - African American History**

**Credits:** 4.00

Experiences, aspirations, and contributions of black Americans from their ethnic origins in Africa to the present American crisis in race relations; comparative study of cultures and institutions. Colonial America to the Civil War. Writing intensive.

### **HIST 506 - African American History**

**Credits:** 4.00

Experiences, aspirations, and contributions of black Americans from their ethnic origins in Africa to the present American crisis in race relations; comparative study of cultures and institutions. Reconstruction to the present. Writing intensive.

### **HIST 509 - Law in American Life**

**Credits:** 4.00

Investigates the role of law in American social, political, and economic life from the European settlements to the present. Traces the development of legal institutions, but focuses on the various functions of law (e.g., in structuring social relationships, allocating resources, defining governmental authority, expressing social and moral values, and as a mechanism for control).

### **HIST 511 - History of New Hampshire**

**Credits:** 4.00

From pre-settlement times to the present, emphasizing the use of locally available materials and sources. Writing intensive.

### **HIST 521 - Origins of Modern Science**

**Credits:** 4.00

Development of scientific ideas in Europe from the Renaissance through the Scientific Revolution to the Enlightenment. Topics include themes in the physical and biological sciences and their relations to cultural and social contexts. No special science background is required.

### **HIST #522 - Science in the Modern World**

**Credits:** 4.00

Development of science, particularly in Europe and North America, from the 18th century to the present. Themes including Darwinism, the growth of modern physical and biological sciences and science in the contemporary world. No special science background is required.

### **HIST 532 - Modern Latin America**

**Credits:** 4.00

Provides a broad overview of Latin America from the 18th century to the present. It examines the breakdown of colonial rules, the establishment of independent countries, the formation of viable nation states, the importance of geography, the roles of the different elements of society. Social, political, and economic changes and continuities emphasized to give a sense of the ambiguities of the historical process. Cultural differences illustrated with slides and music. The effects of elite rule and of United States interventions studied. Writing intensive.

### **HIST #537 - Espionage and History**

**Credits:** 4.00

Introduces the history and politics of espionage and intelligence organizations in modern times. Special attention to intelligence work among the major powers in World War I, World War II, and the Cold War. Readings include autobiographical accounts and other primary sources as well as novels.

### **HIST 538 - Modern European War and Society: The Napoleonic Wars to World War II**

**Credits: 4.00**

This course is organized around three conflicts: the Napoleonic Wars, World War I, and World War II. As we study them, we'll discuss the evolution and impact of total war in order to understand how societies work in wartime and how these conflicts have shaped Europe. In our Exploration of each war, we examine a range of participants from international alliances to individual soldiers and civilians involved in the conflict. Total war, by its nature, incorporates most elements of society, so we will spend time looking at the homefronts as well as the battlefronts. We will survey the conflicts as a whole, but also devote time to some special events or elements. For example, we will look at the battle of Somme during the portion of the course dedicated to World War I. We will also study some of the art that arose out of the conflict. The core of the class will be lectures, but we will engage in some discussion almost every day and there are some classes that will be dedicated to discussion.

**HIST 540 - Foundations of Medieval History: 300-1300 CE****Credits: 4.00**

Introduces the history of Western Europe from the end of the Roman Empire to the late twelfth century. Particular focus on the history of Christianity, social and economic structures, the role of women in medieval culture, and literacy and learning. Writing intensive.

**HIST 560 - History of Great Britain****Credits: 4.00**

History of Great Britain from the earliest times to the present; from social, constitutional, economic, political, and intellectual perspectives. Designed for the history student as well as students interested in literature, western political and social systems, American studies, education, and pre-law.

**HIST 563 - Introduction to Russian Culture and Civilization****Credits: 4.00**

Interdisciplinary course on the development of Russian culture from its origins through the end of the 19th century. Historical documents, literary works, ethnographic materials, films, slides of Russian art, and music.

**HIST 565 - Women in Modern Europe****Credits: 4.00**

A social history of women in Europe from 1700 to the present. Examines the development of the "modern nuclear family," transformations in women's work during the industrial revolution, and women's political evolution from bread rioters to hearth tenders to petitioners. Sources include published diaries, historiographical studies, and novels.

**HIST 575 - Ancient Near East****Credits: 4.00**

From the Neolithic revolution to the time of Alexander the Great. Rise of civilization; nature of human artistic and intellectual development in the earliest civilizations of Mesopotamia and Egypt; Judaism in its historical setting.

**HIST 576 - Hebrew Bible in Historical Context****Credits: 4.00**

An introductory study of the Hebrew Bible, or Old Testament, examining the development of biblical literature in the context of ancient Near Eastern cultures and history. Interpretations of the creation stories and patriarchal narratives using literary and folklore methods; the transformation of Israelite religion from Moses to David to Ezra; the role of prophets and nature of ancient prophecy; the concept of the messiah; "wisdom" literature and the biblical interpretations of misfortune; the formation of a biblical canon; and the critical analysis of sacred texts. (Also offered as RS 576.) Writing intensive.



### **HIST 579 - History of China in Modern Times**

**Credits:** 4.00

The transformation of Chinese society from 1600 to the present. Attention will be given to political and cultural developments as well as China's interaction with the outside world.

### **HIST 580 - History of Japan in Modern Times**

**Credits:** 4.00

Explores major tendencies in Japanese history from the Tokugawa period to present. Will stress the interrelatedness of political, social, institutional, and literary developments so as to achieve a complex view of modern Japanese society.

### **HIST #583 - Mystic and Saint in Islam**

**Credits:** 4.00

Examines how and why a cult of Sufi saints became such a significant part of religious practice in medieval Islamic Egypt and Anatolia.

### **HIST 584 - Patterns in World Religions**

**Credits:** 4.00

Introduces the comparison of religions and religious patterns. Examines cross-cultural themes like sacred places, sacred books, and sainthood. Through readings, students become acquainted with methods used in the historical study of religions. Primary and secondary readings encompass a wide variety of religious practices and ideas in Hinduism, Buddhism, Christianity, Islam, Judaism, as well as tribal religions. Ethnographic films supplement readings and lectures. Some classes may be adjusted to accommodate guest lecturers in medieval European history. Prereq: HIST 483 recommended. Writing intensive.

### **HIST 585 - Venture of Islam: 6th-15th Century**

**Credits:** 4.00

The origins and expansion of Islam and the development of the Muslim community from the time of Muhammad until the Islamic empires of the 16th century. Attention is given to religious and artistic as well as political developments.

### **HIST #586 - Islam in the Modern Age, 15th Century to present**

**Credits:** 4.00

Emergence of modern Middle Eastern states and societies from the time of the Ottoman Empire to the present. A survey of major developments, including the emergence of nationalism, the Islamic resurgence, and social transformations.

### **HIST 587 - History of Africa South of the Sahara**

**Credits:** 4.00

From ancient times to the present. Semester I: from prehistoric times to 1870. African migrations, kingdoms, and societies; African responses to the slave trade; Islam; European imperialism, colonialism, and industrialization; African nationalism, independence, and post-independence problems.

### **HIST 588 - History of Africa South of the Sahara**

**Credits:** 4.00

From ancient times to the present. Semester II: from 1870 to present. African migrations, kingdoms, and societies; African responses to the slave trade; Islam; European imperialism, colonialism, and industrialization; African nationalism, independence, and post-independence problems.

### **HIST #589 - Islam in Africa**

**Credits:** 4.00

Focuses on the advent, spread, and major consequences of Islam in Africa. Examines the major phases of

Islamic expansion: early conquests in North Africa and the Iberian Peninsula, the spread of Islam across the Sahara into the Sudan, the jihadist and reformist movements of the 18th and 19th centuries and the development of Islam during the colonial and postcolonial era. Emphasizes the varieties of the practice of Islam, the role of Islam in states formation and the impact of Islam on the religious and social life of the African peoples. The intersections of Islam with the issues of trade, slavery, politics, gender, imperialism, and modernization, the rise of Islamic fundamentalism, the place of North Africa within the Mediterranean Islamic culture, as well as the relationships of Islam with indigenous religions and with Christianity in African history and societies explored.

### **HIST 595 - Explorations**

**Credits:** 1.00 to 4.00

See department listings for semester topic. Topic Empire, Democracy, and War is Writing intensive.

### **HIST 596 - Explorations**

**Credits:** 1.00 to 4.00

See department listings for semester topic.

### **HIST 597 - Medicine and Society**

**Credits:** 4.00

Explores the history of medical theory and practice in Europe from the twelfth to the early seventeenth century. Themes include: 1) varieties of healing strategies, including naturalistic, magical, astrological, religious, and supernatural; 2) attitudes to the body, health and disease; 3) the broad range of healers who practiced healing arts, including learned physicians, surgeons, barbers, midwives, wise women, saints, and even charlatans; 4) the kinds of institutions devoted to promoting health, including the home, the hospital, and the monastery.

### **HIST 600 - Advanced Explorations**

**Credits:** 1.00 to 4.00

See department listings for semester topic. Barring duplication of subject, may be repeated up to a maximum of 8 credits.

### **HIST 601 - Seminar in Religious Texts**

**Credits:** 4.00

Close study of sacred text(s) from a particular religious tradition (Islam, Christianity, Buddhism, Judaism, etc.) or a thematic selection of texts across religions. (Also offered as RS 601.)

### **HIST 602 - Holocaust: The War on Europe's Jews**

**Credits:** 4.00

The attempted destruction of European Jewry during the Third Reich is one of the pivotal events in the history of modern Western Civilization. Course explores the circumstances and behavior of the Jews (as victims, resisters, survivors), the perpetrators (German and non-German), bystanders (German, European, and American), and rescuers (German and non-German). Attention is also given to such post-1945 matters as justice, compensation, and memory.

### **HIST 603 - European Conquest of America**

**Credits:** 4.00

Study of the social consequences of colonization, migration, and war in America, 1500-1775. Emphasis on the interaction of British colonies with competing European cultures (French, Dutch, Portuguese, and Spanish), with Native Americans, and with African American slaves.

### **HIST 604 - History of Medicine in the United States**

**Credits:** 4.00

Have you been a patient, a nurse, or a holder of insurance? Almost everyone in the United States has a role in health care. We study the growth and development of the field of American medicine from colonial times to the present, examining the changing relationships between patients, health care professionals, technology, government, and others. The focus will be shifts in responsibility and authority over time from patients, to doctors, and even to businesses.

### **HIST 605 - Revolutionary America, 1750-1788**

**Credits:** 4.00

Examines the social, political, and cultural transformation of thirteen British colonies into the United States, up to the adoption of the Constitution.

### **HIST 606 - History of the Early Republic**

**Credits:** 4.00

Explores the histories of the people and institutions that transformed the new United States from a coastal republic of largely independent freeholders to a transcontinental democracy increasingly driven by class. Topics include slavery, the family, reform movements, and the formation of national identity.

### **HIST #608 - Arts and American Society: Women Writers and Artists, 1850-Present**

**Credits:** 4.00

Team-taught course studying the impact of gender definitions on the lives and works of selected American artists. Considers lesser-known figures such as Fannie Fern, Lilly Martin Spencer, and Mary Hallock Foote as well as better-known artists such as Willa Cather and Georgia O'Keefe. Prereq: permission or one of the following: WS 401, HIST 566, ENGL 585 or 586, ENGL 685 or 785, or a 600-level art history course. (Also offered as ARTS 608, ENGL 608, and HUMA 608.) Writing intensive.

### **HIST 609 - Special Topics in American Legal History**

**Credits:** 4.00

In-depth thematic exploration of law in American life. Topics include race and equality in America; community, pluralism, and American law; property, liberty, and law; gender and law. May be repeated for credit with instructor's permission. Prereq: HIST 509 or instructor's permission. Consult department listings of topics. Writing intensive.

### **HIST 611 - Civil War Era**

**Credits:** 4.00

Surveys the period from the presidency of Andrew Jackson to the end of the Reconstruction. Focuses on causes, course, and consequences of the Civil War. Topics include slavery in the Old South, antebellum reform movements, creation and breakdown of the Second Party System, social and economic (as well as military) events during the war and major developments during Reconstruction after the war.

### **HIST 612 - Emergence of Industrial America**

**Credits:** 4.00

Investigates the economic transformation of 19th-century America from a rural, agricultural society to an urban, industrial one. Explores the sweeping economic changes and focuses on such topics as change in work and leisure, westward expansion and its effects on Native Americans, shifts in gender roles, growth of a consumer culture, rise of the labor unions, Populism, immigration, reform and regulation movements, growth of American imperialism, and intellectual developments.

### **HIST 613 - American Ways of War**

**Credits:** 4.00

"Is there an American way of war?" This commonly asked question will be the focal point of the course. To answer that we will study the interactions of both war and society in the United States from the Civil War onwards, addressing such issues as the causes, courses, diplomacy, homefront, legacy, and the art of the

great and small wars.

### **HIST 615 - United States Progressivism to the New Deal**

**Credits:** 4.00

United States from 1900 to 1941: cultural, political, and social factors causing major changes in American life.

### **HIST 616 - United States Since World War II**

**Credits:** 4.00

United States since 1941; cultural, political, and social factors causing major changes in American life.

### **HIST 617 - Vietnam War**

**Credits:** 4.00

An advanced interdisciplinary study of the American experience in Vietnam which utilizes fiction, film, music, and historical analysis to examine such matters as how and why the United States became involved in Vietnam, went to war there, and failed to win, as well as the consequences and legacies of that fateful conflict. It is strongly suggested that students first complete courses in modern American history.

### **HIST 618 - American Environmental History**

**Credits:** 4.00

Examines how nature has been a factor in American history and how Americans have wrestled with the concepts of nature and culture. Topics include industrialization, evolution, conservationism, environmentalism, and environmental diplomacy.

### **HIST 619 - Foreign Relations of the United States**

**Credits:** 4.00

The history of American diplomacy from the colonial era to the present, with the dividing point at 1900. The focus will be on both the foreign and domestic influences that shaped American diplomacy.

### **HIST 620 - Foreign Relations of the United States**

**Credits:** 4.00

The history of American diplomacy from the colonial era to the present, with the dividing point at 1900. The focus will be on both the foreign and domestic influences that shaped American diplomacy.

### **HIST 621 - History of American Thought**

**Credits:** 4.00

Significant American thinkers considered in their social context. Dividing point at 1860.

### **HIST 622 - History of American Thought**

**Credits:** 4.00

Significant American thinkers considered in their social context. 1860 to present.

### **HIST 623 - Early American Social and Cultural History**

**Credits:** 4.00

Gives students the opportunity to explore some of the recent findings of scholars who have studied Early American social and cultural history. Focuses on the experiences of Anglo-Americans and on the experiences of many of the other people with whom Anglo-Americans were frequently in contact, and who also shaped Early America. Includes consideration of the pan-Atlantic context of Early America, cross-cultural contacts, family and gender, labor systems, religious observations, crime, and other themes explored in recent social and cultural theory.

### **HIST 624 - Topics in Modern United States Social History**

**Credits: 4.00**

Advanced study of topics in U.S. social history since the Age of Jackson. Topics will vary; may include slavery and the antebellum South, reform movements in U.S. history, family history, labor history, the impact of war on American society, race in recent U.S. history. May be repeated as topics change.

**HIST 625 - Southern History and Literature since the Civil War****Credits: 4.00**

Equal focus on the history and literature of the South since the Civil War. Topics include reconstruction, the age of segregation, and the Civil Rights Movement. Literary focus is on the period since 1920, including the "Southern Renaissance." Authors include William Faulkner, Robert Penn Warren, Flannery O'Connor, and Zora Neale Hurston.

**HIST 632 - Latin American History: Topics****Credits: 4.00**

Topics vary (see department listing for current semester). Seminar entails reading, discussion, and research on literature and documents related to the selected topic. Provides students with the opportunity to do research under close direction.

**HIST 633 - Medieval England 800-1300****Credits: 4.00**

This course provides students with an opportunity to gain an in-depth understanding of the history of medieval England from the beginning of the period of consolidation under the Wessex dynasty in the ninth-century through the end of the thirteenth century. In addition to obtaining a large corpus of information through the reading of a significant monographs dealing with England during this period, students will be challenged to develop the critical analytical skills necessary for the thorough understanding and practice of historical methodologies, with a particular focus on the practice of historical method in writing medieval history. Finally, students will be given the opportunity to improve their communications skills through extensive class discussions dealing with the scholarly works read for this course, and in writing assignments.

**HIST 634 - Medieval Empires****Credits: 4.00**

This course will explore the intellectual and political foundations of imperial rule in the Middle Ages with a particular focus on the Carolingian, German, and byzantine empires of the early and high Middle Ages. The course will begin with the development of the idea of empire under Alexander the Great and then during the Roman empire. The course will then turn to an examination of how the rulers of the three great empires of the western Middle Ages adapted the classical ideas and practices of empire for their purposes. The course focuses on sources. Background material will be provided in short lectures.

**HIST 640 - Holy War in the Holy Land: The Medieval Crusades****Credits: 4.00**

Survey of the medieval military expeditions organized by Christians to secure the Holy Land during the 12th and 13th centuries. Topics considered include the formulation of a "just war" theory; political, intellectual, religious, and military interactions between Christians, Jews, and Muslims; the Crusader State of Jerusalem; and the histories of individual crusades.

**HIST 641 - Europe after the Black Death****Credits: 4.00**

Explores the dramatic changes that characterized Western Europe as it rebounded in the fifteenth through the seventeenth centuries from the ravages of the Black Death of 1348. Examines the social, political, and artistic developments in late medieval and Renaissance Italy before "crossing the Alps" to trace the expansion of Renaissance culture in Northern Europe. Topics include the humanist movement; new

patterns of social organization; the revival of classical antiquity in the arts, architecture, religion, and political theory; the effects on European society of the encounter with the "New World"; shifting roles for men and women in early modern European societies; religious war and conflict.

### **HIST 642 - Saints, Sinners, and Heretics: Europe in the Age of Religious Reform**

**Credits:** 4.00

Examines the history of Western Christendom from roughly 1400 to 1600, a period of tumultuous religious change throughout Europe. We begin in the Middle Ages where the seeds of religious division were sown. We then tackle Martin Luther's challenge to the Catholic church, trace the diffusion of his message throughout Europe, and address the Catholic response to the evangelizing movements that he inspired. Finally we investigate some of the regional varieties of Protestantism that developed in the latter half of the sixteenth century with a particular focus on Switzerland, Germany, England, Scotland, France, and the Netherlands.

### **HIST 644 - Victorian Britain**

**Credits:** 4.00

The Victorian Era was a time of contrasts. Upon the throne sat Queen Victoria, a monarch known for her moral uprightness, sexual probity and rigid sense of decorum. The streets of London, however, teemed with prostitutes, pickpockets and impoverished Irish immigrants whose lives seemed untouched by either the prosperity or moral stringency that characterized the age. In this class we explore the varieties of Victorian experience both at home and in the global empire Britain had amassed during the nineteenth century. Examining sources such as the novels of Charles Dickens, the decorative arts of William Morris, and the scientific writings of Charles Darwin, we attempt to uncover the many-faceted culture, society and political life of Victorian Britain. The instructor places a strong emphasis on reading, class participation and writing.

### **HIST #645 - 19th Century European Great Powers - Diplomacy and International Law**

**Credits:** 4.00

In this course, we will study power in Europe during the apogee of that region's strength. The long nineteenth century is a period during which Europe avoided major continent-wide (and world-wide) wars, despite constant upheavals. That is a remarkable accomplishment when one compares the events of the nineteenth century with those of the twentieth, despite the fact that the former influenced the latter. Focus is on those who wielded power internationally, including dealmakers, deal-breakers, manipulators, and idealists. To express, test, restrain, or leverage power, actors engaged in wars and negotiations that led to a range of contracts from treaties, such as the Treaty of Fontainebleau ending Napoleon's reign; to alliances, like the Anglo-Japanese Naval Alliance ending Britain's "splendid isolation" from international partnerships; to conferences, including the Hague Conventions regulating wars. In addition, it is important to look at statutes influencing foreign policy, as did the Second German Naval Law of 1900 which increased European tensions before World War I. Examining the relations of powerful nineteenth century states, therefore, illuminates international law as well as more traditional elements of diplomacy. Students learn about 19th century great powers of Europe and important pieces of international legal relationships as well as develop critical thinking and communication skills.

### **HIST 647 - Early Modern France**

**Credits:** 4.00

Explores the culture and politics of early modern French society. Popular culture, religion, gender relations, the family, state-building, political theory, and revolution are emphasized. Primary documents in translation are read and discussion is encouraged.

### **HIST 648 - Modern France**

**Credits:** 4.00

French society from Napoleon to Mitterand. Topics include the Revolution of 1848 and the Paris

Commune; World Wars and the Vichy regime; Existentialism, DeGaulle, and the Revolt of May-June 1968.

### **HIST 652 - Topics in European Intellectual History**

**Credits:** 4.00

Explores such major developments as the Enlightenment, Russian intellectual history, and the relationship between gender and intellectual history. Includes topics since the Renaissance. Since topics vary, students should check the department newsletter or office for course theme in any given term. May be repeated as topics change to a maximum of 12 credits.

### **HIST 654 - Topics in History of Science**

**Credits:** 4.00

Advanced study of a selected topic in the history of European science since the Renaissance.

### **HIST 656 - 20th Century Europe**

**Credits:** 4.00

World War I, European totalitarianisms, World War II, the loss of European primacy and the search for a new Europe.

### **HIST 662 - England in the Tudor and Stuart Periods**

**Credits:** 4.00

England experienced great upheaval under the Tudor and Stuart dynasties. This course explores many of the key political, religious, social and economic changes that changed the face of England in the 16th and 17th centuries. We will study all of the Tudor and Stuart monarchs, and we will focus particularly on the following topics: Henry VIII, the English Reformation, Elizabeth I, Commons v. Nobility, the English Civil Wars and the execution of Charles I, the Restoration and the Glorious Revolution.

### **HIST 664 - Russia: Modernization through Soviet Empire**

**Credits:** 4.00

The challenges of modernization, experience and legacy of Leninist and Stalinist revolutions. Soviet consolidation and decline through the Gorbachev era.

### **HIST 665 - Themes in Women's History**

**Credits:** 4.00

In-depth examination of a selected topic in women's history. Topics may include Women and Health, Women in Modern European Political Theory, Comparative History of Women and Revolution. See Time and Room Schedule of history department newsletter for the specific topic. May be repeated for credit with permission of instructor.

### **HIST 666 - Environmental History of Northwest Atlantic Commercial Fisheries**

**Credits:** 4.00

After centuries of ground-fishing humans have radically transformed the northwest Atlantic marine ecosystem, creating a tragedy for both fish and fisherman. This marine environmental history course considers the changing technology, ecology, and sociology of the commercial fishery off New England and the Canadian maritime from 1500 to the present.

### **HIST 669 - Germany from 1918 to Present**

**Credits:** 4.00

Begins with the revolution of 1918 and then explores the political, social, and intellectual character of the Weimar Republic, the rise and nature of Nazism, the Holocaust, the foundation of both the German Democratic Republic and Federal Republic and their evolution in the shadow of the Cold War, and concludes with the unification of Germany after the fall of the Berlin Wall in 1989.

## **HIST 675 - Early History of Ancient Greece**

**Credits:** 4.00

Greek history from the Minoan and Mycenaean eras through the Persian Wars of the early fifth century. Emphasis on original sources including the Homeric epics, Plutarch, Sappho, and Herodotus. Examination of the distinctive developments of political systems in Sparta and Athens, as well as issues of colonization, diplomacy, religion and culture. Thorough discussion of types of available evidence and their integration into historical understanding.

## **HIST 676 - Classical and Hellenistic Greek Worlds**

**Credits:** 4.00

Greek history from the Persian Wars of the early fifth century through the life of Alexander the Great and the creation of the Hellenistic world. Emphasizes original sources including Herodotus, Thucydides, the Athenian playwrights, and Plato. Examines the transformation from city-state political organization to large Hellenistic kingdoms, as well as discussion of Greek historiography, intellectual life, and social theory. Thorough discussion of types of available evidence and their integration into historical understanding.

## **HIST 677 - Roman Republic**

**Credits:** 4.00

Covers pre-Roman Italy, the Etruscans, and the foundation of the Republic, Rome's expansion through the Punic Wars, relations with the Hellenistic kingdoms, and disintegration and final collapse of the Republic. Includes discussions of Roman art, engineering, and political theory. Emphasis on Latin sources in philosophy, history, and literature.

## **HIST 678 - Roman Empire**

**Credits:** 4.00

Collapse of the Roman Republic and creation of the Augustan principate. History of the principate through the division of the empire, with discussion of the fall of Rome in the west and the eastern empire through Justinian. Discusses Roman art, literature, philosophy, and religious developments such as the proliferation of mystery religions and the rise of Christianity.

## **HIST 679 - Rights Revolution**

**Credits:** 4.00

It is all but impossible to think or talk about contemporary legal and moral controversies without invoking the idea of "rights." Yet few of us can claim a clear understanding of this pivotal concept. Historically, how have particular claims, preferences, and socio-economic interests attained the status of publicly-recognized "rights" Are there other ways to conceptualize and prioritize rights, other forms of "rights talk," than the ones we currently employ? History 679 takes as its point of departure the enormous expansion in rights claimed by both individuals and groups in recent decades -- the "rights revolution." This development has elicited both praise and alarm, and we will examine the philosophical, moral, and political dimensions of each.

## **HIST 680 - Historical Geography**

**Credits:** 4.00

Introduces major themes, important scholars, and commonly used research techniques in historical geography. Course is reading and research oriented. Focus is on North America. Writing intensive. (Also listed as GEOG 680.)

## **HIST 681 - Modern China Topics**

**Credits:** 4.00

Problems in modern Chinese history from 1800 to the present. Topics may vary. Students read translated primary sources, analyze literary works, and write critical essays and a research paper. History 579 is recommended.



## **HIST 682 - Cults and Charisma**

**Credits:** 4.00

Examines religious sects and charismatic leaders using case studies from history and the contemporary world, as well as analytical principles from religious studies and anthropology. Explores various approaches to the question: what makes a person powerful over others, in connection with the formation of messianic sects, the genesis of the "cult," the traditional authority of priests and kings, sainthood, the events at Jonestown and Waco, and the popular image of the "cult." Students learn to employ a variety of tools and models to understand historical situations of charismatic leadership. (Also offered as RS 682.)

## **HIST #684 - History of Southern Africa since 1652**

**Credits:** 4.00

Examines the major themes in the history of a troubled sub-region of Africa. In-depth exploration of the nature and impact of socio-cultural formations, the evolution of centralized societies, the initiation and expansion of white settlements, and the Mfecane revolution. Analysis of the dynamics and consequences of European imperialism, economic competition and industrialization, European settler-nationalism, racial conflict, slavery, class and gender politics, Indian and African nationalism, democratization, and development in post-colonial and post-apartheid Southern Africa.

## **HIST 688 - African Religions**

**Credits:** 4.00

An interdisciplinary introduction to basic principles of African religions including historical and recent developments in the study of religion in Africa. Covers the place of religion in African societies and the interrelatedness of religion with myth, ritual, music, art, orality, gender, economics, social process, illness and healing, and kingship and power. Particular attention to African religions in the Americas and the history and impact of Islam and Christianity in Africa. Helps students to understand what is typical about religion, and special about African religion, while appreciating the role of religion in non-Western societies. Slides, films, maps and other visual aids as well as readings.

## **HIST 691 - Internship**

**Credits:** 1.00 to 4.00

Supervised internship with a governmental agency, private corporation, philanthropic institution, library, archives, museum, historical society, or other institution seeking individuals interested in historical research. May be repeated up to a maximum of 8 credits. Cr/F.

## **HIST 695 - Independent Study**

**Credits:** 4.00 to 8.00

A) Early American History, B) American National History, C) Canada, D) Latin America, E) Medieval History, F) Early Modern Europe, G) Modern European History, H) Ancient History, I) Far East and India, J) Near East and Africa, K) European Historiography, L) American Historiography, M) Russia, N) World History, O) English History, P) New Hampshire History, Q) Historical Methodology, R) Irish History, S) History of Science, T) Maritime, U) Museum Studies. For students showing a special aptitude in history who desire to study an area or subject for which no appropriate course is offered. May be repeated up to a maximum of 8 credits. Prereq: permission

## **HIST 698 - Internship in Museum Studies**

**Credits:** 4.00

Supervised position with a museum, historical society, archive, or other history related site. Cr/F.

## **HIST 701 - Seminar: Historical Explorations**

**Credits:** 4.00

A seminar for advanced undergraduates and graduate students on a selected topic. Topics will vary by

semester. This course is discussion-based and meets once a week. There are no prerequisites for this course, but students should expect to be assigned substantial reading and writing.

### **HIST 771 - Museum Studies**

**Credits:** 4.00

Introduction to theory, methods, and practice of museum studies. Examination of various museum functions, as well as contemporary historical controversies.

### **HIST 772 - Studies in Regional Material Culture**

**Credits:** 4.00

Introduces the theory and methodology of material culture, that is, the study of history through the analysis of buildings, human-created landscapes, and artifacts made and used in the United States, particularly in New England. May be repeated for credit with permission of undergraduate adviser.

### **HIST 774 - Historiography**

**Credits:** 4.00

Analysis of ancient and modern historians. Open to undergraduates with permission. (Not offered every year.)

### **HIST 775 - Historical Methods**

**Credits:** 4.00

Contemporary historical methods. Required of all entering Ph.D. candidates; open to undergraduate with permission. (Not offered every year.)

### **HIST 780 - Special Topics in Museum Studies/Material Culture**

**Credits:** 4.00

Study of a selected topic related to museum studies or material culture. May be repeated for course credit with permission of the undergraduate adviser.

### **HIST 787 - Quantitative Methods and Computers for Historians**

**Credits:** 4.00

The historian's use of computers and statistics: opportunities and problems in using and analyzing quantitative sources; elementary statistical techniques; practical applications involving microcomputers and applications programs. No previous knowledge of computers or college mathematics is assumed or required. Prereq: admission as an undergraduate major or graduate student in history; or permission of the instructor. (Not offered every year.)

### **HIST 789 - Seminar in the History of Science**

**Credits:** 4.00

In-depth examination of a selected topic in the history of science. Subject varies. Open to undergraduates with permission of the instructor. No special background in science required.

### **HIST 796 - Research Internship**

**Credits:** 2.00 to 4.00

Intensive collaborative experience in research for undergraduate majors. Students gain professional skills while assisting a faculty member on a continuing research project. Permission Required.

### **HIST 797 - Colloquium**

**Credits:** 4.00

Selected topics in American, European, and non-Western history. Required of history majors. Students must elect section in the department office at the time of registration. Prereq: HIST 500. Writing intensive.

## **HIST 799 - Senior Thesis**

**Credits:** 4.00

Supervised research leading to the presentation of a major research paper. Open only to history majors. Permission of department chairperson required. May not be used as a substitute for the required senior colloquium.

## Horticultural Technology

### **HT 201 - Freshman Seminar**

**Credits:** 1.00

An introduction to the horticulture technology, the Thompson School, and the University: programs, expectations, advising, and resources. Survival skills for college including time management, study skills, and note-taking. Career preparation including portfolios, resumes, professional organizations, and continuing education. Special fee. 1 hr. lec. Cr/F.

### **HT 205 - Plants, People, Place**

**Credits:** 2.00

An introduction to the New England bioregion through exploration of the interrelationships of plants and plant communities, humans and human culture, and the landforms and natural systems of New Hampshire. Includes field identification of common native and exotic plant species. Special fee. 1 lec/1 lab.

### **HT 207 - Plant Structure and Function**

**Credits:** 4.00

Morphology, anatomy, and physiology, with emphasis on the higher plants. Horticultural implications. Lab stresses observations and manipulations of the particulars of plant life. Special fee. 2 rec/1 lab.

### **HT 227A - Horticultural Facilities Management**

**Credits:** 2.00

Layout, construction, management principles, and horticultural technique used on controlled growth structures, including greenhouses, cold frames, and lath houses. Includes practicum in daily operation of Thompson School horticultural facilities. Special fee. 1 lec/1 lab.

### **HT 227B - Horticultural Facilities Management**

**Credits:** 2.00

Layout, construction, management principles, and horticultural technique used on controlled growth structures, including greenhouses, cold frames, and lath houses. Includes practicum in daily operation of Thompson School horticultural facilities. Special fee. 1 lec/1 lab.

### **HT 227C - Horticultural Facilities Management**

**Credits:** 1.00

Layout, systems, construction, management principles, and horticultural techniques used in controlled growth structures, including greenhouses, propagation houses and beds, cold frames, hoop houses, and lath houses. Includes practicum in daily operation of Thompson School horticultural facilities, with second-year focus on scheduling and supervision. 2 lab.

### **HT 227D - Horticultural Facilities Management**

**Credits:** 1.00

Layout, systems, construction, management principles, and horticultural techniques used in controlled growth structures, including greenhouses, propagation houses and beds, cold frames, hoop houses, and lath houses. Includes practicum in daily operation of Thompson School horticultural facilities, with second-year focus on scheduling and supervision. 2 lab.

### **HT 234 - Pest Management**

**Credits:** 4.00

Introduction to pests of horticultural plants, including diseases, insects, and weeds. Symptoms,

morphology, identification, life cycles, impacts, and management measures. Emphasis on integrated pest management. Special fee. 3 lec./1 lab.

### **HT 240 - Introduction to Floral Design**

**Credits:** 2.00

Basic arrangements, including symmetrical and asymmetrical, circular, triangular, and line pieces; and the basic corsage designs used by florists. Application of principles to designs during laboratory sessions. Special fee. 1 lec/1 lab.

### **HT 244 - Advanced Floral Design**

**Credits:** 2.00

Color and its use; planning both wedding and sympathy floral pieces; comparing traditional and contemporary design techniques and materials; construction of bridal bouquets and other essential bridal designs, sympathy pieces and tropical/dried floral pieces during lab sessions. Prereq: HT 240 or permission. Special fee. 1 lec/1 lab.

### **HT 250 - Flower Show Design and Construction**

**Credits:** 1.00

Design, construction, and maintenance of the Thompson School horticultural exhibit at a public flower show. May be repeated. Special fee. 1 rec.

### **HT 251 - Introduction to Design Communication**

**Credits:** 2.00

Introduction to methods of communicating garden and landscape design. Lab work covers selected 2-D and 3-D tools and techniques, including instrumental drawing, modeling, and computer-aided drafting and design (CADD). Special fee. Prereq: TSAS 205, Computers in the Workplace. 1 lec/1 lab.

### **HT 254 - Irrigation Design**

**Credits:** 3.00

Design, installation, and operation of irrigation systems in the greenhouse, nursery, field crops, and landscape. Special fee. 1 lec/1 lab.

### **HT 256 - Horticultural Pruning**

**Credits:** 2.00

Basic pruning techniques for fruits and ornamentals: apples, peaches, raspberries, blueberries, grapes; deciduous and evergreen shrubs and trees; herbaceous materials. Prereq: HT 205 or equivalent. Special fee. 1 lec/1 lab.

### **HT 257 - Woody Landscape Plants**

**Credits:** 3.00

Identification, morphology and classification of Woody Plant Materials of importance in ornamental horticulture in the Northeast including deciduous and evergreen trees, shrubs, vines and groundcovers. Woody plant selection for landscape situations. Special fee. Prereq: HT 205. 2 lec/1 lab.

### **HT 258 - Herbaceous Ornamental Plants**

**Credits:** 2.00

A comprehensive study of herbaceous ornamental plants including morphology, classification, identification, and usage of common perennials, annuals, ferns, ornamental grasses, herbs, and bulbs used in the Northeast. Production, installation, and maintenance of herbaceous ornamentals is also included. Prereq: HT 205 or permission. Special fee. 1 lec/1 lab.

### **HT 260 - Grounds Maintenance**

**Credits: 2.00**

Introduction to the principles and practices (i.e. weed identification/management, turf maintenance, pruning) of maintaining public and private grounds--residential, commercial, institutional, recreational. Special fee. 1 lec/1 lab.

**HT 263 - Landscape Construction****Credits: 4.00**

Materials and methods of landscape construction: grading and drainage, site preparation, transplanting, turf installation, pavements, walls, and retaining walls, wood structures. Introduction to construction drawings, specifications, estimating, and bidding. Special fee. Prereq: HT 205, 215. 4 lec.

**HT 266 - Garden Design and Culture****Credits: 2.00**

Design, installation, and maintenance of flower gardens in New England. Includes perennial, annual, herb, bulb, and combination gardens. Also covers business aspects of gardening, including estimating. Field trips. Coreq: HT 258. Special fee. 3 lec/1 lab/7 wks.

**Co-requisites:** HT 258

**HT 270 - Grounds Management****Credits: 2.00**

Grounds management with emphasis on field organization and project supervision. Special fee. Prereq: HT 260. 1 lec/4-hr. Lab/7 wks. May be repeated for a maximum of four (4) credits.

**HT 272 - Landscape Design Studio****Credits: 4.00**

Principles of residential and commercial landscape design: site analysis, spatial organization, graphics and drafting, use of landscape fixtures and plant materials, final plans and specifications, cost estimates. Special fee. Prereq: HT 257 and 263. 2 lec/4-hr lab.

**HT 275 - Floricultural Crop Production****Credits: 2.00**

Leading cut-flower crops, potted plants, and bulbous crops, including cultural requirements, crop timing, harvesting procedures, distribution systems, and marketing principles. Special fee. Prereq: permission. 2 lec/1 lab.

**HT 276 - Bedding Plant Production****Credits: 2.00**

Bedding plant production, cultural requirements, crop timing, marketing principles. Includes common annuals, perennials, vegetables, and herbs of the Northeast. Field trips. Special fee. Prereq: permission. 3 lec/1 lab/7 wks.

**HT 286 - Fruit and Vegetable Production****Credits: 3.00**

Tree fruits (apple, pears, and peaches) small fruits (strawberries, raspberries, grapes and blueberries) and vegetables grown in New England will be covered. Information will emphasize the growing, maintenance and the marketing of fruits and vegetables from the garden center perspective. Special fee. 2 lec/1 lab.

**HT 291 - Studies****Credits: 1.00 to 3.00**

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a new topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material

in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include floriculture, floral design, nursery, landscape, and horticultural therapy. Permission required. Course may be repeated up to a maximum of 6 credits.

### **HT 292 - Studies**

**Credits:** 1.00 to 3.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a new topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include floriculture, floral design, nursery, landscape, and horticultural therapy. Permission required. Course may be repeated up to a maximum of 6 credits.

### **HT 293 - Field Operations**

**Credits:** 1.00 to 3.00

Seven-week or fourteen-week modules of field experience in selected areas of horticulture under the supervision of an appropriate member of the faculty/staff. A student may enroll in two modules per term. A) Floriculture; B) Floral Design; C) Nursery and Garden; D) Landscape; E) Horticultural Therapy. Special fee. Prereq: permission of instructor and student's adviser.

### **HT 294 - Field Operations**

**Credits:** 1.00 to 3.00

Seven-week or fourteen-week modules of field experience in selected areas of horticulture under the supervision of an appropriate member of the faculty/staff. A student may enroll in two modules per term. A) Floriculture; B) Floral Design; C) Nursery and Garden; D) Landscape; E) Horticultural Therapy. Special fee. Prereq: permission of instructor and student's adviser.

### **HT 297 - Horticultural Work Experience**

**Credits:** 2.00

A guided work experience in a student-selected area of horticulture, providing both a broad overview and a detailed understanding of work in the field. Contracting with an employer for 480 hours of career-oriented work, the student is assigned a wide variety of duties and responsibilities typical of that business or organization. Students maintain a detailed reflective journal of the experience, a portfolio-based summary report, and thorough self-evaluations. Cr/F.

### **HT 404 - Plant Propagation**

**Credits:** 4.00

Reproduction of plants for horticultural purposes by sexual and asexual methods. Seeds, cuttings, separation, division, layering, grafting, budding, and in vitro propagation. Special fee. Prereq: HORT 207 or permission. 2 lec/1 lab.

### **HT 415 - Soils and Land Use**

**Credits:** 2.00

Introduction to soils with emphasis on physical, morphological, chemical, and biological characteristics and their applications in horticultural land use decisions. Includes soil genesis and classification and soil survey use. Special fee. 3 rec/1 lab/7 wks.

### **HT 417 - Soils and Plant Nutrition**

**Credits:** 2.00

Role of nutrition in plant health care. Macro- and micro-nutrient needs, nutrition deficiency symptoms, soil testing, and fertilizer application techniques in both soil and soil-less media. Special fee. 3 rec/1 lab/7 wks.

## **HT 488 - Horticultural Business Management**

**Credits:** 4.00

Business principles and practices in the formation, operation, and growth of horticultural enterprises. An introduction to marketing, accounting, personnel, and operation management. 4 lec.



## Hospitality Management

### **HMGT 401 - Hospitality Industry: Historical Perspectives and Distinguished Lecture Series**

**Credits:** 4.00

Review the broad spectrum of the hospitality industry from an historical perspective, in concert with current history, trends, and challenges presented by notable industry executives. Distinguished guests represent all segments of the hospitality industry plus selected allied support businesses. Industry segments include, but are not limited to, hotels and lodging, restaurant and food service, travel and tourism, conferences and conventions, casinos and gaming, clubs and resorts, health care and senior living, franchising and entrepreneurship, and technology support. Writing intensive.

### **HMGT 403 - Introduction to Food and Beverage Management**

**Credits:** 4.00

Designed to introduce the student to the fundamental components of food and beverage production principles and to some basic management skills. The subject matter is presented through classroom lectures, interactive electronic instruction, guest lectures, and food production labs, including the Hospitality Management Department's Gourmet Dinner Program. Prereq: permission.

### **HMGT 404 - UHS Hospitality Practicum I**

**Credits:** 1.00

Work Experience in the hospitality industry through University Hospitality Services; contributes toward Hospitality Management practicum requirement. Students complete at least 100 hours clock time on the job, keep a weekly diary, and write a final paper. Students responsible for arranging their own work experience. Restricted to first-year Hospitality Management majors. Course may be continued into the succeeding semester. Cr/F.

### **HMGT 504 - UHS Hospitality Practicum II**

**Credits:** 1.00

Work Experience in the hospitality industry through University Hospitality Services; contributes toward Hospitality Management practicum requirement. Students complete at least 100 hours clock time on the job, keep a weekly diary, and write a final paper. Students responsible for arranging their own work experience. Restricted to sophomore Hospitality Management majors. Course may be continued into the succeeding semester. Cr/F.

### **HMGT 554 - Lodging Operations Management**

**Credits:** 4.00

Focus on management history, planning, organizing, leadership, and current and future management issues. Requires students to compare rooms-division management in a large hotel with that of a small hotel, including reservations, front desk operations and accounting, housekeeping, and auxiliary functions. The complexities and the terminology of the design, management, and maintenance of physical structures used by civil engineers and architects are integral to the course. Guest lecturers include hotel general managers and department heads who highlight students' projects. Pre- or Coreq: HMGT 401.

### **HMGT 567 - Food and Beverage Operations Management**

**Credits:** 4.00

Introduces the student to the basic elements of food and beverage management with a focus on front of the house operations. The subject matter is presented through lectures, guest speakers, certification training, the department's Gourmet Dinner program, and laboratory experiences. The laboratory activities are based at Acorns Restaurant in the New England Conference Center. Five certifications are achieved in

this course. Lab.

### **HMG 570 - International Food and Culture**

**Credits:** 4.00

This course will focus on the importance of location in the production, distribution and consumption of food, inter-related with the hospitality management industry. The role of where we come from is critical in understanding why we eat, and where we eat it. For most people of the world, food is tied to group identity (religion, culture), but globalization, migration, commoditization of culture, is tied to group identity (religion, culture), but globalization, migration, commoditization of culture, environmental sustainability, and technological innovations have confused the relationship with food. Writing intensive.

### **HMG 595 - Internship I**

**Credits:** 1.00 to 12.00

A nontraditional academic experience relating to work experience within the university system. Coordinated by a faculty member who provides supervision, along with an on-site supervisor, through regular class meetings. Includes academic assignments and a written report. May be repeated to a maximum of 12 credits. Prereq: permission and good academic standing. Cr/F.

### **HMG 600 - Hospitality Marketing Management**

**Credits:** 4.00

Students apply basic marketing principles to the competitive environment of service businesses, such as hotels, restaurants, and other hospitality firms. Strong emphasis on consumer behavior, services management theory, and the hospitality marketing mix as they relate to service firms of all types. Course material is presented through a variety of techniques: case studies, lectures, guest speakers, team projects, and written assignments. Pre- or Coreq: HMG 401, 403, 554, 567. Writing intensive.

### **HMG 618 - Uniform Systems for the Hospitality Industry**

**Credits:** 4.00

Following a review of financial statements and an introduction to the Uniform System of Accounts for Hotels and Restaurants, students learn specific applications of managerial accounting and decision support systems for the hospitality industry. Topics include cash flow analysis, cost management, cost-volume-profit analysis, pricing models, budgeting, and forecasting. Students develop an understanding of computer software and back-and front-office computer systems as they relate specifically to the hospitality industry. Lectures, computer exercises, and papers. Prereq: ADMN 502.

### **HMG 625 - Hospitality and Employment Law**

**Credits:** 4.00

Tort and contract liability in the hospitality industry. Emphasizes a managerial approach to solving or avoiding potential problems including employment law issues that arise in any business environment: wrongful termination, compensation rules, affirmative action, employment discrimination, sexual harassment, and issues involving privacy in the workplace. Prereq: junior standing.

### **HMG 635 - Hospitality Human Resource Management**

**Credits:** 4.00

Addresses key hospitality resource management issues of a general, technical, and social nature including communication, motivation and leadership, job stress and safety, security, government regulations, discrimination, and substance abuse. Covers technical areas such as recruiting and selecting, placement, employment, training, performance appraisal, disciplining, and termination. Pre- or Coreq: ADMN 575 or ADMN 611. Writing intensive.

### **HMG 655 - Hospitality Finance and Development**

**Credits:** 4.00

Provides the advanced student with a familiarity of the principles and practices of development and acquisition of hotel, restaurant, and other hospitality businesses, and the real estate development process. Emphasizes market and financial evaluation and decision making relative to economic, ethical, legal, and social aspects of the organization's environment. Group projects involving the preparation of a complete economic feasibility study for hotel or restaurant development or acquisition or repositioning are required. Prereq: HMGT 600, 618. Pre- or Coreq: HMGT 603.

### **HMGT 661 - Meeting Planning Management**

**Credits:** 4.00

Strategic and logistical considerations in managing the planning, development, marketing, and implementation of meetings, conventions, and events.

### **HMGT 662 - Convention Sales and Service Management**

**Credits:** 4.00

Provides students with an understanding of the sales and service management aspects of the international convention, exhibition and meeting industries. Analyze the market potential of convention centers, resort hotels, convention hotels and independent venues. Consider the strategic and logistical aspects of the planning, development, coordination and execution of conventions, exhibitions and meetings. Use case studies to examine American and overseas properties. Introduction to and certification in numerous aspects of the DELPHI software system.

### **HMGT 667 - Adv Food/Bev Operations Mgt**

**Credits:** 4.00

A project management course integrating management principles and techniques in the presentation of large scale gourmet dinners. Examines services operations management: planning and forecasting, marketing and sales, production delivery systems, service encounters, technology, purchasing and inventory management, human resources, scheduling, productivity and quality issues. Prereq: HMGT 401, 403, 554, 567. Pre- or Co-requisite: HMGT 618.

**Co-requisites:**

### **HMGT 681 - Resort and Spa Management**

**Credits:** 4.00

Complexities of developing and managing various types of resort properties. Emphasis on time-share properties and recreation elements of full service resorts. Writing intensive.

### **HMGT 682 - Private Club Management**

**Credits:** 4.00

Examines the effective operation and management of private clubs including city clubs, country clubs and yacht clubs. Major topics include: the unique niche that clubs represent in the hospitality industry, the general manager/COO concept, organizational structure of clubs, role of the board of directors, membership requirements, differences between tax-exempt clubs and non-exempt clubs, duties and responsibilities of department heads in private clubs, government regulation, preparing for a career in the club field, trends in club management and the future of clubs.

### **HMGT 685 - Study Abroad**

**Credits:** 1.00 to 16.00

Open to students studying abroad in the discipline as approved by the hospitality management program director. Cr/F.

### **HMGT 686 - Study Abroad**

**Credits:** 1.00 to 16.00

Open to students studying abroad in the discipline as approved by the hospitality management program

director. Special fee. Cr/F.

### **HMG 695 - Independent Analysis**

**Credits:** 2.00 to 12.00

Study and research project for honor students to advance knowledge in lodging and food services fields. Prereq: junior standing and permission.

### **HMG 695W - Independent Analysis**

**Credits:** 2.00 to 12.00

Study and research project for honor students to advance knowledge in lodging and food services fields. Prereq: junior standing and permission. Writing intensive.

### **HMG 696 - Supervised Student Teaching Experience**

**Credits:** 1.00 to 8.00

Participants are expected to perform such functions as attending classes, leading discussion groups, assisting faculty, presenting information in undergraduate courses that they have successfully completed, holding office hours, grading papers and exams. Enrollment is limited to juniors and seniors who have had above average GPAs. May be repeated to a maximum of 8 credits. Prereq: permission of instructor, program director, and director of advising. Cr/F

### **HMG 698 - Topics**

**Credits:** 1.00 to 4.00

Special topics and developments in lodging, food services, and other hospitality industries. Prereq: junior standing and permission. Course may be repeated when topics change up to a maximum of 8 credits.

### **HMG 703 - Strategic Management in the Hospitality Industry**

**Credits:** 4.00

Capstone course, interrelating and applying strategic management concepts to hospitality organizations. Cases from hotel companies, restaurant chains, and other hospitality-related businesses, supplemented by economic and other published information from the industry, are used as departure points for class discussion. Prereq: senior standing. Writing intensive.

### **HMG 750 - Senior Operations Seminar**

**Credits:** 4.00

Students travel to a major Boston hotel weekly to spend a day working in various departments. The course gives students an in-depth look at the operation of the individual departments, as well as learning how departments must function in an integral way for a successful hotel to operate. Students also experience areas not able to be covered in the on-campus curriculum including Receiving, Security, Maintenance and a day with a General Manager. Prereq: HMG senior status.

### **HMG 756 - International Franchising**

**Credits:** 4.00

Designed to help the student acquire an understanding of franchising as a system of distribution and business expansion. Franchising is studied from both the perspectives of the franchisee and the franchiser. In addition, economic, financial, and legal issues associated with franchising are covered. By the end of the course, students acquire the skills and sources of information that would permit sound assessment of the business opportunities available in franchising. Prereq: ADMN 585 or ADMN 651 or HMG 600. (Also offered as MKTG 756.)

### **HMG 771 - Beverage Management/International Wines**

**Credits:** 4.00

Examination of purchasing, evaluation, storage, service, and control of alcoholic beverages. Emphasizes

wines, although beer, ale, distilled spirits, liqueurs, and mixed drinks are examined. Enrolled students must be at least 21 years old.

### **HMGT 777 - Casino Management**

**Credits:** 4.00

History, development and management of casinos and gaming. Emphasizes environment, operations, regulation, accounting, auditing and taxation of casinos and gaming. Investigates the economics, moral and cultural issues of gaming. Field trip required. Enrolled students must be at least 21 years old.

### **HMGT 795 - Internship II**

**Credits:** 1.00 to 12.00

Off-campus work in the hospitality industry for on-the-job skill development. Normally supervision is provided by a qualified individual in the organization with frequent consultation by a hotel program faculty sponsor. A written report is required of the student. Internships may be part-time or full-time, with course credits assigned accordingly. May be repeated to a maximum of 12 credits. Prereq: permission and good academic standing; junior and senior students only. Cr/F.

### **HMGT 799 - Honors Thesis/Project**

**Credits:** 4.00 to 8.00

Supervised research leading to the completion of an honors thesis or project; required for graduation from the honors program in hospitality management. Prereq: permission of director of undergraduate programs and department chair. Writing intensive.

## Humanities

### **HUMA 401 - Introduction to the Humanities**

**Credits:** 4.00

Introduction to the interdisciplinary study of the humanities. Taking as its entry point a significant work, the course is organized by topics related to that work, selected and arranged to invoke lively intellectual debate among faculty and students alike. Group lectures by the three core humanities faculty members. The instructors teaching the course will provide material for smaller weekly discussion sections led by each of those faculty members. Requirements include lively discussions, papers, and examinations. Not repeatable.

### **HUMA 401W - Introduction to Humanities**

**Credits:** 4.00

Introduction to the interdisciplinary study of the humanities. Taking as its entry point a significant work, the course is organized by topics related to that work, selected and arranged to invoke lively intellectual debate among faculty and students alike. Group lectures by the three core humanities faculty members. The instructors teaching the course will provide material for smaller weekly discussion sections led by each of those faculty members. Requirements include lively discussions, papers, and examinations. Writing intensive.

### **HUMA 411 - Humanities I**

**Credits:** 4.00

Introduction to the humanities and Western culture through literature, history, philosophy, music, art, and architecture. Examination of selected historical periods from classical Greece through the Renaissance through readings, films, slides, and field trips. Special fee. Writing intensive.

### **HUMA 412 - Humanities II**

**Credits:** 4.00

Introduction to the humanities and Western culture through literature, history, philosophy, music, art, and architecture. Examination of selected historical periods from the Enlightenment to the present through the use of readings, films, slides, and field trips. Writing intensive.

### **HUMA 444 - Idea of University**

**Credits:** 4.00

An inquiry course that introduces first-year students to the history of the university and to the philosophical, artistic, and political crises it has undergone and continues to undergo today. HUMA 444 is an interdisciplinary course, team-taught by three professors from different fields. Writing intensive.

### **HUMA 444A - Everlasting Fame: The Hero in Literature, Film, and Popular Culture**

**Credits:** 4.00

An interdisciplinary introductory seminar designed for first-year students. Course uses an inquiry-guided approach to examine the concept of the hero and the heroic life through a variety of media. How do we define a hero? What are the common characteristics inherent in the heroic life? How has the idea of the hero evolved over time? Do we share a common definition of the hero? What criteria are essential to the heroic life? What does it mean to be a hero today? Students will explore possible answers to these questions through an examination of primary texts from ancient Indo-European myths to Celtic sagas, articles from historical, anthropological, and literary sources, and popular culture.

### **HUMA 444B - Richard Wright's Native Son and the American 1930s and 1940s**

**Credits: 4.00**

This inquiry course uses Richard Wright's groundbreaking novel, *Native Son*, to explore ways in which literature can reflect, interact with, and change the world out of which it arises. After a careful reading of the novel, we consider how a writer's comments on his art can help us understand the art, how a novel's composition and reception affect our understanding, how the historical context of a work can help us reflect upon the relationship of literature and history, how other media such as film versions of the novel interpret it, and how social and philosophical interpretations of experience are reflected in the narrative.

**HUMA 444C - Mozart and the Enlightenment: Social Norms and Sexual Behavior in the Age of Reason****Credits: 4.00**

An interdisciplinary introduction to the European Enlightenment (approximately 1690-1790) as a cultural phenomenon, arising from developments in the natural sciences, that infused all areas of human endeavor with new ways of thinking and behaving, including social norms and sexual behavior, and how it was communicated and disseminated, not only through the written word but also through theater and music, especially in works of Mozart exploring the use and abuse of Human Reason in daily life. Writing intensive.

**HUMA 500 - Critical Methods in the Humanities****Credits: 4.00**

Critical analysis of works in the humanities. Focuses on major texts, evaluation of secondary literature, research writing, criticism. Required of all HUMA majors. Writing intensive.

**HUMA 510A - Ancient World: An Interdisciplinary Introduction****Credits: 4.00**

What is a human being? How should we explain or understand what happens to us? How ought we to live? This team-taught course examines these important questions by focusing on the literature, art, philosophy, and science of ancient Greece and Rome. Writing intensive.

**HUMA 510B - Ancient World: An Interdisciplinary Introduction****Credits: 4.00**

What is a human being? How should we explain or understand what happens to us? How ought we to live? This team-taught course examines these important questions by focusing on the literature, art, philosophy, and science of ancient Greece and Rome. Writing intensive.

**HUMA 510C - Ancient World: An Interdisciplinary Introduction****Credits: 4.00**

What is a human being? How should we explain or understand what happens to us? How ought we to live? This team-taught course examines these important questions by focusing on the literature, art, philosophy, and science of ancient Greece and Rome. Writing intensive.

**HUMA 510D - Ancient World: An Interdisciplinary Introduction****Credits: 4.00**

What is a human being? How should we explain or understand what happens to us? How ought we to live? This team-taught course examines these important questions by focusing on the literature, art, philosophy, and science of ancient Greece and Rome. Writing intensive.

**HUMA 511A - Medieval World: An Interdisciplinary Introduction****Credits: 4.00**

What is the soul and how is its health related to temptation and also to specifically Christian virtues? How closely does the medieval definition of an eternal God determine good and evil in daily life? To what extent does the hope of immortality affect the practice of writing literature, making art, studying philosophy, and investigating science? This team-taught course examines these important questions by focusing on the

literature, art, philosophy, and science from the collapse of the classical world to the rise of capitalism.  
Writing intensive

### **HUMA 511B - Medieval World: An Interdisciplinary Introduction**

**Credits:** 4.00

What is the soul and how is its health related to temptation and also to specifically Christian virtues? How closely does the medieval definition of an eternal God determine good and evil in daily life? To what extent does the hope of immortality affect the practice of writing literature, making art, studying philosophy, and investigating science? This team-taught course examines these important questions by focusing on the literature, art, philosophy, and science from the collapse of the classical world to the rise of capitalism.  
Writing intensive

### **HUMA 511C - Medieval World: An Interdisciplinary Introduction**

**Credits:** 4.00

What is the soul and how is its health related to temptation and also to specifically Christian virtues? How closely does the medieval definition of an eternal God determine good and evil in daily life? To what extent does the hope of immortality affect the practice of writing literature, making art, studying philosophy, and investigating science? This team-taught course examines these important questions by focusing on the literature, art, philosophy, and science from the collapse of the classical world to the rise of capitalism.  
Writing intensive

### **HUMA 511D - Medieval World: An Interdisciplinary Introduction**

**Credits:** 4.00

What is the soul and how is its health related to temptation and also to specifically Christian virtues? How closely does the medieval definition of an eternal God determine good and evil in daily life? To what extent does the hope of immortality affect the practice of writing literature, making art, studying philosophy, and investigating science? This team-taught course examines these important questions by focusing on the literature, art, philosophy, and science from the collapse of the classical world to the rise of capitalism.  
Writing intensive

### **HUMA 512A - Renaissance and Early Modern: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the interrelationship of art, literature, philosophy, and science from the High Renaissance into the 18th century. Study of the works and ideas of such influential figures as Shakespeare and Milton, Raphael and Rembrandt, Galileo, Descartes, Newton, and Hume. Writing intensive.

### **HUMA 512B - Renaissance and Early Modern: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the interrelationship of art, literature, philosophy, and science from the High Renaissance into the 18th century. Study of the works and ideas of such influential figures as Shakespeare and Milton, Raphael and Rembrandt, Galileo, Descartes, Newton, and Hume. Writing intensive.

### **HUMA 512C - Renaissance and Early Modern: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the interrelationship of art, literature, philosophy, and science from the High Renaissance into the 18th century. Study of the works and ideas of such influential figures as Shakespeare and Milton, Raphael and Rembrandt, Galileo, Descartes, Newton, and Hume. Writing intensive.

### **HUMA 512D - Renaissance and Early Modern: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the interrelationship of art, literature, philosophy, and science from the High Renaissance into the 18th century. Study of the works and ideas of such influential figures as Shakespeare and Milton, Raphael



and Rembrandt, Galileo, Descartes, Newton, and Hume. Writing intensive.

### **HUMA 513A - Modern World: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the central paradoxes of our culture in the modern age. Is there such a thing as "progress" and if so what is its nature? What is the relation of conscious and unconscious? Is the contemporary world devoid of meaning? Questions such as these are examined in relation to works since the 18th century in the fields of literature, history of science, philosophy, and art. Writing intensive.

### **HUMA 513B - Modern World: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the central paradoxes of our culture in the modern age. Is there such a thing as "progress" and if so what is its nature? What is the relation of conscious and unconscious? Is the contemporary world devoid of meaning? Questions such as these are examined in relation to works since the 18th century in the fields of literature, history of science, philosophy, and art. Writing intensive.

### **HUMA 513C - Modern World: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the central paradoxes of our culture in the modern age. Is there such a thing as "progress" and if so what is its nature? What is the relation of conscious and unconscious? Is the contemporary world devoid of meaning? Questions such as these are examined in relation to works since the 18th century in the fields of literature, history of science, philosophy, and art. Writing intensive.

### **HUMA 513D - Modern World: An Interdisciplinary Introduction**

**Credits:** 4.00

Explores the central paradoxes of our culture in the modern age. Is there such a thing as "progress" and if so what is its nature? What is the relation of conscious and unconscious? Is the contemporary world devoid of meaning? Questions such as these are examined in relation to works since the 18th century in the fields of literature, history of science, philosophy, and art. Writing intensive.

### **HUMA 514A - 20th Century, 1900-1945: An Interdisciplinary Introduction**

**Credits:** 4.00

This course examines the relationships of literature, art, philosophy, and science in the first half of the twentieth century. Topics include the rise of modernism in literature and the arts, the distinctive themes of 20th century philosophy, and crucial innovations in the sciences. Students study the works of such figures as Picasso, Woolf, Einstein, Freud, and Wittgenstern. Writing intensive.

### **HUMA 514B - 20th Century, 1900-1945: An Interdisciplinary Introduction**

**Credits:** 4.00

This course examines the relationships of literature, art, philosophy, and science in the first half of the twentieth century. Topics include the rise of modernism in literature and the arts, the distinctive themes of 20th century philosophy, and crucial innovations in the sciences. Students study the works of such figures as Picasso, Woolf, Einstein, Freud, and Wittgenstern. Writing intensive.

### **HUMA 514C - 20th Century, 1900-1945: An Interdisciplinary Introduction**

**Credits:** 4.00

This course examines the relationships of literature, art, philosophy, and science in the first half of the twentieth century. Topics include the rise of modernism in literature and the arts, the distinctive themes of 20th century philosophy, and crucial innovations in the sciences. Students study the works of such figures as Picasso, Woolf, Einstein, Freud, and Wittgenstern. Writing intensive.

### **HUMA 514D - 20th Century, 1900-1945: An Interdisciplinary Introduction**

**Credits: 4.00**

This course examines the relationships of literature, art, philosophy, and science in the first half of the twentieth century. Topics include the rise of modernism in literature and the arts, the distinctive themes of 20th century philosophy, and crucial innovations in the sciences. Students study the works of such figures as Picasso, Woolf, Einstein, Freud, and Wittgenstein. Writing intensive.

**HUMA 515A - 20th Century, 1945-1999: An Interdisciplinary Introduction****Credits: 4.00**

Examines the relationships of literature, art, philosophy, and science since the middle of the twentieth century. Topics include the philosophical and literary implications of the Holocaust and nuclear weapons, movements in the arts and literature since World War II, the rise of the sciences of life and information, and postmodernism. Students study the works of such figures as Arendt, Turing, Beckett, and Pollock. Writing intensive.

**HUMA 515B - 20th Century, 1945-1999: An Interdisciplinary Introduction****Credits: 4.00**

Examines the relationships of literature, art, philosophy, and science since the middle of the twentieth century. Topics include the philosophical and literary implications of the Holocaust and nuclear weapons, movements in the arts and literature since World War II, the rise of the sciences of life and information, and postmodernism. Students study the works of such figures as Arendt, Turing, Beckett, and Pollock. Writing intensive.

**HUMA 515C - 20th Century, 1945-1999: An Interdisciplinary Introduction****Credits: 4.00**

Examines the relationships of literature, art, philosophy, and science since the middle of the twentieth century. Topics include the philosophical and literary implications of the Holocaust and nuclear weapons, movements in the arts and literature since World War II, the rise of the sciences of life and information, and postmodernism. Students study the works of such figures as Arendt, Turing, Beckett, and Pollock. Writing intensive.

**HUMA 515D - 20th Century, 1945-1999: An Interdisciplinary Introduction****Credits: 4.00**

Examines the relationships of literature, art, philosophy, and science since the middle of the twentieth century. Topics include the philosophical and literary implications of the Holocaust and nuclear weapons, movements in the arts and literature since World War II, the rise of the sciences of life and information, and postmodernism. Students study the works of such figures as Arendt, Turing, Beckett, and Pollock. Writing intensive.

**HUMA 519 - Classical Greece****Credits: 4.00**

Examination of the culture of classical Greece through the history, drama, philosophy, and art of the period. Open to all students. Recommended for students in the humanities major. Special fee.

**HUMA 592 - Special Topics in the Humanities****Credits: 2.00 to 8.00**

Special topics; offered occasionally. May be repeated up to a maximum of 12 credits.

**HUMA #608 - Arts and American Society: Women Writers and Artists, 1850-Present****Credits: 4.00**

Team-taught course studying the impact of gender definitions on the lives and works of selected American artists. Considers lesser-known figures such as Fannie Fern, Lilly Martin Spencer, and Mary Hallock Foote as well as better-known artists such as Willa Cather and Georgia O'Keeffe. Prereq: permission or one of

the following: WS 401, HIST 566, ENGL 585 or 586, ENGL 685 or 785, or a 600-level art history course. (Also offered as ARTS 608, ENGL 608, and HIST 608.) Writing intensive.

### **HUMA 609 - Ethnicity in America: The Black Experience in the 20th Century**

**Credits:** 4.00

Team-taught course investigating music, literature, and social history of black America in the period of the Harlem Renaissance, the Great Depression, World War II, and in the 1960s. Special attention to the theme of accommodation with, and rejection of, dominant white culture. (Also offered as AMST 609, ENGL 609.) Writing Intensive.

### **HUMA 610 - Regional Studies in America: New England Culture in Changing Times**

**Credits:** 4.00

Team-taught course investigating some of the major contributions New England has made to American life. Focusing on three periods: the Puritan era, 1620-90; the Transcendental period, 1830-60; and the period of emerging industrialism in the late 19th century. Prereq: second-semester sophomore. (Also offered as AMST 610, ARTS 610, ENGL 610, and HIST 610.) Not for art studio major credit. Writing intensive.

### **HUMA 622 - Studies of Freedom and Liberty**

**Credits:** 4.00

Principles of freedom and liberty that helped to form Western culture from the Renaissance to the present. Topics include concepts of human nature, theories of government and society. Readings include Machiavelli, Locke, Paine, Mill, Marx, Freud, Sartre, and Marcuse.

### **HUMA 640 - Birth of Rock and Roll**

**Credits:** 4.00

An interdisciplinary study of the cultural forces that brought the birth of rock and roll in the 1950's. This study of pre-rock music and culture will be further enriched by art, literature, and photography which focuses on the roots of rock and roll. Writing intensive.

### **HUMA 650 - Humanities and the Law: The Problem of Justice in Western Civilization**

**Credits:** 4.00

Interdisciplinary modular course examines interpretations of the nature of justice, its origins, the role of the professional judiciary, and the relationship of law and ethics. Students take three successive five-week modules during the semester. (Not offered every year.) Writing intensive.

### **HUMA 651 - Humanities and Science: The Nature of Scientific Creativity**

**Credits:** 4.00

Interdisciplinary modular course examines the historical and intellectual foundations of the physical, biological, and human sciences. Students take three successive five-week modules during the semester. (Not offered every year.) Writing intensive.

### **HUMA #680 - New England Culture: Roots and Branches**

**Credits:** 4.00

Interdisciplinary examination of the richness, variety, and significance of selective periods of New England culture using literature, history, art and photographic images, music, artifacts, and oral histories. Subjects include Native American lore, European American contributions to regional culture, New England's literary tradition and influence on American culture.

### **HUMA 698 - Independent Study**

**Credits:** 4.00

Independent study open only to highly qualified juniors and seniors who have completed at least four humanities courses above the 400 level. Requires original research and substantial writing projects under

the direction of a member of the core faculty of the humanities. Prereq: HUMA junior or senior majors; four HUMA courses above the 400 level.

### **HUMA 700 - Seminar**

**Credits:** 4.00

Provides an opportunity for in-depth reading, viewing, and/or listening to texts and artifacts. Emphasis on the multiple perspectives and methodologies that can be brought to bear upon these works from several humanistic disciplines. May be repeated for credit. Writing intensive.

### **HUMA 730 - Special Studies**

**Credits:** 4.00

Selected topics not covered by existing courses, with subjects to vary. May be repeated for credit. Prereq: one 400- or 500-level HUMA course or junior standing. Writing intensive.

### **HUMA 795 - Study of Creativity**

**Credits:** 4.00

A study of human creativity through representative lives and works of such figures as daVinci, Einstein, Kathe Kollwitz, Bach, Dickens, and Freud. Lectures, class discussions, films, and slides supplemented by gallery tours plays, and concerts. Open to students with a background in humanities or by permission of the instructor. Special fee. (Normally offered every other year.) Writing intensive.

### **HUMA 796 - Study of Contemporary Issues**

**Credits:** 4.00

Current social and political issues with focus on recent developments in public policy, science, and business, and their impact of social values. Prereq: junior status or permission. (Normally offered every other year.) Writing intensive.

### **HUMA 798 - Research Seminar**

**Credits:** 1.00

Provides a context within which students may discuss and receive direction in the course of completing a major research paper. At the end of the seminar, students present their research to the faculty and their fellow students. Prereq: senior standing; permission. Writing intensive.

### **HUMA 799 - Research Seminar**

**Credits:** 3.00

Provides a context within which students may discuss and receive direction in the course of completing a major research paper. At the end of the seminar, students present their research to the faculty and their fellow students. Restricted to majors. Prereq: HUMA 798; senior standing; permission. Writing intensive.

## Information Technology

### **IT 502 - Intermediate Web Design**

**Credits:** 4.00

An intermediate level exploration of the theory and practice of Web design. Students learn the fundamentals of design theory applicable to the World Wide Web and examine tools and techniques for applying that knowledge to their projects. Additional topics include information architecture, usability, accessibility, optimization, typography, and market visibility. Working knowledge of XHTML and CSS required. Prereq: CS 403.

### **IT 505 - Database Programming**

**Credits:** 4.00

Introduces database programming in the microcomputer environment. Students use a procedural programming language such as Visual Basic to manipulate data managed by a database management system. Emphasis is on the relational database model. Topics include connections, queries (including use of SQL), relations, constraints, transaction processing, concurrency issues, exception handling, and report generation. Prereq: a programming course.

### **IT 506 - Intermediate Applications Programming with Visual Basic**

**Credits:** 4.00

Introduction to advanced Visual Basic data structures, focusing on the language's object oriented features. Topics include the creation of programmer-defined classes and objects, collections, user controls, exception handling, regular expressions, and Web forms. Prereq: a programming course.

### **IT 520 - Computer Architecture**

**Credits:** 4.00

Fundamentals of computer organization, including binary systems, data representation (and compression), machine language, program execution, memory and process issues. Operating systems and networking basics. Not open to CS majors. Prereq: a programming course.

### **IT 600 - Internship**

**Credits:** 1.00

Provides opportunity to apply academic experience in settings associated with future professional employment. A written proposal for the internship must be approved by the instructor. The proposal must specify what the student will learn from the internship, why the student is properly prepared for the internship, and what supervision will be available during the internship. A mid-semester report and a final report are required. Prereq: permission. May be repeated up to a maximum of 4 credits. Cr/F.

### **IT 604 - Intermediate Web Development**

**Credits:** 4.00

An intermediate-level examination of the theory and practice of developing applications for the World Wide Web. Students will learn practical techniques for designing and implementing Web applications, with a particular emphasis on server-side processing and data-driven Web sites. Working knowledge of XHTML, CSS, and some programming language is required. Prereq: CS 403 and a programming course.

### **IT 609 - Network/Systems Administration**

**Credits:** 4.00

Introduces the central issues in administration of a networked computer system. Topics include the client-server model (including support of mail, FTP, Telnet, the Web), disk and file systems, backup and

recovery, and security. Privacy and other legal/social issues will be discussed. Prereq: IT 520 and a programming course, or permission of the instructor.

### **IT 666 - Computer Security**

**Credits:** 4.00

Provides students with the skills required to recognize and diagnose potential security issues in computer and network systems. Through readings, case studies, exercises, research papers, exams and personal experience, students will discuss and debate security policies and legislation, system procedures, security tools and techniques and the patterns that attackers use to foil security systems. Other topics include types of attacks, viruses, intrusion detection and tracking, firewalls, trust relationships and authentication, secure connections, and cryptography. At the conclusion of the course, student will have a heightened sense of security in the actions they take when using and maintaining computer systems. Prereq: IT 520 or permission of the instructor. No credit if credit earned for CIS 615.

### **IT 696 - Independent Study**

**Credits:** 1.00 to 6.00

Individual projects developed and conducted under the supervision of a faculty member. Prereq: permission of faculty supervisor and department chairperson. May be repeated.

### **IT 704 - Advanced Web Development**

**Credits:** 4.00

An advanced exploration of various topics in Web development. Topics covered each semester will be chosen to reflect the current state of stable and accepted Web technologies, with a decided emphasis on open-source solutions. Both client-side and server-side technologies are likely to be included, with particular attention given to concepts and techniques used to facilitate efficient Web development. Prereq: IT 604.

### **IT 705 - Project Management for Information Technology**

**Credits:** 4.00

This course focuses on a core set of project management essentials that can affect the bottom line of project technical and business performance. These are termed "best practices," and those addressed are: formal risk management, agreement on interfaces, metrics based scheduling/tracking, frequent binary completion milestones, incremental development, people aware management style, and change management. The emphasis is on information technology projects; however, the basic principles are pertinent to a wider class of project domains. Prereq: Senior standing in IT or permission. Writing intensive.

### **IT 710 - Senior Project**

**Credits:** 4.00

Students are organized into teams and work on a specific IT project. Utilizing the skills and concepts learned in IT 705 (as well as other previous academic and field experience), each team works with one or more stakeholders to provide all necessary project elements - from initial specification through design and development to delivery. Teams are expected to provide both interim and final written and/or oral reports for the project. Prereq: IT 705.

### **IT 725 - Network Technology**

**Credits:** 4.00

Introduction to computer networks using the standard Internet protocol reference model as a framework. The topics of the course include the fundamental concepts in networking, common application protocols, network security and management, Internet protocol suite, and discussion of wired/wireless networking technologies. Prereq: IT 520.

### **IT 771 - Web Programming Languages**

**Credits:** 4.00

In this course, you will learn languages to program the Web. Languages integrated into browsers, like JavaScript, and languages invoked on the server, like Ruby. You will also learn about frameworks, like Rails, and various techniques used to support the programming process. In addition, you will learn languages you will need to create, modify and process Web documents. Prereq: IT 520, IT 604.

### **IT 775 - Database Technology**

**Credits:** 4.00

Topics include database architecture, schema design and definition, entity-relationship diagrams, data retrieval and update, and indexing performance. Architectures for single-user, multi-user, client-server, and web access are introduced. The relational data model is emphasized but alternative database models, such as semi-structured and object models, are introduced. Database administration topics include examination of metadata information, data integrity, and management of users and privileges, performance tuning, transactions, isolation levels, and security. Ethics of data protection are introduced. Students develop skill in SQL. Not open to CS majors. No credit if credit earned for CS 775. Prereq: IT 505.

### **IT 780 - Topics in Information Technology**

**Credits:** 4.00

Material not normally covered in course offerings. May be repeated for credit.

## Integrated Applied Mathematics

### **IAM 751 - Introduction to High-Performance Computing**

**Credits:** 4.00

Course gives an introduction to select areas of high-performance computing, providing a basis for writing and working with high-performance simulation codes. The three main topics are: 1) basic software engineering, 2) high-performance and parallel programming, and 3) performance analysis and modeling. Additional topics may include heterogeneous architectures like GPUs and data analysis/visualization. Prereq: MATH 753 and working knowledge of a programming language (C or Fortran), or by permission of instructor.



## Intercollege

### **INCO 400 - Graduate Preparation Seminar**

**Credits:** 1.00

A survey seminar that explores issues related to graduate school preparation. Topics include graduate school culture, academic research, the role of multicultural scholars, faculty relations, the graduate record exam, resume/vita development, and financing graduate education. Prereq: Enrollment in McNair Scholars Program. May be repeated for credit. Cr/F.

### **INCO 402 - Peace**

**Credits:** 4.00

Investigates (1) military deterrence in theory and practice; (2) alternatives to military deterrence such as diplomacy, international law, and conflict resolution, and nonviolent defense; (3) economic and environmental interdependence of nations; and (4) political, cultural, ethical, and religious conceptions of peace.

### **INCO 402H - Honors/Peace**

**Credits:** 4.00

Investigates (1) military deterrence in theory and practice; (2) alternatives to military deterrence such as diplomacy, international law, and conflict resolution, and nonviolent defense; (3) economic and environmental interdependence of nations; and (4) political, cultural, ethical, and religious conceptions of peace.

### **INCO 403 - Healthcare Professions Seminar**

**Credits:** 2.00

This seminar is designed for students (primarily first year primarily first year undergraduates, but to include any others) who are in the initial phase of preparation to a career in allopathic or osteopathic medicine, dentistry, podiatry, optometry, physicians assistant, chiropractics, physical therapy, pharmacy, or naturopathic medicine. Through readings and discussion students will become informed about current topics in healthcare, and specifically about these professions, requirements for admission to degree programs, and about how to become a competitive applicant. Cr/F.

### **INCO 410 - Introduction to College Teaching**

**Credits:** 2.00

Evolving role and function of colleges and universities in American higher education. Issues involving the professorate including teaching, scholarship and service as the framework for an academic career.

### **INCO 430 - Interdisciplinary Science**

**Credits:** 4.00

Advanced topics in selected areas of science through interdisciplinary lectures, demonstrations, hands-on laboratory experience, and field trips; the use of mathematical and computer skills in science; social, economic, environmental, and ethical applications and implications of recent advances in the selected area of science; the process of research. Restricted to high school juniors and seniors by permission only.

### **INCO 450 - Introduction to Race, Culture and Power**

**Credits:** 4.00

Explores the ways in which the concept of "race" serves to justify global relationships of domination and inequality and is embedded in U.S. society. Examines how dominant powers use "culture" to maintain subordination and how subordinated peoples use "culture" to resist exploitation. (Also listed as ANTH 450.)

### **INCO 501 - Introduction to the Research Process**

**Credits:** 2.00

A) biological sciences; B) humanities; C) physical sciences; D) social sciences; E) thematic/interdisciplinary. Examines how scholars ask questions and what methods they employ to gain answers. Cumulative GPA of 3.0 required. Permission. Cr/F.

### **INCO 501H - Honors/Introduction to the Research Process**

**Credits:** 2.00

A) biological sciences; B) humanities; C) physical sciences; D) social sciences; E) thematic/interdisciplinary. Examines how scholars ask questions and what methods they employ to gain answers. Cumulative GPA of 3.0 required. Permission. Cr/F.

### **INCO 510 - McNair Introduction Seminar**

**Credits:** 1.00 to 2.00

Course assists newly inducted student scholars in understanding the requirements of participation. Substantive reading and writing on the life of Dr. Ron McNair as the starting point from which to understand program expectations and begin sketching research and graduate school goals. Prereq: Enrollment in McNair Scholars Program and permission. Cr/F.

### **INCO 529 - Writing Consultation**

**Credits:** 2.00

Includes instruction in philosophy and techniques of tutoring, theoretical and practical issues in collaborative learning and complex-skill formation, and cross disciplinary conventions of writing. In addition to the classroom portion of course, each student undertakes a supervised practicum experience in the University Writing Center. Permission required. Cr/F.

### **INCO 530 - Writing Consultation Across the Curriculum**

**Credits:** 2.00

This course provides the fundamental background for peer writing consultation serving as Writing Fellows in courses across the curriculum. Emphasis is on the application of theoretical assumptions about writing, tutoring, and discipline-specific discourse. Restricted to members of the Writing Fellows Program. Faculty recommendation required. May be repeated for credit. Prereq: ENGL 401, one other Writing intensive course.

### **INCO 555 - Peer Education**

**Credits:** 1.00 to 3.00

Students serve as co-instructors for a section of INCO 444, First Year Seminar. Under the supervision of the course coordinator and their co-instructor (a University faculty member or Student Affairs professional), they prepare and present materials and exercises for their section. With their co-instructor, they also grade written and other exercises. Students attend weekly meetings with their section co-instructor and biweekly meetings of all section instructors. They also attend a two day workshop on teaching and course facilitation prior to the semester and a one day workshop at the end of the semester. Prereq: permission. May be repeated up to a maximum of 3 credits. Cr/F.

### **INCO 585 - Foreign Exchange**

**Credits:** 1.00 to 16.00

Juniors and seniors may spend a semester or year in Canada at one of eleven colleges and universities in Nova Scotia or one of eighteen participating institutions in Quebec. Possible disciplines include public relations, hospitality management, and computer science. Eligibility requirements include U.S. citizenship, junior or senior standing, and good academic achievement. For more information contact the Center for International Education. Cr/F.

### **INCO 586 - Foreign Exchange**

**Credits:** 1.00 to 16.00

Juniors and seniors may spend a semester or year in Canada at one of eleven colleges and universities in Nova Scotia or one of eighteen participating institutions in Quebec. Possible disciplines include public relations, hospitality management, and computer science. Eligibility requirements include U.S. citizenship, junior or senior standing, and good academic achievement. For more information contact the Center for International Education. Cr/F.

### **INCO 590 - Student Research Experience**

**Credits:** 1.00 to 4.00

Provides hands-on research experience to develop critical thinking, problem solving, and analytical skills. An entry-level research experience that introduces students to research theories, tools, and ethical issues. Each student completes a contract with a faculty mentor identifying the research activities the student will undertake. May be repeated up to a maximum of 8 credits.

### **INCO 595 - Winterim Topics**

**Credits:** 1.00 to 4.00

Concentrated interdisciplinary exposure to a particular culture or locale off campus during the winter term. Includes anthropological, artistic, biological, cultural, environmental, or geographical, historical, political, sociological, and other aspects of a culture, country or locale. May be repeated to a maximum of 8 credits.

### **INCO 595W - Winterim Topics**

**Credits:** 1.00 to 4.00

Concentrated interdisciplinary exposure to a particular culture or locale off campus during the winter term. Includes anthropological, artistic, biological, cultural, environmental, or geographical, historical, political, sociological, and other aspects of a culture, country or locale. May be repeated to a maximum of 8 credits. Writing intensive.

### **INCO 596 - Summer Topics**

**Credits:** 1.00 to 4.00

Provides a concentrated interdisciplinary exposure to a particular culture or locale off campus during the summer session. Includes anthropological, artistic, biological, cultural, environmental, geographical, historical, political, sociological, and other aspects of a culture, country or locale. May be repeated to 8 credits.

### **INCO 604H - Honors Senior Thesis**

**Credits:** 4.00 or 8.00

Final requirement for graduation with University Honors. Intended for honors students in majors that do not offer honors work. Open by special permission to other honors students. May be repeated for a maximum of 8 credits. IA (continuous grading). Writing intensive.

### **INCO 610 - Research Inquiry Seminar**

**Credits:** 2.00 to 6.00

With the notion of understanding self as the basis for investigating the world, this seminar focuses on exploring elementary concepts of academic research. Students are engaged in identifying strengths, discovering their passions, discerning the joys and frustrations of research, and developing a sketch of a research project. Prereq: Enrollment in McNair Scholars Program and permission. Cr/F.

### **INCO 650 - Study Abroad Seminar: Encountering Oneself/Encountering the World**

**Credits:** 1.00

This seminar, which meets during the second half of each semester, seeks to prepare outgoing students for the Study Abroad experience. The course specifically engages the ways in which the international

experience affects personal, academic, and career perspectives. Readings, discussions, and short written assignments will focus on cultural adaptation, cross-cultural communication, practical skills for international living, and especially the implications of global perspectives on a student's major field(s) of study. Students are strongly encouraged to take INCO 651: Studying Abroad/Returning Home in the first half of the semester in which they return to UNH. Permission required. May be repeated up to a maximum of 3 credits. Cr/F.

### **INCO 650H - Honors/Encountering Oneself/Encountering the World**

**Credits:** 1.00

This seminar, which meets during the second half of each semester, seeks to prepare outgoing students for the Study Abroad experience. The course specifically engages the ways in which the international experience affects personal, academic, and career perspectives. Readings, discussions, and short written assignments will focus on cultural adaptation, cross-cultural communication, practical skills for international living, and especially the implications of global perspectives on a student's major field(s) of study. Students are strongly encouraged to take INCO 651: Studying Abroad/Returning Home in the first half of the semester in which they return to UNH. Permission required. May be repeated up to a maximum of 3 credits. Cr/F.

### **INCO 651 - Study Abroad Seminar: Returning Home**

**Credits:** 1.00

This seminar, which meets during the first half of each semester, offers returning students an opportunity to reflect on their Study Abroad experience. The course specifically engages the ways in which the international experience affects personal, academic, and career perspectives. Readings, discussions, and short written assignments will focus on the experience of re-entry: cultural (re)adaptation, cross-cultural communication, and especially the implications of global perspectives on a student's major field(s) of study. Students should expect to have taken INCO 650: Encountering Oneself/Encountering the World in the second half of the semester before they left UNH. Permission required. May be repeated up to a maximum of 3 credits. Cr/F.

### **INCO 651H - Honors/Study Abroad Seminar/Returning Home**

**Credits:** 1.00

This seminar, which meets during the first half of each semester, offers returning students an opportunity to reflect on their Study Abroad experience. The course specifically engages the ways in which the international experience affects personal, academic, and career perspectives. Readings, discussions, and short written assignments will focus on the experience of re-entry: cultural (re)adaptation, cross-cultural communication, and especially the implications of global perspectives on a student's major field(s) of study. Students should expect to have taken INCO 650: Encountering Oneself/Encountering the World in the second half of the semester before they left UNH. Permission required. May be repeated up to a maximum of 3 credits. Cr/F.

### **INCO 685 - Study Abroad**

**Credits:** 4.00 to 16.00

Enables students to pursue a semester, summer, or an academic year of foreign study in programs other than those offered by UNH. Students must provide the University Committee on Study Abroad with detailed information about the curriculum and must receive approval from that committee before registration. Credit awarded only upon successful completion of the course of study and after receipt by the committee of an official transcript. Interested students should consult the Center for International Education. Prereq: permission. Special fee. (Financial aid requires a minimum of 6 credits.) Cr/F.

### **INCO 686 - Study Abroad**

**Credits:** 4.00 to 16.00

Enables students to pursue a semester, summer, or an academic year of foreign study in programs other

than those offered by UNH. Students must provide the University Committee on Study Abroad with detailed information about the curriculum and must receive approval from that committee before registration. Credit awarded only upon successful completion of the course of study and after receipt by the committee of an official transcript. Interested students should consult the Center for International Education. Prereq: permission. Special fee. (Financial aid requires a minimum of 6 credits.) Cr/F.

### **INCO 698 - Summer Research Project**

**Credits:** 8.00

Guided independent research or student/faculty collaborative research. Open to recipients of summer undergraduate research fellowships or by permission of the Undergraduate Research Opportunities Program. (Summer only.) Cr/F.

### **INCO 699 - McNair Summer Internship**

**Credits:**

McNair Fellows; not graded; Summer only.

### **INCO 710 - Introduction to McNair Research**

**Credits:** 2.00 to 4.00

An Introduction to methods and techniques of research design within the social sciences, mathematics and natural sciences, and the humanities. Concepts are tailored to students' research thesis. Students design and construct a research project (execution of project may be allowed for additional credit). A comprehensive written proposal is required. Prereq: Enrollment in McNair Scholars Program. May be repeated up to a maximum of 8 credits. Special fee on Study Abroad sections.

### **INCO 720 - McNair Research Experience**

**Credits:** 2.00 to 4.00

This independent study course allows students to work one-on-one with a faculty scholar to execute the research project. The course also provides a forum for faculty mentors and research supervisors to troubleshoot challenges and assist in the completion of the project. Prereq: Enrollment in McNair Scholars Program. Permission required.

### **INCO 730 - Writing Consultation Across the Curriculum**

**Credits:** 2.00

This course provides the fundamental background for peer serving as Writing Fellows in courses across the curriculum. Emphasis is on the application of theoretical assumptions about writing, tutoring, and discipline-specific discourse. Restricted to members of the Writing Fellows Program. Faculty recommendation required. May be repeated for credit. Students will be asked to evaluate their discipline-specific writing experience and apply it to their Writing Fellows' work. Prereq: ENGL 401, one other Writing intensive course.

### **INCO 740 - McNair Research Abroad**

**Credits:** 1.00 to 6.00

This course focuses on the execution of a comprehensive undergraduate research project in a country other than the U.S. Students learn about the cultural elements entailed in conducting research in a foreign country, They grapple with ethical dilemmas, as well as with the joys and frustration of performing research. In addition, students are asked to identify and examine a particular aspect of the host nation's customs and traditions. Special fee.

### **INCO 790 - Advanced Research Experience**

**Credits:** 1.00 to 4.00

Advanced research, Scholarly or creative projects developed and conducted under the supervision of a faculty member. Provides the students with the opportunity to apply advanced knowledge and techniques

of their major to a specific problem or question. Prereq: INCO 590, significant preparatory course work for research, or other research experience approved by the INCO 790 faculty mentor. INCO 790 may be repeated alone or in combination with INCO 590 for a maximum of 8 credits. Graded.

**INCO 796 - Touching the Limits of Knowledge: Cosmology and Our View of the World**

**Credits:** 1.00

A seminar analyzing the paradoxes and limits of scientific knowledge and religious understanding, their compatibility or lack of it with respect to contemporary cosmology.

## International Affairs

### **IA 401 - International Perspectives: Science, Business, and Politics**

**Credits:** 4.00

Examination of the interaction of developments in science, economics, and politics as they shape international affairs. Topics include science and technology; world trade and investment; politics, cultural values, and ethics in world affairs. Team-taught, modular course. Prereq: permission; IA major. Writing intensive.

### **IA 501 - Global Issues in International Affairs**

**Credits:** 4.00

Introduce students to the various relationships among peoples, states, and cultures within a global environment. While built upon the general knowledge acquired in IA 401, IA 501 provides more in-depth study of particular issues involving a variety of regions of the globe. This course is essential to preparing students for study abroad and to equip them to conceptualize suitable research topics for IA 701. Each student will be expected to put substantial time into developing the reading, research, and analytical skills necessary for the study of international affairs. Prereq: IA 401. Writing intensive.

### **IA 555 - Summer in Costa Rica Program**

**Credits:** 10.00

This UNH/CIE managed program enables International Affairs students and others in disciplines such as nursing, business, environmental studies and more, to spend 8 weeks in a Costa Rican host family and explore global issues like human rights, sustainable tourism and development, or corporate social responsibility. Students take 2 courses to satisfy IA electives and the IA foreign experience, Discovery and/or FL requirements and complete 30 hours of community service for a total of 10 UNH credits. Special fee

### **IA 599 - Special Topics**

**Credits:** 4.00

Subjects vary. Course descriptions are available at the Center for International Education. Some semesters, this course will satisfy specific requirements for the dual major in international affairs. For specific information in a particular semester, contact the Center for International Education.

### **IA 695 - Internship**

**Credits:** 2.00 to 4.00

Designed to provide research and work opportunities with an international aspect to UNH undergraduates. Internships may involve either research with a faculty member or work with an employer. Prereq: permission. May be repeated up to 8 credit hours. Cr/F.

### **IA 699 - Topics**

**Credits:** 4.00

Special topics course with varying subject matter and format. Study of areas and subjects not covered by existing courses. Center for International Education provides information on current offerings. Recommended as a dual major elective.

### **IA 701 - Seminar**

**Credits:** 4.00

Capstone of the dual major in international affairs. To be taken after completion of the foreign language and foreign experience requirements. Strong emphasis on research and analysis, use of foreign language

skills, writing, and criticism. Prereq: IA 501; IA major. Writing intensive.



## Italian

### **ITAL 401 - Elementary Italian I**

**Credits:** 4.00

For students without previous training in Italian. Aural comprehension, speaking, writing, reading. Labs. (No credit for students who have had two or more years of Italian in secondary school; however, any such students whose studies of Italian have been interrupted for seven years should consult the section coordinator about possibly receiving credit.) Special fee.

### **ITAL 402 - Elementary Italian II**

**Credits:** 4.00

For students without previous training in Italian. Aural comprehension, speaking, writing, reading. Labs. (No credit for students who have had two or more years of Italian in secondary school; however, any such students whose studies of Italian have been interrupted for seven years should consult the section coordinator about possibly receiving credit.) Special fee.

### **ITAL 425 - Introduction to Italian Studies**

**Credits:** 4.00

Designed for students interested in exploring Italian language and culture. Culture learning by means of guest speakers and visuals. Prepares for ITAL 401-402. Taught in English. Does not satisfy foreign language proficiency requirement. Special fee. (Offered summers only, Not offered every summer.) Writing intensive.

### **ITAL 425H - Honors/Introduction to Italian Studies**

**Credits:** 4.00

Designed for honors students interested in exploring Italian language and culture. Culture learning by means of guest speakers and visuals. Prepares for ITAL 401-402. Taught in English. Does not satisfy foreign language proficiency requirement. Special fee. (Offered summers only, Not offered every summer.) Writing intensive.

### **ITAL 500 - Selected Topics in World Literature**

**Credits:** 4.00

Topics will be chosen which introduce students to major themes and genres. (Also offered as CLAS 500, FREN 500, GERM 500, PORT 500, RUSS 500, SPAN 500.) May be repeated for credit. Credit/Fail. Writing intensive.

### **ITAL 503 - Intermediate Italian I**

**Credits:** 4.00

A complete review of the fundamentals of grammar and syntax. Selected readings as a general introduction to Italian civilization and culture. Labs and films. Special fee. Writing intensive.

### **ITAL 504 - Intermediate Italian II**

**Credits:** 4.00

A complete review of the fundamentals of grammar and syntax. Selected readings as a general introduction to Italian civilization and culture. Labs and films. Special fee. Writing intensive.

### **ITAL 521 - Italian Literature in Translation, 13th-16th Centuries**

**Credits:** 4.00

Major works of fiction and nonfiction, reflecting ideas and taste during the first three centuries of Italian

history. Readings, discussions, papers in English. No more than one course in English may be counted toward the minor. Special fee. (Not offered every year.) Writing intensive.

### **ITAL 522 - Italian Literature in Translation, 18th-20th Centuries**

**Credits:** 4.00

Major trends in post-Renaissance thought and culture in Italy. Readings, discussions, papers in English. No more one course in English may be counted toward the minor. Special fee. (Not offered every year.) Writing intensive.

### **ITAL 525 - Italian Cinema**

**Credits:** 4.00

Acquaints students with major Italian film texts. Through cinema the course explores the culture, society, history, and politics of Italy. Students examine filmmakers, genres, periods, and movements. The course is conducted in English. Special fee.

### **ITAL 595 - Practicum**

**Credits:** 2.00

Practical use of Italian language and culture through special projects outside the classroom. May be repeated for a maximum of 4 credits. Prereq: permission. Cr/F.

### **ITAL 595A - Practicum**

**Credits:** 2.00 or 4.00

Practical use of Italian language and culture through special projects outside of the classroom. The Practicum consists of unpaid placement in an approved business, social service, or educational organization in an Italian-speaking context with on-site supervision. The course also includes a classroom component that incorporates readings and assignments pertinent to the Practicum experience. May be repeated for a maximum of 4 credits. permission. Letter Grade.

### **ITAL 631 - Advanced Conversation and Composition I**

**Credits:** 4.00

Rapid review of basic grammatical structures and in-depth study of more complex linguistic patterns. Vocabulary building. Frequent written compositions and oral presentations using materials on contemporary culture taken from the various media. Phonetics and oral/aural skills development in lab and class. Prereq: C or better in ITAL 504 or permission. Special fee. Writing intensive.

### **ITAL 632 - Advanced Conversation and Composition II**

**Credits:** 4.00

Advanced spoken and written Italian to attain aural-oral fluency. Advanced reading and composition. Prereq: C or better in ITAL 631 or permission. Special fee. Writing intensive.

### **ITAL 651 - Introduction to Italian Culture and Civilization I: Middle Ages, Renaissance, Baroque**

**Credits:** 4.00

Survey of major representative writers and artists, studied against the backdrop of social and cultural history. Dante, Petrarch, Boccaccio, Machiavelli, Marino. Pre- or Coreq: ITAL 631 or permission. Special fee. (Not offered every year.) Writing intensive.

### **ITAL 652 - Introduction to Italian Culture and Civilization II: Age of Enlightenment, Romanticism, Modernism**

**Credits:** 4.00

Survey of major representative writers and artists, studied against a backdrop of social and cultural history. Parini, Goldoni, Leopardi, Manzoni, Pavese, Calvino. Pre- or co-req: ITAL 631 or permission. Special fee. (Not offered every year.) Writing intensive.

### **ITAL 681A - Interdisciplinary Field Seminar in Italian Culture: Ancient and Medieval Italy**

**Credits:** 4.00

Taking an interdisciplinary, but historically centered perspective, this course examines the construction of Italy as both a nation and a culture. The course is conducted on site and includes several fieldtrips throughout Italy.

**Co-requisites:** ARTS 695I

### **ITAL 681B - Interdisciplinary Field Seminar in Italian Culture: Ancient and Medieval Italy**

**Credits:** 4.00

Taking an interdisciplinary, but historically centered perspective, this course examines the construction of Italy as both a nation and a culture. The course is conducted on site and includes several fieldtrips throughout Italy.

**Co-requisites:** ARTS 695I

### **ITAL 682A - Interdisciplinary Field Seminar in Italian Culture: Early Modern and Contemporary Italy**

**Credits:** 4.00

Taking an interdisciplinary, but historically centered perspective, this course examines the construction of Italy as both a nation and a culture. The course is conducted on site and includes several fieldtrips throughout Italy.

**Co-requisites:** ARTS 695I

### **ITAL 682B - Interdisciplinary Field Seminar in Italian Culture: Early Modern and Contemporary Italy**

**Credits:** 4.00

Taking an interdisciplinary, but historically centered perspective, this course examines the construction of Italy as both a nation and a culture. The course is conducted on site and includes several fieldtrips throughout Italy.

**Co-requisites:** ARTS 695I

### **ITAL 684 - UNH-in-Italy Summer Program**

**Credits:**

UNH-in-Italy Summer Program in Ascoli Piceno. This course number is a place-holder, but differs with regard to the special fee. Students register for both this administrative course number and the actual course number and the actual course being offered on site. These courses will vary from year to year, but the special fee will remain constant. Permission required. Special fee. Cr/F.

**Co-requisites:** ARTS 796, ARTS 996

### **ITAL 685 - UNH-in-Italy Study Abroad**

**Credits:**

Provides a unique opportunity to study abroad in Ascoli Piceno, Italy during the fall semester. Special fee. Cr/F.

### **ITAL 686 - UNH-in-Italy Study Abroad**

**Credits:**

Provides a unique opportunity to study abroad in Ascoli Piceno, Italy during the spring semester. Special fee. Cr/F

### **ITAL 733 - History and Development of the Italian Language**

**Credits:** 4.00

Development of the Italian language from Roman times to the present. Examines the comparative method and internal reconstruction as well as processes of changes in phonology, syntax and lexicon. The course introduces issues in dialect geography, the basic features of paleography and surveys the evolution of scripts. Prereq: ITAL 631 or above or permission of instructor. Special fee.

**ITAL 795 - Independent Study in Italian Language and Literature**

**Credits:** 1.00 to 4.00

Individual guided study. Prereq: permission.

**ITAL 796 - Independent Study in Italian Language and Literature**

**Credits:** 1.00 to 4.00

Individual guided study. Prereq: permission.

## Japanese

### **JPN 401 - Elementary Japanese I**

**Credits:** 4.00

Elements of Japanese grammar. Oral practice and written drills designed to achieve a mastery of basic grammatical patterns. Reading of graded exercises introducing the student to written Japanese (Hiragana and Katakana) and Chinese characters used in contemporary Japan. Labs. (No credit for students who have had two or more years of Japanese in secondary school; however, any such students whose studies of Japanese have been interrupted for a significant period of time should consult with the department chairperson about possibly receiving credit.) Special fee.

### **JPN 402 - Elementary Japanese II**

**Credits:** 4.00

Elements of Japanese grammar. Oral practice and written drills designed to achieve a mastery of basic grammatical patterns. Reading of graded exercises introducing the student to written Japanese (Hiragana and Katakana) and Chinese characters used in contemporary Japan. Labs. (No credit for students who have had two or more years of Japanese in secondary school; however, any such students whose studies of Japanese have been interrupted for a significant period of time should consult with the department chairperson about possibly receiving credit.) Special fee. Prereq: JPN 401.

### **JPN 425 - Introduction to Japanese Culture and Civilization**

**Credits:** 4.00

Taught in English and designed for students interested in exploring Japanese culture and society. Learning by means of lectures, discussions, guest speakers, selected readings, and multimedia. Does not fulfill B.A. foreign language requirement, but does fulfill the Group 5 foreign culture general education requirement. Also counts toward the Asian Studies Minor. Special fee. Writing intensive.

### **JPN 425H - Honors/Introduction to Japanese Culture and Civilization**

**Credits:** 4.00

Taught in English and designed for students interested in exploring Japanese culture and society. Learning by means of lectures, discussions, guest speakers, selected readings, and multimedia. Does not fulfill B.A. foreign language requirement, but does fulfill the Group 5 foreign culture general education requirement. Also counts toward the Asian Studies Minor. Special fee. Writing intensive.

### **JPN 503 - Intermediate Japanese I**

**Credits:** 4.00

Review of Japanese grammar. Reading of prose and practice in oral and written expression. Labs. Prereq: JPN 402 with a grade of C (2.00) or better or permission of instructor. Special fee.

### **JPN 504 - Intermediate Japanese II**

**Credits:** 4.00

Review of Japanese grammar. Reading of prose and practice in oral and written expression. Labs. Prereq: JPN 402 with a grade of C (2.00) or better or permission of instructor. Special fee.

### **JPN 631 - Advanced Japanese I**

**Credits:** 4.00

Advanced spoken and written Japanese to attain aural-oral fluency. Advanced reading and composition. Prereq: JPN 504 with a grade of C or better or permission of instructor. Writing intensive. Special fee.

**JPN 795 - Independent Study****Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with the permission of department chairperson and of the supervising faculty member or members. Barring duplication of subject, may be repeated for credit.

**JPN 796 - Independent Study****Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with the permission of department chairperson and of the supervising faculty member or members. Barring duplication of subject, may be repeated for credit.

## Justice Studies

### **JUST 401 - Introduction to Justice Studies**

**Credits:** 4.00

Overview of justice studies as the study of law and law-like systems. Includes literature from both the law and society, and criminology. Topics will include morality versus legality, the American legal civil and criminal system, torts, and adult versus juvenile justice.

### **JUST 405 - Technology, Crime, and Society: A Forensic Exploration of High-Tech and Digital Crime**

**Credits:** 4.00

This course addresses the ways in which technology, crime, and law converge in the wider society in the twenty-first century. While emerging technologies bring great benefits, they also bring unintended and unforeseen consequences. This course uses a social science orientation to explore a new and evolving field of forensic technology.

### **JUST 501 - Research Methods**

**Credits:** 4.00

Overview of the various methodologies used in justice studies research: quantitative, qualitative, and legal. Topics include issues of design such as ethics, reliability, and validity measurement. Students will design and write up research proposals using one of the methods reviewed in the course. Prereq: PSYC 402 or SOC 502 or equivalent. Special fee.

### **JUST 520 - Girls Gone Bad: Delinquent Girls in Cultural Context**

**Credits:** 4.00

This course explores the important and under-studied intersection between gender/girls and delinquency. Who is the typical female delinquent? What causes her to get into trouble? What happens to her if she is arrested? Topics include the extent and nature of adolescent girl's delinquency and theoretical explanations for delinquency. Focus on social contexts (family, peers, school), developmental and social psychological factors and adolescent girls' experiences with the juvenile system.

### **JUST 530 - Inside the Courtroom: Torn from the Headlines**

**Credits:** 4.00

JUST 530 provides students an overview of criminal law procedure. The course is expressly aimed to serve students in the humanities and social sciences who may work in law-related fields, pursue advanced course work in academic disciplines that focus on law-related phenomena or go to law school. The course uses a distance education model, which requires students to invest significant amounts of time and effort outside of "class" activities to master the salient concepts presented in the course. The course provides students with a thorough introduction to the major legal categories of crime. The course also provides students with an understanding of the importance and role of the law of criminal procedure through an exploration of current issues and controversies. From time to time the course touches upon comparative views of other legal traditions. Class discussions, readings, and assignments frequently use current New Hampshire law and criminal cases as points of reference. Prereq: JUST 401.

### **JUST 550 - Mock Trial**

**Credits:** 2.00

Participation in American Mock Trial Association intercollegiate competition. Study and preparation for trial of national case (criminal or civil, alternate years). Year long course, 2 credit hours per semester. May be repeated up to a maximum of 8 credits. Special fee. Permission required.

### **JUST 551 - Mock Trial**

**Credits:** 2.00

Participation in American Mock Trial Association intercollegiate competition. Study and preparation for trial of national case (criminal or civil, alternate years). Year long course, 2 credit hours per semester. May be repeated up to a maximum of 8 credits. Special fee. Permission required.

### **JUST 601 - Internship**

**Credits:** 4.00

Placement by the justice studies coordinator in a position related to the justice system (e.g., criminal courts, corrections, civil courts, law firms, policy-making agencies, law enforcement agencies); weekly class meetings. Prereq: permission; seniors only.

### **JUST 602 - Research Internship**

**Credits:** 4.00

Independent research working with Justice Studies faculty on their projects. Includes working with faculty at such research centers as Crimes against Children, Family Research Lab, and Justiceworks. Student/supervisor contract required. Minimum time commitment: 12 hours per week. Prereq: JUST 401, 501; or permission.

### **JUST 650 - Special Studies in Comparative Justice Systems**

**Credits:** 4.00

This course will involve periodic offerings in comparative analysis of justice systems in an international context. May be repeated for a total of 8 credits provided both course offerings are substantially different. Must be taken with JUST 651 for those students participating in the Justice Studies Budapest Program. Prereq: POLT 507 and/or SOC 515.

**Co-requisites:** INCO 657, JUST 651

### **JUST 651 - Field Studies in the Hungarian Justice System**

**Credits:** 6.00

This course is designed to provide Justice Studies Budapest Program students with first-hand experience with the workings of the Hungarian justice system. Weekly field trips to agencies in law enforcement, the courts, and correctional facilities in the Budapest area will be arranged, and periodic lectures by Hungarian criminal justice professionals and scholars will compliment these visits. Must be taken with JUST 650 for those students participating in the Justice Studies Budapest Program. Prereq: POLT 507 and/or SOC 515.

**Co-requisites:** INCO 657, JUST 650

### **JUST 695 - Special Topics**

**Credits:** 4.00

Special topics of advanced study in Justice Studies. Selected offerings reflect faculty expertise in teaching and research. May be repeated in different topic areas. Prereq: SOC 515 or POLT 507 and one other Justice Studies course. Must hold sophomore standing or above.

### **JUST 701 - Senior Seminar**

**Credits:** 4.00

Advanced material in which the instructor has specialized knowledge through research and study. Topics may include the death penalty, terrorism, psychology of the jury, ethics and morality, immigration, therapeutic jurisprudence, and juveniles tried as adults. Prereq: JUST 401, 501.

### **JUST 765 - Special Topics**

**Credits:** 4.00

New or specialized courses are presented under this listing. Staff present material not normally covered by the course offerings. Cross-listed courses. May be repeated but not duplicate content.



**JUST 765W - Special Topics****Credits:** 4.00

New or specialized courses are presented under this listing. Staff present material not normally covered by the course offerings. Cross-listed courses. May be repeated but not duplicate content. Writing intensive.

**JUST 795 - Reading and Research****Credits:** 1.00 to 4.00

An independent study that is arranged by the student and supervised by a Justice Studies faculty member. Course requirements include: assembling and reading a substantial bibliography in the field; completing several written assignments and in some cases participating in hands-on experiences such as data collection and analysis. This course is by permission only and requires a signed agreement/proposal prior to registration. May be taken for 1-4 credits and includes a minimum of 3 hours of coursework per week per credit hour. Writing intensive in some select cases.

## **Kinesiology**

### **KIN 406 - Intro to Athletic Training**

**Credits:** 1.00

Introduction to the profession of athletic training. Past, present, and future of athletic training in the U.S. and Internationally. Components of the academic and experiential preparation of athletic trainers. Overview of the professional and personal attributes to be successful in a health care profession.

### **KIN 444A - Risk and the Human Experience**

**Credits:** 4.00

Explores the construct of risk in two phases: 1) knowledge building, focusing on the historical development of risk and its current manifestations in contemporary society; and 2) knowledge application, which focuses on applying conceptions of risk to various case study examples. The second phase of the course employs a problem-based learning approach with four distinct modules that ask students to apply, experience, and evaluate risk in a variety of contexts. Each module includes: a) a case study description, b) an experiential exercise, and c) a collaborative debriefing of the experience and reflective application to broader societal issues.

### **KIN 444B - Coolest Game?: Hockey and History**

**Credits:** 4.00

This course uses hockey as a vehicle for exploration and practice in three critical processes of scholarship: 1) analyzing and framing questions, 2) employing different methods/sources for pursuing answers to the questions, 3) presenting the results of research. Research exercises, discussions, and papers consider hockey's development in larger social and cultural contexts/practices such as ethnicity, nationalism, technology, mass media and marketing, gender relations, labor relations, and regionalism. The course also looks at hockey as a medium of craft, hero formation, community, and collective violence. Students read and analyze interdisciplinary articles and books, and also work with a range of historical sources, including those in the UNH Archives and the Charles Holt Archives of American Hockey. Writing intensive.

### **KIN 444C - Amped Up: Social and Psychological Perspectives on Adventure**

**Credits:** 4.00

Interest in the topic of adventure has exploded in recent years; with enough money, almost any adventure is available to anyone. The widespread rise in popularity of adventure brings questions, however. What is the role of adventure in modern society? What is its value to individuals? Through lectures, written assignments, group projects, multimedia, and experiential learning, this course surveys psychological, sociological, and anthropological perspectives on these and students' own questions. Special fee.

### **KIN 500 - Historical and Contemporary Issues in Physical Education**

**Credits:** 4.00

Physical education is discussed in historical and philosophical terms to lay the foundation for later courses in the major. The teaching of physical education and health are thoroughly examined. Open to KIN students in the pedagogy option, undeclared HHS students, and undeclared liberal arts students.

### **KIN 501 - First Aid: Responding to Emergencies**

**Credits:** 2.00

Covers the nationally accredited American National Red Cross First Aid--Responding to Emergencies and BLS-CPR professional rescuer course. May not repeat for credit. Special fee. Cr/F.

### **KIN 505 - Prevention and Care of Athletic Injuries**

**Credits: 4.00**

A primer in athletic injury, care, prevention and rehabilitation, specifically designed for anyone involved in sports or exercise either as a coach, personal trainer, exercise physiologist, first-aider or participant. Topics to be covered include general conditioning, bony, muscular and ligamentous anatomy of the trunk and extremities, head trauma, emergency care, the injury process, thermal conditions, nutritional considerations and the diabetic and asthmatic athlete. Special fee.

**KIN 506 - Concepts of Athletic Training for the Professional****Credits: 4.00**

Introduces techniques for prevention, recognition, treatment, and rehabilitation of common athletic injuries. Course is a prerequisite for beginning clinical experience in athletic training rooms for the athletic training professional. Prereq: ZOOL 507.

**Co-requisites:** KIN 507

**KIN 507 - Concepts of Athletic Training Lab****Credits: 1.00**

Theory and techniques of protective taping and wrapping to prevent common athletic injuries. Techniques of transfer and transportation of injured athletes. Identification of anatomical landmarks. Observation and practice in the University athletic training rooms. Special fee. Coreq: KIN 506.

**Co-requisites:** KIN 506

**KIN 521 - Theory of Coaching Basketball****Credits: 2.00**

Individual and team offense and defense; rules of the game. Problems in team handling and conditioning. Prereq: permission. Pre- or Coreq: KIN 565.

**KIN 522 - Theory of Coaching Football****Credits: 2.00**

Systems of play; team and individual offensive and defensive fundamentals; theory and strategy of team play; coaching methods, physical conditioning; rules.

**KIN 523 - Theory of Coaching Hockey****Credits: 2.00**

Basic hockey skills. Fundamentals of individual and team offense and defense; coaching methods; rules. Prereq: student must have basic skating skills prior to taking course. Pre- or Coreq: KIN 565. Special fee.

**KIN 525 - Theory of Coaching Soccer****Credits: 2.00**

Fundamental and advanced skills and techniques; offensive and defensive principles of team play; tactical formations and strategy; methods of training and practicing; rules. Prereq: permission. Pre- or Coreq: KIN 565.

**KIN 527 - Scientific Foundations of Health and Fitness****Credits: 4.00**

Provides students with practical, scientific, entry-level information relative to physical conditioning, health, and wellness from childhood through adulthood. Students are given theoretical information that will be followed by practical, hands-on experiences offered through laboratory experiences. Special fee. Writing intensive.

**KIN 528 - Theory of Coaching Track and Field****Credits: 2.00**

Starting, sprinting, middle-distance and distance running, relay, hurdling, high and broad jumping, pole

vault, shot putting, discus, hammer, and javelin. Methods of training and practicing. Prereq: permission. Pre- or Coreq: KIN 565.

### **KIN 533 - Basic Scuba**

**Credits:** 3.00

Full semester in the fundamentals of scuba diving. Through a progressive series of classroom lectures and pool sessions, students gain the knowledge and skill necessary to conduct themselves with competence underwater. Emphasizes safety and problem prevention. Once the students are ready, further training takes place in an open ocean environment. NAUI Certification for successful completion of all course requirements and at least five open-water dives. Strong swimming ability required. Special fee. Lab. Credit/Fail.

### **KIN 540 - Top Rope Rock Climbing**

**Credits:** 4.00

Provides students with an understanding of the equipment, techniques, and procedures necessary for the setup and management top rope rock climbing and rappelling sites, including advanced rescue skills. Students also develop basic climbing movement techniques and skills, an understanding of the pedagogical techniques used in climbing, and the requisite knowledge/skill development to conduct safe top rope experiences in multiple settings. The format of this course is a combination of demonstration/lecture and "hands-on" learning with the emphasis upon student interaction and practical skill development. Special fee. Lab.

### **KIN 541 - Management of Challenge Courses**

**Credits:** 4.00

Provides students with an introduction to the basic facilitation/technical skills to manage a challenge course program. Exposure to intermediate technical skills usually required for lead facilitators. Specific topics include group process, framing, and sequencing, belay methods, participant and instructor equipment, operating procedures for low and high challenge course elements, and industry standards. Permission required for freshmen. Special fee. Lab.

### **KIN 542 - Sea Kayaking**

**Credits:** 2.00

An introduction to the technical, teaching, and leadership skills required to lead inland kayaking programs and to assist with coastal canoeing programs. Emphasis on individual kayaking skills, self- and group-assisted rescues, safety and group management in a marine environment, and tactics for ocean travel and navigation. Special fee. Lab.

### **KIN 543 - Winter Adventure Programming**

**Credits:** 2.00

An introduction to winter programming and backcountry travel, including snowshoeing and Nordic skiing, winter interpretation activities, backpacking, and winter camping. Emphasis on teaching of introductory winter programs and trips. Prereq: KIN:OE major, KIN 551 or instructor permission. Special fee. Lab.

### **KIN 545 - High Angle Rescue**

**Credits:** 2.00

Provides students with the skills necessary to perform self and group rescues in a variety of steep terrain and high angle environments. Students also gain the basic skills necessary for the implementation of self- and partner-rescues while in a technical climbing environment. The skills learned from this class will adapt readily to climber rescue, crevasse rescue, big wall rescue, cave rescue, and vertical urban rescue. Prereq: KIN 547 or instructor permission. Special fee. Lab.

### **KIN 546 - White Water Canoeing**

**Credits: 3.00**

Introduces white water canoeing skills. Students gain a basic understanding of the equipment, techniques, and procedures to conduct canoeing activities in flat water, moving water, and white water environments. Emphasizes development of individual paddling skills, safe and conscientious paddling, and group management on moving water and white water. Prereq: KIN:OE majors, KIN 552. Special fee. Lab.

**KIN 547 - Lead Rock Climbing****Credits: 3.00**

Advanced climbing course designed to provide students with a structured environment to transition from top rope rock climbing or sport climbing to multi-pitch traditional lead climbing. Focuses on the development of the technical skills and judgment associated with leading in a multi-pitch environment. Specific topics include use of artificial protection, belay anchor construction, multi-pitch rappelling, knots, rope/belay station management, climbing technique, and multi-pitch leading considerations. Prereq: KIN 540 or instructor permission. Special fee. Lab.

**KIN 548 - Winter Expedition Programming****Credits: 4.00**

Introduces methods and techniques of winter expedition travel including camping, snowshoeing, alpine climbing skills, technical skiing and ice climbing skills. A variety of teaching styles are used to familiarize students with each topic area, and occur in classroom, basecamp, and wilderness settings. Prereq: KIN OE majors, KIN 551. Special fee. Lab.

**KIN 549 - Wilderness Navigation****Credits: 4.00**

Introduces the methods and techniques of wilderness navigation. Topics include map interpretation, compass use, global positioning systems, and other navigation methods. A variety of teaching styles are used to familiarize the students with each topic area, and occur in both classroom and wilderness settings. Special fee. Lab.

**KIN 550 - Outdoor Education Philosophy and Methods****Credits: 4.00**

Explores the philosophical basis for experiential and outdoor education. Experiential exercises and readings focus on the role of risk, traditional versus progressive education, role of nature, ethics, models of learning and facilitation, and developing a personal philosophy of outdoor education. Includes full-day outdoor education laboratory experiences. Special fee. Writing intensive.

**KIN 551 - Adventure Programming: Backcountry Based Experiences****Credits: 3.00**

Introduces the leadership of land-based backpacking programs. Students develop an understanding of backpacking equipment, trip planning and organization, instruction of basic camping skills, implementation of safety procedures and group management on backpacking trips. Special fee. Lab.

**KIN 552 - Adventure Programming: Water Based Experiences****Credits: 3.00**

Introduces the leadership of canoe expeditions. Students develop an understanding of necessary canoeing equipment, trip planning and organization, instruction of basic canoeing strokes, implementation of safety procedures, and group management on canoe expeditions. Prereq: KIN 551. Special fee. Lab.

**KIN 560 - Sport Psychology****Credits: 4.00**

Introduction to the discipline of sport psychology. Explores behavioral, cognitive, and social psychology in relation to elite, collegiate, and high school athletes, as well as recreational sport participants.

### **KIN 561 - History of American Sport and Physical Culture**

**Credits:** 4.00

Major individuals, organizations, and trends that influenced the development of an American industry in sports, active recreation, and physical fitness. Readings, discussions, and research projects provide experience in the craft and utility of history.

### **KIN 561W - History of American Sport and Physical Culture**

**Credits:** 4.00

Major individuals, organizations, and trends that influenced the development of an American industry in sports, active recreation, and physical fitness. Readings, discussions, and research projects provide experience in the craft and utility of history. Writing intensive.

### **KIN 562 - Sports Media Relations**

**Credits:** 4.00

A survey of basic concepts of sports media relations for students considering careers in school or college sports coaching or administration, media or related fields. The focus is on developing necessary skills, techniques and recommended media relations practices as well as social implications of the media in sports public relations including print, radio, television, the World Wide Web, and social media.

### **KIN 565 - Principles of Coaching**

**Credits:** 4.00

Overviews current theory and practice in coaching education, including sport pedagogy, physiology, psychology, administration, and risk management. Issues of performance and competition specific to child, youth, and collegiate coaching are addressed.

### **KIN 570 - Elementary Physical Education Practicum**

**Credits:** 4.00

Provides opportunities for developing and refining elementary and special physical education movement content with pedagogical processes. Emphasizes demonstrating competence in teaching and establishing a least-restrictive learning environment. Prereq: KIN 610; KIN:PE Pedagogy majors. Writing intensive.

### **KIN 580 - Sport Industry**

**Credits:** 4.00

Overviews the various segments that make up the sport industry, including governing bodies, the mass media, sporting goods firms, players' and coaches' associations, public regulatory agencies, and secondary and higher education. Readings and discussions consider the development and structure of each segment. interaction between segments, legal issues, and policy implications. While the course will focus on the United States, there is some comparison to other countries.

### **KIN 585 - Emergency Medical Responder**

**Credits:** 4.00

Standards of practice that conform to the content of the U.S. Department of Transportation curriculum for Emergency Medical Responder. Initial evaluation and stabilization of patients at the scene of medical emergencies, CPR, and other basic medical care for illness and injury. Prepares the student for the National Registry of EMT and EMR certifications exams. Prereq: KIN: Athletic Training; KIN: Exercise Science; HHS: undeclared. Lab. Special fee.

### **KIN 600 - Movement and Gymnastics Exploration**

**Credits:** 4.00

Combines the elements of movement education and gymnastics progressions to develop a basis for students to learn the fundamentals of movement and how to teach efficient and safe movement and

gymnastics skills in a variety of settings. Includes fundamental movement skills, movement elements, fundamental gymnastics skills, and fundamental gymnastics spotting skills.

### **KIN 601 - Lifetime Sports**

**Credits:** 3.00

Provides teachers with the technical knowledge as well as the psychomotor and pedagogical skills necessary for instructing lifetime activities, including tennis, golf and cross country skiing, among others.

### **KIN 603 - Team Sports**

**Credits:** 3.00

Provides teachers with the technical, physical, and pedagogical skills necessary for instructing team sports, including soccer, basketball and volleyball, among others. Prereq: KIN:PE Pedagogy majors.

### **KIN 607 - Biology of Aging**

**Credits:** 4.00

Biological mechanisms of the aging process, with special emphasis on human aging; changes due to chronic disease.

### **KIN 610 - Elementary Physical Education Pedagogy**

**Credits:** 4.00

Planning, implementing, and evaluating a movement-based curricular model of instruction relative to teaching preschool and elementary-aged children physical education. Systematic observation, teaching, strategies and styles, lesson design, and methods of integrating academic subject matter into elementary physical education. Prereq: KIN:PE Pedagogy majors; KIN 600, 675.

### **KIN 620 - Physiology of Exercise**

**Credits:** 4.00

Acute and chronic effects of exercise. Muscle physiology, respiration, cardiac function, circulation, energy metabolism, and application to training. Prereq: BMS 507-508

### **KIN 621 - Exercise Laboratory Techniques**

**Credits:** 4.00

Laboratory assessment of functional capacity, body composition, anaerobic power, anaerobic threshold, pulmonary function, blood pressure control, muscle strength, and temperature regulation. Field tests are used where appropriate. Extensive out-of-class time is required as each week a detailed lab report is submitted for grading. Prereq: KIN 620. KIN Exercise Science majors. Special fee. Writing intensive.

### **KIN 648 - Current Issues in Teaching Health**

**Credits:** 4.00

Designed to assist students in their understanding of issues related to health and health education.

### **KIN 650A - Internship in Exercise Science**

**Credits:** 4.00 or 8.00

Individualized experiential training in an external (off-campus) exercise science setting (hospital, health & fitness club, business, physical therapy, or medical (physician assistant) offices, research laboratory) offering programs of prevention, intervention, and/or rehabilitation. The internship requires 400 contact hours and is a full-time commitment (10 weeks at 40 hours per week) usually taken the summer following the senior academic year. Activities may include graded exercise testing, exercise prescription, and exercise leadership. Must have completed all requirements for the option or have permission from the instructor prior to starting the internship. The course may be repeated once with 4 credits taken each time for a total of 8 credits. Cr/F. (IA continuous grading).

### **KIN 650B - Internship in Outdoor Education**

**Credits:** 2.00 to 8.00

Experiential learning in a setting appropriate to the student's objectives. An 2 credit internship requires a minimum of 400 hours experience. Provides an appropriate transition from undergraduate education to future employment in the field of outdoor education. Generally done after students have completed all other requirements for the option. Prereq: permission. Cr/F. May be repeated up to a maximum of 8 credits. (IA continuous grading).

### **KIN 650C - Internship in Sport Studies**

**Credits:** 1.00 to 8.00

Experiential learning in a setting appropriate to the major option and to student's objectives. An 8 credit internship requires a minimum of 600 hours experience; fewer credits will require proportionally fewer hours. Sport Studies: May be on- or off-campus with an approved organization. Student must participate in securing the internship. A journal, bi-weekly reports and a final paper required. Prereq: junior/senior major; permission. May be repeated up to a maximum of 12 credits, with no more than 8 credits taken in any given semester. (IA continuous grading)

### **KIN 650D - Internship in Coaching**

**Credits:** 2.00 to 4.00

Experiential learning in a setting appropriate to student's learning objectives in coaching. May be on- or off-campus with an approved organization. Student must participate in securing the assistantship. A journal, bi-weekly reports, and final report required. May be repeated up to a maximum of 4 credits. Prereq: KIN 505, 565. (IA continuous grading).

### **KIN 652 - Clinical Kinesiology**

**Credits:** 4.00

The science of human movement from biomechanical, neuromuscular, and anatomical perspectives; human muscular, joint, and connective tissue anatomy; and actions of skeletal muscles are detailed. Prereq: HHS major; ZOOL 507-508. Coreq: KIN 653A or 653B.

### **KIN 653A - Musculoskeletal Assessment**

**Credits:** 2.00

Principles and methodology of joint range of motion, body mechanics, and muscle strength evaluation. Uses muscle palpation, goniometry, manual muscle testing, hand-held dynamometry to facilitate understanding of musculoskeletal anatomy and assessment. Special fee. Prereq: BMS 507-508.

**Co-requisites:** KIN 652

### **KIN 653B - Biomechanical Analysis of Movement**

**Credits:** 2.00

Principles and methodology of analyzing posture and movement. Uses muscle palpation and testing, electromyography, and cinematography to facilitate students' understanding of movement analysis. Special fee. Prereq: BMS 507-508.

**Co-requisites:**

### **KIN 655 - Middle School and Secondary Physical Education Pedagogy**

**Credits:** 4.00

Planning, implementing, and evaluating curricular models of instruction, as well as effective teaching strategies and styles relevant to secondary (grades 6-12) physical education is studied. Content and process knowledge is applied through micro-teaching episodes with peers. Systematic observation is introduced for the purpose of reflecting on teaching behaviors. Prereq: EDUC 500. Lab.

### **KIN 658 - Evaluation and Care of Athletic Training I**



**Credits:** 4.00

Factors involved in the care and recognition of athletic injuries. Mechanisms, etiology, and pathology. Clinical signs and symptoms. Techniques for performing appropriate test and assessment procedures. First aid procedures. Emphasizes fractures, soft tissue injury, and the lower extremities. Prereq: KIN 506; BMS 507-508. Writing intensive

**Co-requisites:** KIN 658L

### **KIN 658L - Evaluation and Care of Athletic Training Injury I Lab**

**Credits:** 1.00

Techniques and practice for performing test and assessment procedures for athletic injuries. Prereq: KIN 507.

**Co-requisites:** KIN 658

### **KIN 659 - Evaluation and Care of Athletic Training Injury II**

**Credits:** 4.00

Factors involved in the care and recognition of athletic injuries. Mechanisms, etiology, and pathology. Clinical signs and symptoms. Techniques for performing appropriate test and assessment procedures. First aid procedures. Emphasizes upper extremities, head, and trunk. Prereq: KIN 506; BMS 507-508. Writing intensive.

**Co-requisites:** KIN 659L

### **KIN 659L - Evaluation and Care of Athletic Training Injury II Lab**

**Credits:** 1.00

Techniques and practice for performing test and assessment procedures for athletic injuries. Prereq: KIN 507.

**Co-requisites:** KIN 659

### **KIN 660 - Therapeutic Exercise in Athletic Training**

**Credits:** 4.00

Rationale, use, and application of exercise in athletic injury rehabilitation. Basic components of designing and implementing rehab programs. Assessment of physical/injury status.

**Co-requisites:** KIN 661

### **KIN 661 - Therapeutic Exercise in Athletic Training Laboratory**

**Credits:** 1.00

Students learn and practice psychomotor techniques associated with rehabilitative and conditioning exercise.

**Co-requisites:** KIN 660

### **KIN 662 - Therapeutic Modalities in Athletic Training**

**Credits:** 4.00

Rationale, use, and application of therapeutic modalities in athletic injury rehabilitation. Principles of electrophysics and biophysics. Physiological effects on body tissues, indications and contraindications, and clinical applications. Prereq: KIN 506; 507.

**Co-requisites:** KIN 663

### **KIN 663 - Therapeutic Modalities in Athletic Training Laboratory**

**Credits:** 1.00

Students use and practice with the devices, machines, and techniques associated with the treatment and rehabilitation of athletic injuries.

**Co-requisites:** KIN 662

### **KIN 665 - Laboratory Practicum in Athletic Training**

**Credits:** 2.00

Clinical experience in athletic training under the supervision of an approved clinical instructor. KIN 665A, Level I. Prereq: KIN 506. KIN 665B, Level II. Prereq: KIN 658. KIN 665C, Level III. Prereq: KIN 659. KIN 665D, Level IV. Prereq: KIN 710. KIN 665E, Level V. Prereq: KIN 670.

### **KIN 666 - Middle School and Secondary Physical Education Practicum**

**Credits:** 4.00

Students observe, assist and teach grades 6 through 12 within a public school. The course emphasizes lesson and unit plan design and implementation. Prereq: KIN 655, KIN: PE Pedagogy majors. Writing intensive.

### **KIN 667 - Pharmacology for Athletic Training**

**Credits:** 2.00

Introduces the use of drugs as they pertain to the health care of athletes and their effect on athletic competition. Topics to be covered will include basic drug action, commonly prescribed medications, dealing with the diabetic and asthmatic athlete and performance enhancing substances. Prereq: junior or senior Standing.

### **KIN 668 - Ergogenic Aids in Sports**

**Credits:** 2.00

In sports, faster, higher, stronger, longer, and better is what everyone wants. Athletes and coaches seek out sports ergogenics that will give them a training and performance advantage over their competition. This course introduces the use of sports ergogenics and their use in athletic competition. Prereq: sophomore, junior or senior Standing.

### **KIN 670 - General Medical Conditions in Athletics**

**Credits:** 4.00

Athletes often sustain non-orthopedic pathologic conditions. An athletic trainer must be able to recognize, assess, and determine appropriate action or referral in an athlete suffering general or systemic illness or disease. Covers conditions affecting the major systems of the body. Prereq: KIN 620.

### **KIN 675 - Motor Development and Learning**

**Credits:** 4.00

Characteristics of motor behavior across time, and the role of movement in children's and adolescents' total development. Growth processes, stage theory, as well as the relationship of maturation, experience, and the environment to motor development. Prereq: KIN 600; KIN: PE Pedagogy majors; family studies majors.

### **KIN 676 - Adventure Activities**

**Credits:** 3.00

Provides teachers with the technical, physical, and teaching skills necessary to instruct adventure activities, initiatives, ropes course management, and orienteering. Prereq: KIN: PE Pedagogy majors. Special fee.

### **KIN #681 - Theory of Adventure Education**

**Credits:** 4.00

An in-depth investigation of the theories that underpin the professional practice of outdoor education. Students examine program applications in corporate, therapeutic, and educational settings, study advanced facilitation techniques, and analyze pertinent outdoor education research. Prereq: KIN 550. Special fee. Writing intensive.

### **KIN 682 - Outdoor Leadership**

**Credits:** 4.00

Leadership theories applied through field experiences in adventure programming. Students will understand a variety of leadership, teaching, and communication styles, decision-making models, program planning and logistics, and risk management considerations for planning and delivering adventure programs. Prereq: KIN 541, 550, 551,686. KIN: OE majors or instructor permission. Special fee.

### **KIN 684 - Emergency Medical Care: Emergency Medical Technician (EMT)**

**Credits:** 3.00

Based on the curriculum established by the U.S. Department of Transportation for Emergency Medical Technician, and authorized by the State of New Hampshire-Bureau of Emergency Medical Services (EMS). Topics covered include trauma; medical, environmental and psychiatric emergencies; childbirth; hazardous materials; and infection control procedures. Students participate in clinical observations in one of the region's hospital emergency departments. Students have the option to take the state of NH-EMS Practical Examination and the National Registry Written Examination for EMT. Passage of both these examinations leads to national certification as an EMT.

**Co-requisites:** KIN 685

### **KIN 685 - Emergency Medical Care: EMT Lab**

**Credits:** 2.00

Basic emergency health care, including trauma patients, medical and environmental emergencies, and childbirth. Includes clinical experience with a local hospital and ambulance service. Prepares the student for the National Registry of EMT's Examination. Prereq: department approval. Special fee.

**Co-requisites:** KIN 684

### **KIN 686 - Wilderness Emergency Medical Care**

**Credits:** 4.00

Standards of practice for professionals providing emergency medical care in remote areas. Consideration of prolonged transport times, severe environments, and the use of portable and improvised equipment. Topics include wilderness trauma and illness, search and rescue operations, and environmental emergencies. Prereq: KIN 684, KIN 685. Special fee.

### **KIN 687 - Leadership Practicum**

**Credits:** 4.00

Supervised semester-long experience working with an organization external to the university setting to plan, prepare, and implement outdoor education programs and activities. Class sessions involve advanced leadership topics (e.g., current issues in risk management, conflict resolution, social justice issues, adaptive programming). Prereq: KIN OE major. Lab.

### **KIN 690 - Study Abroad in Kinesiology**

**Credits:** 12.00 to 20.00

A) Foreign study in, or related to, athletic training. Interested students should contact Program Director, Kinesiology Athletic Training Option. Prereq: KIN: Athletic Training majors only. special fee. Cr/F. Permission. B) Foreign study in, or related to, exercise science. Interested students should contact Program Director, Kinesiology Exercise Science Option. Prereq: KIN: Exercise Science majors only. special fee. Cr/F. Permission. C) Foreign study in, or related to, outdoor education. Interested students should contact Program Director, Kinesiology Outdoor Education Option. Prereq: KIN: Outdoor Education majors only. special fee. Cr/F. Permission. D) Foreign study in, or related to, physical education. Interested students should contact Program Director, Kinesiology Physical Education Option. Prereq: KIN: Physical Education majors only. special fee. Cr/F. Permission. E) Foreign study in, or related to, sports studies. Interested students should contact Program Director, Kinesiology Sports Studies Option. Prereq: KIN: Sports Studies majors only. special fee. Cr/F. Permission.

### **KIN 693 - Teaching Assistantship**

**Credits:** 2.00

A) Physical Education Pedagogy; B) Exercise Leader; C) Outdoor Education; D) Science Labs; E) Cardiac Rehabilitation; F) Coaching. Students serve as teaching assistants in assigned class activities. Assignments to be made by the class instructor may include teaching assistants' and administrative duties. May take two different sections. May be repeated up to a maximum of 4 credits. Prereq: junior standing; departmental approval. Cr/F.

### **KIN 694 - Supervised Teaching in Physical Education**

**Credits:** 4.00

This student teaching course is the culminating experience for students who wish to be certified to teach physical education upon completion of their senior year. Students must sign-up for both KIN 694 and EDUC 694(.D01). They will receive 4 credit hours for each. Permission required. Cr/F.

### **KIN 696 - Independent Study**

**Credits:** 2.00 to 4.00

An advanced, individual scholarly project under the direct supervision of a faculty member. Prereq: junior or senior; departmental approval. May be repeated to a maximum of 8 credits. Special fee.

### **KIN 696W - Independent Study**

**Credits:** 2.00 to 4.00

An advanced, writing-intensive, individual scholarly project under the direct supervision of a faculty member. Student and Faculty Adviser will prepare a written proposal that outlines: the questions to be pursued, the methods of investigation, the student's qualifications to conduct the research, the nature of the finished written product (e.g. case study, position paper, extended lab report) This proposal must be approved by option faculty and the department chair prior to the student's registration for KIN 696 WI. All KIN 696 WI projects must include: Some forms of informal, ungraded writing such as a journal, reading summaries, draft chapters, or invention activities. Regular writing interaction between student and faculty adviser (i.e. at least weekly or biweekly), to include written feedback from the adviser. A finished product that is polished via revision. Faculty sponsors and students should consult the resources and guidelines of the UNH Writing Program, available at: <http://www.unh.edu/writing/> Prereq: junior or senior; departmental approval. May be repeated to a maximum of 8 credits. Writing intensive.

### **KIN 699H - Honors Project**

**Credits:** 4.00

Project first involves tutorial sessions to introduce the student to the experimental design, after which a research question is developed. After an appropriate literature review, the student collects and analyzes data, forms conclusions, and prepares a written report on the findings.

### **KIN 704 - Electrocardiography**

**Credits:** 4.00

Designed to provide exposure to basic interpretation and identification of electrocardiograms (ECGs). Includes detailed heart anatomy, coronary circulation, cardiac conduction system, electrocardiogram development, and all aspects pertaining to normal and abnormal ECGs. Prereq: KIN 621, KIN Exercise Science majors.

### **KIN 705 - Topics in Applied Physiology**

**Credits:** 4.00

Advanced exercise physiology course dealing with topics both current and relevant to exercise science majors. Includes genetics, environmental influences, immune system, detraining and over-training, epidemiology, ergogenic acids, and the influence of age and gender. Prereq: KIN 620, 621. KIN Exercise Science majors. Special fee.

**KIN 706 - Neurology****Credits:** 4.00

Development, morphology, internal configuration, physiology, histology, function, and pathology of the human nervous system. Prereq: ZOOL 507-508 or equivalent. Special fee.

**Co-requisites:** KIN 707**KIN 707 - Neurology Lab****Credits:** 2.00

Basic histology, neuroanatomy and neurophysiology of the human nervous system. Use of brain specimens, videos and pathology case studies to elucidate cell structure, sensory and motor systems, and spinal cord, brainstem and cortical organization and anatomy. Prereq: ZOOL 507-508 or COMM 521 or equivalent. Cr/F.

**Co-requisites:** KIN 706**KIN 710 - Organization and Administration of Athletic Training Programs****Credits:** 4.00

Principles of organization and administration of athletic training programs; management of personnel; legal aspects; relation of athletic trainer to athletic programs and sports medicine team. Writing intensive.

**KIN 715 - Seminar in Athletic Training****Credits:** 4.00

Career issues and special topics in athletic training. Students are required to submit and present a term project on assigned topic.

**KIN 718 - Career Preparation in Athletic Training****Credits:** 4.00

Designed to provide the methods to integrate the knowledge and skills learned in prerequisite courses into practical applications as the students prepare to graduate. Advanced knowledge and skills are emphasized in the areas of evaluation, treatment, rehabilitation, and implementation of policies and procedures. Prereq: KIN 658, 659, 660, 662, 710, KIN: Athletic Training majors.

**KIN 720 - Science and Practice of Strength Training****Credits:** 4.00

Designed to provide students exposure to the knowledge and practical experience necessary for establishing strength development programs in a variety of populations, including healthy, athletic, and higher risk individuals. Program design, correct lifting techniques, physiological adaptations, and organization and administration of programs are highlighted. Includes fundamentals regarding the selection of programs and equipment, spotting techniques, as well as ways to assess strength and power in humans without expensive equipment. Prereq: KIN 620.

**Co-requisites:****KIN 724 - Metabolic Adaptations to Exercise****Credits:** 4.00

Overview of the metabolic processes that occur during exercise and metabolic changes that occur as a result of exercise training. Topics include glycogenolysis and glycolysis in muscle, cellular oxidation of pyruvate, lipid metabolism, metabolism of proteins and amino acids, neural and endocrine control of metabolism, and fatigue during muscular exercise. Prereq: KIN 620; CHEM 404; KIN: Exercise Science majors. Special fee.

**KIN 730 - Research Diving Techniques****Credits:** 4.00

Takes previously certified divers with the need to assist, or conduct research underwater, and trains them

in the methods and specific techniques of scientific diving programs. Progressively builds upon the basic diving skills until the student is knowledgeable and competent. Culminates with a small research project formulated and implemented by the students. Prereq: SCUBA certification, department approval. Special fee. (Also offered as ZOOL 730.

### **KIN 731 - Inclusive Teaching Through Sport**

**Credits:** 4.00

This course examines the use sports, including disability sports such as boccia, sit-volleyball, goalball and wheelchair basketball as a program of instruction for individuals of all abilities. The course adopts a holistic approach to inclusion that examines best practices within sepcific contexts. The medical, social, and relational models of disability are used as a format for discussion and the inclusion spectrum is adopted as the underlying format for instruction.

### **KIN 735 - Advanced Scuba**

**Credits:** 4.00

Classroom, pool, and open-water "hands-on" application in advanced diving techniques. The student's diving ability progresses to become safer and highly educated in a variety of diving disciplines. Topics covered are navigation, search and recovery, low visibility/night diving, surface supplied diving, boat diving, accident management hyperbaric medicine, and physiology and scientific research methods for divers. Special fee. Lab.

### **KIN 736 - Fitness and Graded Exercise Testing**

**Credits:** 4.00

Designed to provide students exposure to the knowledge and practical experience necessary for establishing exercise programs in apparently healthy populations. Topics include fitness testing, test interpretation, and exercise prescription. Prereq: KIN 704, KIN Exercise Science majors. Special fee.

### **KIN 737 - Exercise Prescription and Leadership**

**Credits:** 4.00

Provides exposure to the knowledge and practical experience necessary for establishing exercise and health promotion programs in a variety of populations. Includes fundamentals regarding personal training and program selection, implementation and equipment, legal issues, and budget establishment. Strength training programs and special populations are highlighted. Prereq: KIN 736; KIN: Exercise Science majors.

### **KIN 740 - Athletic Administration**

**Credits:** 4.00

Introduces basic management components and processes used in the successful administration of school and college athletic programs. Topics include planning, organizing, and managing sports programs, personnel, and policies; game scheduling; finances and facilities; equipment and event management; student support services; and key legal issues. Prereq: permission.

### **KIN 741 - Social Issues in Contemporary Sports**

**Credits:** 4.00

Investigation of interrelationships among sport, culture, and society in an attempt to understand the role and function of sport in contemporary society. Overview of selected socio-cultural factors that influence and result from participation in sports. Prereq: SOC 400 or permission.

### **KIN 742 - PE Practicum for Students with Disabilities**

**Credits:** 4.00

This experience is part of the required coursework for the Adapted Physical Education (PE/APE) certificate through the Graduate School. As a bi-weekly seminar intergrates the field experience with general physical education (GPE) and adapted physical education (PE/APE) concepts through class discussion, exercises,

readings, and written assignments. The seminar format provides an opportunity for refinement and continued development of teacher skills and attributes for working with students with disabilities. Students learn to instruct effectively, to participate in the Individual Education Plan (IEP) process, and to manage their time.

### **KIN 743 - Sport Marketing**

**Credits:** 4.00

Survey of concepts and processes used in the successful marketing of sport programs and events. Special emphasis on the unique or unusual aspects of sport products, markets, and consumers. Prereq: MKTG 550 or permission.

### **KIN 761 - Senior Seminar Sport Studies**

**Credits:** 4.00

Discussions of sport studies topics, such as gambling, aggression, media, gender, race, class. Students consider different disciplinary approaches to these topics and develop projects to advance knowledge related to their interests. Prereq: KIN: Sport Studies majors; students must accumulate an aggregate total of 150 hours of work (paid or unpaid) in four approved sport organizations before they are allowed to register for KIN 761. Writing intensive.

### **KIN 765 - Advanced Topics in Coaching**

**Credits:** 4.00

This course goes beyond the basic principles of coaching and addresses advanced topics in coaching (talent identification, talent development) from both the science and the art of coaching technique and strategies. This course is structured as an upper division course in Sports Studies. Content includes topics related to the development of the field of coaching. The class makes extensive use of case studies and analysis of practical coaching situations for the betterment of coach development. This course combines lecture, small group discussion and practical application of material. Prereq: KIN 565.

### **KIN 780 - Psychological Factors in Sport**

**Credits:** 4.00

Factors of outstanding athletic achievement; psychological variables in competition; the actions and interactions of sport, spectator, and athlete. Special attention directed to strategies for coaches, teachers, and athletic trainers to utilize sport psychology in their professional practice. Prereq: PSYC 401 or KIN 671.

### **KIN 781 - Inclusion in Physical Education**

**Credits:** 4.00

Overview of special physical education. Addresses modifying instruction, expectations, and learning environment to accommodate physical and motor behaviors of students with disabilities. Prereq: KIN P.E. Pedagogy majors. Lab. Writing intensive.

### **KIN 782 - Therapeutic Applications of Adventure Programming**

**Credits:** 4.00

A study of theory, practice, and research of adventure experiences in therapeutic settings. Incorporates theoretical seminars and associated practical experiences. Prereq: KIN 787.

### **KIN 786 - Organization and Administration of Outdoor Education Programs**

**Credits:** 4.00

Study of administration of outdoor education programs using a variety of organizational models. Students use simulated exercises and work with outdoor agencies on special projects to learn the key factors necessary to manage a program. KIN Outdoor Education majors. Special fee. Writing intensive.

**KIN 787 - Theory of Adventure Education****Credits:** 4.00

Provides an in-depth investigation of the theories that underpin professional practice and research in adventure education. Students examine program applications in different settings, analyze pertinent outdoor education and social science research, and independently complete a research or applied project. Prereq: KIN 550 or permission of the instructor. Special fee. Writing intensive.

**KIN 794 - Cardiopulmonary Pathologies****Credits:** 4.00

Lecture study of the anatomy, physiology, and pathophysiology of the cardiac, vascular, and pulmonary systems. Particular emphasis on the study of cardiovascular function in diseased and stressed states. Clinical assessment of the cardiopulmonary patient. Prereq: KIN 704.

**KIN 795 - Practicum in Cardiac Rehabilitation****Credits:** 2.00

Provides students with practical and theoretical experience in all aspects involving cardiac rehabilitation programs. Prereq: KIN 704, 794.

**KIN 798 - Special Topics****Credits:** 1.00 to 4.00

New or specialized courses not normally covered in regular course offerings. May be repeated up to 8 credits. Prereq: departmental approval. Special fee on some sections.



## Languages, Literatures & Cultures

### **LLC 401 - Elementary Language Study I**

**Credits:** 4.00

Generic course introduces students to a foreign language and culture through speaking, listening, reading, writing, labs and films. Designed for students without previous training in the specified language. 401-402 taken together satisfies the foreign language requirement. Special fee.

### **LLC 402 - Elementary Language Study II**

**Credits:** 4.00

Generic course introduces students to a foreign language and culture through speaking, listening, reading, writing, labs and films. Designed for students without previous training in the specified language. 401-402 taken together satisfies the foreign language requirement. Special fee.

### **LLC 440 - Cultural Approaches to Film and Fascism**

**Credits:** 4.00

Taking a transnational perspective, this course examines the phenomenon of fascism through its cinematic representation. Analyzes definitions of fascism, narrative representations of fascism and the role of propaganda in fascism. Special fee.

### **LLC #444A - Love and Nation in German Film**

**Credits:** 4.00

In this course, we look at German films from the early Weimar period to the present. Our main question is: What connections exist between love stories and the creation of national identity in films from different periods of German history? We learn to read films as an aesthetic text with a narrative and form and as an historical text with a social and political function. Special fee. Writing intensive.

### **LLC #444B - France and the European Union in a Global World**

**Credits:** 4.00

Encourages students in their freshman year of college-level education to move beyond the US borders, to make connections with the diversity of European cultures, and to think as citizens of a global world. This introductory course focuses on contemporary France from the perspective of a long European historical and cultural tradition, as well as in the new context of post-May 29, 2005. (French vote against the EU Constitution) The icons on both sides of the Euro banknotes serve as illustrations of the scope of this course: bridges will be established between European countries, and windows will open onto 21st Century France at a critical crossroad. This course ultimately leads students to ask themselves new questions about their own history, identity and culture. Special fee. Writing intensive.

### **LLC 444C - World of Salvador Dali**

**Credits:** 4.00

Students investigate essential components of modern culture and Western tradition through the mind, art and writing of Salvador Dalí. This interdisciplinary course poses fundamental, universal questions about human existence including death, rebirth, eternity and God, sexuality and love as well as the irrational dark side of our psyche. Certain cultural movements such as the Surrealist movement, Freudian psychoanalysis, the Gothic tradition and modern scientific discoveries and concepts are also explored. Special fee. Writing intensive.

### **LLC 444D - Love in Disguise**

**Credits:** 4.00

This course is designed around the theme of love in disguise, which we will study in French dramas (in translation) from the 17th to the 20th centuries. In each play one or more characters use a disguise to obtain or confirm a romantic attachment and each play uses disguise in a somewhat different manner. The course considers the French drama over four centuries through a coherent body of texts. As time allows, we will view films based on these plays and/or have brief performances of selected passages. Students are required to participate actively in this course (attendance, participation in class discussion, and text presentation). Students are also required to attend a performance of the University's Celebrity Series. Writing intensive.

### **LLC 444E - Italians Come to America: Representing Emigration and Immigration on Both Sides of the Atlantic**

**Credits:** 4.00

Course is designed around the phenomenon of emigration from Italy to the United States over the last century or so, with particular attention to the time period between the end of the nineteenth century and the mid-twentieth century. While core media under examination are literature and film, we also draw on historical, anthropological, political and sociological readings to help us consider the many issues involved.

### **LLC 444F - Vampires and the Supernatural in Modern Western Culture**

**Credits:** 4.00

This interdisciplinary course examines the elusive nature of the vampire as well as scholarly controversies regarding its name and origins, the historical and intellectual foundations of the belief in such creatures and its impact on culture during the last five centuries. Our quest is to understand the various roles and functions, allegorical, metaphorical and otherwise that the thirsty dead have played in art, literature, politics, psychology, etc. This inquiry should lead us not only to vampires but to ourselves, and should encourage fruitful reflections on the intellectual development of Western civilization as well as cast some light on the central aspects of modernity such as its attitudes toward death and its fascination with fear and the uncanny. Writing intensive.

### **LLC 444G - Pirates of the Caribbean: Facts, Legends, and Interpretations**

**Credits:** 4.00

This course will explore the historical, economic, literary and artistic structures of the pirate myth and will compare the popular image with the reality of the early modern Caribbean bandit. It will focus on contemporary sources written both by pirates, their victims and Spanish and English colonial authorities as well as on the most important scholarly interpretations of this phenomenon. Then we will examine some influential fictional portrayals in order to consider the roles that pirates play in contemporary culture. Writing intensive.

### **LLC 450 - Film and Communism**

**Credits:** 4.00

Examines Communist mythology from its birth to its deconstruction through film. Particular attention is focused on the instructive nature of Soviet film (1917-1991) and the cultural idioms used in this medium, but the course also examines Liberation Cinema and leftist filmmaking in the West. Films, readings, lectures, discussion. No prerequisites. Special fee.

### **LLC 503 - Intermediate Language Study I**

**Credits:** 4.00

Generic language course. Review of grammar with emphasis on listening comprehension, speaking, reading, and writing. Increasing attention to contemporary cultural texts of the given language. Prereq: LLC 401-402 or equivalent or by permission of instructor. Satisfies foreign language requirement. Lab and films. Special fee.

### **LLC 504 - Intermediate Language Study II**

**Credits:** 4.00

Generic language course. Review of grammar with emphasis on listening comprehension, speaking, reading, and writing. Increasing attention to contemporary cultural texts of the given language. Prereq: LLC 503 or permission. Satisfies foreign language requirement. Lab and films. Special fee.

**LLC 540 - Film History****Credits:** 4.00

Examines the historical development of film from a global perspective and the emergence of national cinemas as well as the cross-cultural influences that have produced the modern transnational film industry. Special fee.

**LLC 595 - Language Practicum****Credits:** 2.00 to 4.00

Practical use of language skills outside the classroom through special projects. Prereq: LLC 504 or its equivalent. May be repeated up to a maximum of 4 credits. Cr/F.

**LLC 642 - Theory and Practice of Translation****Credits:** 4.00

This course is designed both as an introduction to various theories and philosophies of translation and as an intensive workshop on different types of translation (literary, technical, professional, business, and health related, etc.). Translation is both a simple matter of transferring content and an intensely complex process of adapting linguistic, tonal, and cultural components of communication. The course works extensively on the craft of translation while developing detailed analyses of the theoretical and philosophical implications of choices made. Students complete various translation exercises and develop a significant final project. It is open to students at different levels of language ability but requires at least an intermediate competency. Students work at their own level. Taught in English. Prereq: Intermediate language or permission.

**LLC 695 - International Internship****Credits:** 12.00

Field experience in governmental or nongovernmental organization abroad. Students are responsible for identifying and making arrangements with the sponsoring internship organization. All such arrangements are subject to the approval of the Department of Languages, Literatures, and Cultures. Open to juniors and seniors with at least a 3.2 G.P.A. Permission from the Program Coordinator and the Department chair is required. Approval of the Center for International Education is also required. The internship is for 12 credits (non-variable). Cr/F.

**LLC 791 - Methods of Foreign Language Teaching****Credits:** 4.00

Objectives, methods and techniques in teaching foreign languages from elementary grades through college. Discussion, demonstration, preparation of instructional materials, microteaching of the language skills, including developments in computer-aided instruction. Special fee.

**LLC XXX - Special message place holder****Credits:**

## Latin

### **LATN 401 - Elementary Latin I**

**Credits:** 4.00

Elements of grammar, reading of simple prose. (No credit for students who have had two or more years of Latin in secondary school; however, any such students whose studies of Latin have been interrupted for a significant period of time should consult the section supervisor about possibly receiving credit.) Special fee.

### **LATN 402 - Elementary Latin II**

**Credits:** 4.00

Elements of grammar, reading of simple prose. (No credit for students who have had two or more years of Latin in secondary school; however, any such students whose studies of Latin have been interrupted for a significant period of time should consult the section supervisor about possibly receiving credit.) Special fee.

### **LATN #403 - Review of Latin**

**Credits:** 4.00

Intensive review of Latin grammar and vocabulary. Preparation for LATN 503. Designed primarily for those whose study of Latin has been interrupted for a year or more and for those who have had only two years of high school Latin. Special fee.

### **LATN #501 - Review of Latin**

**Credits:** 4.00

Intensive review of Latin grammar and vocabulary. Designed primarily for those whose study of Latin has been interrupted for a year or more and for those who have had only two years of high school Latin. Special fee.

### **LATN 503 - Intermediate Latin I**

**Credits:** 4.00

Review. Readings from Cicero, Caesar, Sallust, Livy, Catullus, Horace, Ovid, Plautus, Terence, and Seneca. Prereq: LATN 402 or equivalent. Special fee.

### **LATN 504 - Intermediate Latin II**

**Credits:** 4.00

Review. Readings from Cicero, Caesar, Sallust, Livy, Catullus, Horace, Ovid, Plautus, Terence, and Seneca. Prereq: LATN 402 or equivalent. Special fee.

### **LATN 595 - Directed Reading**

**Credits:** 2.00 or 4.00

Independent study of a classical or medieval Latin author. May be repeated to a maximum of 8 credits. Prereq: LATN 503, 504, or equivalent. Special fee. Cr/F.

### **LATN 596 - Directed Reading**

**Credits:** 2.00 or 4.00

Independent study of a classical or medieval Latin author. May be repeated to a maximum of 8 credits. Prereq: LATN 503, 504, or equivalent. Special fee. Cr/F.

### **LATN 605 - Readings in Latin Literature**

**Credits:** 4.00

Reading and analysis of major works of Latin literature. Focus on improving translation skills and comprehension of Latin grammar and Latin language. Introduction to the critical analysis of Latin literature

in the context of Roman civilization and culture. Prereq: Latin 504 or equivalent with a grade of C or better. Satisfies foreign language requirement. Special fee.

### **LATN 606 - Readings in Latin Literature**

**Credits:** 4.00

Reading and analysis of major works of Latin literature. Focus on improving translation skills and comprehension of Latin grammar and Latin language. Introduction to the critical analysis of Latin literature in the context of Roman civilization and culture. Prereq: Latin 504 or equivalent with a grade of C or better. Satisfies foreign language requirement. Special fee.

### **LATN 631 - Latin Prose Composition**

**Credits:** 4.00

Grammar review; study of Latin prose style; English to Latin translation. Prereq: permission. Special fee.

### **LATN #632 - Latin Prose Composition**

**Credits:** 4.00

Grammar review; study of Latin prose style; English to Latin translation. Prereq: permission. Special fee.

### **LATN 752 - Cicero and the Roman Republic**

**Credits:** 4.00

Prereq: permission. Special fee. Writing intensive.

### **LATN 753 - Advanced Studies in the Literature of the Golden Age**

**Credits:** 4.00

A) Lucretius; B) Catullus; C) Caesar; D) Sallust; E) Vergil; F) Horace; G) Tibullus; H) Propertius; I) Ovid; J) Livy. Major Roman authors from the dictatorship of Sulla to the death of Augustus. Prereq: permission. Special fee. Writing intensive.

### **LATN 754 - Advanced Studies in the Literature of the Golden Age**

**Credits:** 4.00

A) Lucretius; B) Catullus; C) Caesar; D) Sallust; E) Vergil; F) Horace; G) Tibullus; H) Propertius; I) Ovid; J) Livy. Major Roman authors from the dictatorship of Sulla to the death of Augustus. Prereq: permission. Special fee. Writing intensive.

### **LATN 755 - Advanced Studies in the Literature of the Silver Age**

**Credits:** 4.00

A) Seneca the Younger; B) Persius; C) Petronius; D) Lucan; E) Statius; F) Quintilian; G) Martial; H) Juvenal; I) Tacitus; J) Pliny the Younger. Major Roman authors from the reign of Nero to the death of Trajan. Prereq: permission. Special fee. Writing intensive.

### **LATN 756 - Advanced Studies in the Literature of the Silver Age**

**Credits:** 4.00

A) Seneca the Younger; B) Persius; C) Petronius; D) Lucan; E) Statius; F) Quintilian; G) Martial; H) Juvenal; I) Tacitus; J) Pliny the Younger. Major Roman authors from the reign of Nero to the death of Trajan. Prereq: permission. Special fee. Writing intensive.

### **LATN 795 - Special Studies**

**Credits:** 4.00

A) Minor Authors of the Republic; B) Plautus; C) Terence; D) Minor Authors of the Empire; E) Suetonius; F) Latin Church Fathers; G) Medieval Latin; H) Advanced Latin Composition; I) Introduction to Classical Scholarship; J) Latin Epigraphy; K) Italic Dialects; L) Comparative Grammar of Greek and Latin; M) Roman Law. Topics selected by instructor and student in conference. Prereq: permission. Special fee. Writing

intensive.

**LATN 796 - Special Studies**

**Credits:** 4.00

A) Minor Authors of the Republic; B) Plautus; C) Terence; D) Minor Authors of the Empire; E) Suetonius; F) Latin Church Fathers; G) Medieval Latin; H) Advanced Latin Composition; I) Introduction to Classical Scholarship; J) Latin Epigraphy; K) Italic Dialects; L) Comparative Grammar of Greek and Latin; M) Roman Law. Topics selected by instructor and student in conference. Prereq: permission. Special fee. Writing intensive.

## Life Sciences & Agriculture

### **LSA 400 - Freshmen Seminar**

**Credits:** 1.00

Assistance to the undeclared student in identifying a major within the College of Life Sciences and Agriculture, including the biological, natural, and social sciences. The goal of this seminar is to support students in developing a sound academic program and assist them in making a successful transition from high school to college. The seminar also covers strategies for being a successful college student. Guest speakers from departments and programs lead discussions on career opportunities. Required for all first-semester LSA undeclared students. Cr/F.

### **LSA 401 - College Research Experience**

**Credits:** 1.00 to 4.00

Hands-on research experience for high school students and UNH freshmen under the supervision of a College of Life Sciences and Agriculture (COLSA) faculty member. This independent-study course will introduce students to the research process and require them to undertake a research project that will involve laboratory and/or field work. Before a student can register for the course, he/she must meet with a COLSA faculty member who will serve as mentor and supervisor, and the two of them must have a formal agreement on the specific research activities that the student must carry out. Prereq: Permission. May be repeated up to a maximum of 8 credits.

### **LSA 699 - Special Topics**

**Credits:** 1.00 to 2.00

Seminar on new or specialized topics that involve two or more disciplines in the College of Life Sciences and Agriculture and are not covered in regular course offerings. May be repeated to a maximum of 4 credits.

## Linguistics

### **LING 405 - Introduction to Linguistics**

**Credits:** 4.00

Overview of the study of language: universal properties of human language, Chomsky's innateness hypothesis, language acquisition in children, dialects and language variation, language change. Includes an introduction to modern grammar (phonology, syntax, and semantics) and to scientific linguistic methodology. (Also offered as ENGL 405.)

### **LING 405H - Honors/Introduction to Linguistics**

**Credits:** 4.00

Overview of the study of language: universal properties of human language, Chomsky's innateness hypothesis, language acquisition in children, dialects and language variation, language change. Includes an introduction to modern grammar (phonology, syntax, and semantics) and to scientific linguistic methodology. (Also offered as ENGL 405.)

### **LING 444F - Language Matters in America**

**Credits:** 4.00

Students engage in active research to understand how we use language to construct and interpret identity. Linguistic patterns typical of groups of various types (regional, ethnic, gender, age, communities of shared practice, etc.) are explored as are issues related to education, language use in politics and marketing, ESL, ASL, and African-American English. Course engages students in inquiry-based learning: determining what questions are important in the field, figuring out how to find answers, pursuing these answers, and interpreting what you find out, following established practices in the social sciences. Writing intensive. (Also listed as ENGL 444F.)

### **LING 605 - Intermediate Linguistic Analysis**

**Credits:** 4.00

Analysis and problem solving in phonology, morphology, and syntax using data from many languages. Emphasis is both practical (learning how to describe grammar and sound system of a language) and theoretical (understanding languages' behavior). Prereq: LING/ENGL 405, or permission. (Also offered as ENGL 605.)

### **LING 620 - Applied Experience in Linguistics**

**Credits:** 1.00 to 4.00

Students who have an opportunity for appropriate career-oriented work experience may arrange with a faculty sponsor to add an academic component. The work must be related to the linguistics major, and nonacademic employers must normally be an established organization approved by Career Services. Research and writing required in addition to the job experience. Registration requires permission of employer, faculty sponsor, and major adviser. May be repeated with permission to a maximum of 8 credits. Up to 4 credits may count toward the linguistics major requirements, with permission of the program coordinator. Prereq: LING 505; permission. Cr/F.

### **LING 695 - Senior Honors**

**Credits:** 4.00

Open to senior LING majors who, in the opinion of the department, have demonstrated the capacity to do superior work. Prereq: permission.

### **LING 719 - Sociolinguistics Survey**



**Credits: 4.00**

How language varies according to the characteristics of its speakers: age, sex, ethnicity, attitude, time, and class. Quantitative analysis methods; relationships to theoretical linguistics. Focus is on English, but some other languages are examined. Prereq; ENGL or LING 405 (previously numbered 505) or permission. (Also offered as ENGL 719.)

**LING 779 - Linguistic Field Methods****Credits: 4.00**

Study of a non-Indo-European language by eliciting examples from an informant, rather than written descriptions of the language. Students learn how to work out the grammar of a language from raw data. Prereq: ENGL/LING 505. (Also offered as ENGL 779.) (Not offered every year.) Writing intensive.

**LING 790 - Special Topics in Linguistics Theory****Credits: 4.00**

Advanced course on a topic chosen by the instructor. Inquire at the English department office for a full course description each time the course is offered. Topics such as word formation, dialectology, linguistic theory, and language acquisition, history of linguistics, language and culture, cross-disciplinary studies relating to linguistics. Barring duplication of subject, may be repeated for credit. (Also offered as ENGL 790.) Writing intensive.

**LING 793 - Phonetics and Phonology****Credits: 4.00**

Sound system of English and of other languages viewed from the standpoint of modern linguistic theory, including the following topics: the acoustic and articulatory properties of speech sounds, the phonemic repertoires of particular languages, phonological derivations, and prosodic phenomena such as stress and intonation. Prereq: a basic linguistics course or permission. (Also offered as ENGL 793.)

**LING 794 - Syntax and Semantic Theory****Credits: 4.00**

Relationship of grammar and meaning viewed from the standpoint of modern linguistic theory. Emphasis on the syntax and semantics of English, with special attention to the construction of arguments for or against particular analyses. Prereq: a basic linguistics course or permission. (Also offered as ENGL 794.) Writing intensive.

**LING 795 - Independent Study****Credits: 1.00 to 4.00**

A) Synchronic Linguistics, B) Diachronic Linguistics, C) Linguistic Theory. For students showing a special aptitude for linguistics who desire to pursue a line of inquiry for which no appropriate course is offered. All requests must be forwarded by the faculty sponsor to the director of the Inter-departmental Linguistics Committee.

**LING 796 - Independent Study****Credits: 1.00 to 4.00**

A) Synchronic Linguistics, B) Diachronic Linguistics, C) Linguistic Theory. For students showing a special aptitude for linguistics who desire to pursue a line of inquiry for which no appropriate course is offered. All requests must be forwarded by the faculty sponsor to the director of the Inter-departmental Linguistics Committee.

## Management

### **MGT 444 - Meaning of Entrepreneurship**

**Credits:** 4.00

This course explores the idea and ideals of entrepreneurship, the creating of value through individual initiative, creativity, and innovation. The idea of entrepreneurship is of significant relevance in the highly dynamic and competitive 21st century global economy. It is an idea that is important for students to understand and to critically consider and apply. The course encourages the development of multiple views of entrepreneurship, and uses a broad, not just business, approach to the study as it engages students in the subject matter. Open to freshmen from all majors. (Also offered as DS 444 in alternating terms). Writing intensive.

### **MGT 580 - Introduction to Organizational Behavior**

**Credits:** 4.00

Application of behavioral science concepts to work settings in profit and nonprofit organizations. Individual settings behavior, interpersonal relations, work groups, relations among groups studied in the context of organizational goals and structure. Experiential focus. For non-business administration majors and minors. No credit for students who have had ADMN 575 or ADMN 611.

### **MGT 614 - Organizational Leadership and Structure**

**Credits:** 4.00

How structural characteristics in an organization (e.g., the design of roles, reporting relationships, coordinating mechanisms, communication systems, and processes, etc.) affect whether leader actions and choices enable or prevent high performance. An open systems framework is used to assess how reactions to change occurring inside and outside an organization determine whether individuals, groups, and organizations position themselves to adapt, grow and develop, or decline. Examination of individual roles in organizations. Prereq: ADMN ADMN 575 or 611.

### **MGT 647 - Business Law I**

**Credits:** 4.00

Law of contracts, agency, sales, negotiable instruments, real and personal property, partnership and corporations, with application of the Uniform Commercial Code. Prereq: Junior standing, ECON 401, ECON 402, and ADMN 420.

### **MGT 701 - Business, Government, and Society**

**Credits:** 4.00

Managerial problem solving and decision making relative to economic, ethical, legal, political, social, and technological aspects of an organization's environment. Case discussion, stakeholder analysis, managerial values and ethics, and social issues management are important course components. Open to WSBE majors only. Prereq: ADMN 575 or ADMN 611; at least two of ADMN 570 or ADMN 601; ADMN 580 or ADMN 640; and ADMN 585 or ADMN 651.

### **MGT 713 - Leadership Assessment and Development**

**Credits:** 4.00

Activities and exercises to help students determine their ideal job upon graduation as well as their career goals for the next three to five years. Students learn a matrix of key leadership behaviors and skills that distinguish high-performing managers and executives. Each student's behavior is assessed using this model so that students can determine the leadership behaviors and skills they most need to develop to meet their early career goals. Faculty assist students in developing a personal leadership development

plan to focus professional energy, efforts, and achievements over the next three to five years. Prereq: ADMN 575 or ADMN 611.

### **MGT 732 - Exploration in Entrepreneurial Management**

**Credits:** 4.00

Examines the management of change and innovation, especially the role of entrepreneur in managing new ventures. Uses case analysis, guest speakers, and business plan preparation to study the characteristic behavioral, organizational, financial, and marketing problems of entrepreneurs and new enterprises.

Prereq: ADMN 570 or ADMN 601, ADMN 575 or ADMN 611, and ADMN 585 or ADMN 651. Writing intensive.

### **MGT 742 - Internship in Entrepreneurial and Management Practice**

**Credits:** 4.00

Involves working for leading companies and dynamic entrepreneurs, as well as classroom instruction. The priority experiential, real-world, and real-time learning in the high growth environment of entrepreneurial ventures. Focuses on several topic areas, including venture capital. Prereq: senior standing; permission. (Also listed as DS 742.

### **MGT 755 - International Management**

**Credits:** 4.00

Develops an understanding of international ventures and partnerships from the viewpoint of management, leadership, human resource management, and organizational structure and strategy. Emphasizes the impact of culture on business practices and on interpersonal skills and global perspectives needed for personal effectiveness in international and multicultural environments. Prereq: ADMN 575 or ADMN 611. Writing intensive.

### **MGT 798 - Topics**

**Credits:** 4.00

Special topics; may be repeated. Prereq: permission.

### **MGT 798W - Topics**

**Credits:** 4.00

Special topics; may be repeated. Prereq: permission. Writing intensive.

## **Marine, Estuarine, Freshwater**

### **MEFB 401 - Marine Estuarine and Freshwater Biology: Freshmen Seminar**

**Credits:** 2.00

The purpose of this course is threefold: First to acquaint freshmen MEFB majors to the wide range of topics that are included in the broad area of marine, estuarine and freshwater biology. Second, to introduce new UNH students to many of the MEFB faculty at UNH and give them the opportunity to become aware of the types of research that is being conducted at UNH. Finally, to begin teaching freshmen how to read the primary literature, write concise summaries of papers they read, give oral presentations to their peers, and understand how scientific knowledge is acquired and disseminated. Students attend a series of seminars presented by a wide range of MEFB faculty. The topics presented vary from year to year depending on the faculty that agree to participate. In addition students are required to read the current literature, write short papers and give presentations to the class. Finally, whenever possible, students go on field trips to directly experience the activities that are being carried out in various laboratories and to learn about the most common organisms found in NH aquatic habitats ranging from lakes to the Gulf of Maine.

### **MEFB 410 - Marine Immersion**

**Credits:** 2.00

An intensive 2-credit course for incoming freshmen, surveying a range of marine-related fields (with an emphasis on biology and ecology), research approaches, and organisms. The course is based at the Shoals Marine Laboratory on Appledore Island, where students and some faculty will be in residence. "Marine Immersion" introduces students to the breadth, excitement, and challenges of marine sciences through lectures, demonstrations, and field experiences offered by a cohort of UNH faculty, and through short research projects carried out on the island. It also introduces them to resources and opportunities available at UNH, provides an opportunity to get to know some of their professors, and lets them begin building a network among their peers even before they arrive in Durham. Special fee.

### **MEFB 460 - Biological Illustration**

**Credits:** 3.00

Scientific publishing and illustration including labeling, color techniques, and printing processes. Illustration techniques include (1) pen and ink: wildlife illustrations; (2) carbon dust: half-tone illustrations; (3) colored pencil: drafting film; (4) watercolor: for accurate and detailed illustrations. The student may choose to explore a single technique in-depth with subjects selected from a wide variety of material on Appledore Island. Course size is limited to allow individual attention. (Summers only at Shoals Marine Lab.)

### **MEFB 510 - Field Ornithology**

**Credits:** 3.00

Introduces field ornithology focusing on the biology, ecology, and behavior of avifauna on the Isles of Shoals. Includes such ornithological field methods as censusing techniques, territory mapping, banding, behavioral observation, and creating a field notebook. Fieldwork is designed to supplement many classroom concepts, including territoriality, breeding biology, and survivorship. Prereq: one year of college-level biology. Lab. (Summers only at Shoals Marine Lab.) Special fee.

### **MEFB 515 - Introduction to Marine Conservation Biology**

**Credits:** 3.00

Marine conservation biology originates in efforts to manage and conserve valuable fisheries. Despite long-term data about landings, the ecological context of harvest activities is relatively unknown. Consequently, efforts at fisheries conservation are data-rich, yet understanding-poor. Student integrate principles of marine biology and ecology with case studies of successes and failures in management, the scientific

underpinnings of our understanding, and consideration of changes in marine governance that may hold promise for progress towards sustainability. Prereq: one term college biology or permission. Special fee.

### **MEFB 525 - Introduction to Aquatic Botany**

**Credits:** 4.00

This team-taught course introduces students to microalgae, seaweeds, and vascular aquatic plants with an emphasis on unique habitats and plant adaptations to the aquatic environment. Students survey the diversity of algae and aquatic plants spanning fresh, estuarine, and marine habitats through a combination of lecture, field, and laboratory exercises. Special fee.

### **MEFB 571 - Estuarine Ecology**

**Credits:** 4.00

A field-based course providing an introduction to the physical, chemical, and biological processes that form and sustain estuaries. Plant and animal adaptations to various environmental stresses are examined in specific estuarine habitats. Since human activities impact estuaries profoundly, management actions are examined and major issues are investigated and discussed. A variety of new techniques and technologies are demonstrated and provided as hands-on activities. The course is appropriate for beginning undergraduates, interested lay persons, and working professionals. Special fee.

### **MEFB 609 - Biology of the Lobster**

**Credits:** 3.00

An introduction to the biology of the American lobster, *Homarus americanus*. The course includes an overview of this ecologically and economically important species, and covers several major topics in depth, each taught by a lobster biologist expert in that field. Topics may include life history, larval development and metamorphosis, anatomy, physiological adaptation, fisheries and fishing methods, feeding mechanisms, ecology, and behavior. Lecture, laboratory, discussion, and field work. Special fee. (Summers only at Shoals Marine Lab.) Prereq: one year college level biology.

### **MEFB 615 - Field and Experiment Oceanography**

**Credits:** 3.00

Intended for mid-upper division undergrads, this course provides a foundation in oceanography (the four oceanographic disciplines: geological, chemical, physical, and biological) applied in experimental and field settings. Includes two oceanographic trips in the Gulf of Maine. Student groups develop a small oceanographic project while on Appledore Island, carry it out, and present their study to the Shoals academic community. The course integrates investigative, practical, and theoretical aspects of oceanography. Prereq: one term college biology or permission. Special fee.

### **MEFB 616 - Tropical Coastal Plant Ecology**

**Credits:** 4.00

A field-based course taught on location in Grenada, West Indies, providing an introduction to the physical chemical and biological processes that form and sustain tropical coastal plant communities with an emphasis on mangroves and seagrasses. Plant adaptations to various environmental stresses will be examined over a range of habitats spanning a gradient of salinity from fresh to saline environments. As a dynamic ecosystem affected by both natural and anthropogenic disturbances from hurricanes to large-scale development, major environmental impacts and pressures will be examined first hand, and conservation and management actions will be discussed. A variety of on-going, community-based coastal habitat restoration and ecological monitoring sites will be visited throughout Grenada. Student participation in management actions will be encouraged through interaction with students from St. Georges University, local volunteers, and representatives from governmental environmental agencies and local non-governmental organizations. The course material is relatively specialized and is appropriate for juniors and seniors with interest/background in botany, coastal ecology and restoration, and conservation. Prereq: BIOL 411/412.

### **MEFB 630 - Biodiversity and Biology of Marine Invertebrates**

**Credits:** 3.00

An introduction to the biology and evolution of the major invertebrate phyla, concentrating on marine representatives. Emphasis placed on the evolution of form and function, and the ecology, behavior, physiology, chemical ecology, and natural history of invertebrates. Appledore Island's unique location provides an excellent venue for the study of freshly collected and in situ representatives of most of the major phyla. Special fee. (Summers only at Shoals Marine Lab.) Prereq: one year college level biology.

### **MEFB 674 - Ecology and Marine Environment**

**Credits:** 3.00

Introduces the marine sciences with an emphasis on field work in natural habitats. Examines aspects of the systematics, morphology, physiology, behavior, and ecology of marine organisms, including intertidal plants and invertebrates, fishes, marine mammals and birds; fisheries biology; oceanography, marine geology; and human impacts on the marine environment. Sessions include lectures, discussions, field work, experience aboard a coastal research vessel, and excursions to distinctive habitats. Offered in cooperation with Cornell University. Students may not take Field Marine Science after taking Field Marine Biology and Ecology. Prereq: one full year of college-level biology/or permission. Special fee. (Summers only at Shoals Marine Lab.)

### **MEFB 702 - Sustainable Marine Fisheries**

**Credits:** 4.00

An intensive course for undergraduate students that introduces students to the complex challenges facing today's fishing industry, which is being asked to simultaneously sustain the livelihood of fishermen while meeting long-term conservation goals. The course is held both at the UNH Campus and at the Shoals Marine Laboratory. New England fisheries are used as a case-study for this course through global fishing management, trends, and issues are also discussed.

### **MEFB 714 - Field Animal Behavior**

**Credits:** 3.00

An animal's behavioral patterns represent its abilities to deal with the environment dynamically. Course focuses on ecological and evolutionary significance of behavioral patterns found in all organisms, particularly those animals that inhabit coastal marine environments. Strong emphasis on methods of behavioral research and interpretation of behavioral patterns using field observations of diverse fauna of Appledore Island and surrounding waters. Prereq: one year college biology or permission. Special fee. (Summers only at Shoals Marine Lab.)

### **MEFB 723 - Marine Botany**

**Credits:** 3.00

Introduces the biology of marine plants, with an emphasis on the macroalgae common to the Gulf of Maine and found in abundance at the Isles of Shoals. Lecture topics include productivity in the world's oceans, rocky shore ecology, commercial cultivation of algae, and phytoplankton ecology, as well as molecular analysis of the evolution and biogeography of marine plants. Field and laboratory exercises include collection and identification of algae from Appledore's intertidal and subtidal habitats, experimental design and data analysis for field study, and tide-pool community surveys. Individual field projects may involve studies of algae growth, productivity as it relates to morphology, photosynthesis, and desiccation during low tide. Daily and evening lectures, laboratories and field work. Prereq: field marine science or one year of introductory biology. (Summers only, at Shoal's Marine Lab.)

### **MEFB 730 - Underwater Research**

**Credits:** 3.00

Hypothesis testing and experimental design, theoretical and practical aspects of sampling, and critiques of

current research papers. Includes special problems of conducting research underwater (diving physics and physiology, theory and use of diving tables, hyperbaric medicine) and underwater techniques (underwater photography and video, photo quadrates, tagging and marking, cages and enclosures). Students must supply their own equipment. Students with special research interests are encouraged to enroll in an additional third week of independent underwater research. Prereq: recognized scuba certification, a medical examination, one year of biology or other supporting science. (Summers only at Shoals Marine Lab.)

### **MEFB 734 - Diversity of Fishes**

**Credits:** 3.00

Emphasizes the diversity of fishes in two aspects: diversity of evolutionary solutions to problems faced by fishes and the great diversity of different types of fishes that inhabit the world. Prereq: one full year of college level biology; background in vertebrate biology is recommended, but not required. Special fee. (Summers only at Shoals Marine Lab.)

### **MEFB 741 - Sharks: Biology and Conservation**

**Credits:** 3.00

This course covers advanced topics in the evolution, diversity, anatomy, functional morphology, neurobiology, sensory systems, behavior, reproduction, development, and conservation of cartilaginous fishes: the approximately 1000 species of sharks, skates, rays and chimaeras, which collectively make up the group Chondrichthyes. Special fee. (Summers only at Shoals Marine Lab.) Prereq: Anatomy, Ichthyology or permission.

### **MEFB 751 - Research in Marine Biology**

**Credits:** 3.00

Introduces the adaptations of organisms to marine environments and the role these adaptations have in structuring marine communities using an experimental approach. Emphasizes experimental design, implementation, data analysis, and scientific presentations. Offered in cooperation with Cornell University. Prereq: one year of college-level biology or permission. Additional experience in ecology or physiology is recommended. (Summers only at Marine Lab.)

### **MEFB 754 - Anatomy and Function of Marine Vertebrates**

**Credits:** 3.00

The course is designed to introduce students to a comparative study of the principal organ systems of vertebrates (i.e., fishes, sea turtles, marine birds, marine mammals) that are specifically adapted to the marine environment. Rather than focusing only on description of anatomical structure, the anatomy of structures are investigated with function, biological role, and evolutionary relationships. Laboratory exercises cover osteology, dissection, behavior and biomechanics. Special fee. (Summers only at Shoals Marine Lab.) Prereq: one year college biology/or permission.

## Marketing

### **MKTG 550 - Survey of Marketing**

**Credits:** 4.00

Focuses on marketing as the process of planning and executing the conception, pricing, promotion, and distribution of ideas, goods and services to create exchanges that satisfy individual and organizational objectives. For business administration minors and non-business administration majors. No credit for students who have had ADMN 585 or ADMN 651.

### **MKTG 598 - Topics in Marketing**

**Credits:** 1.00 to 4.00

Special topics covering a variety of marketing principles. Topics may include promotion and advertising; retail and retail management; sales and sales management. Certain topics may have pre- or co-requisite courses. May be repeated up to 12 credits.

### **MKTG 750 - Marketing Strategy**

**Credits:** 4.00

An integrative marketing course designed to provide the student with a cohesive understanding of marketing decision making through the exploration of marketing problems with an emphasis on qualitative analysis and strategy formulation. Through the use of case studies, the students will apply concepts and tools marketing decision-makers employ in practice. Prereq: ADMN 585. MKTG 752 and/or MKTG 753 are recommended.

### **MKTG 752 - Marketing Research**

**Credits:** 4.00

Examines marketing information management and decision-making. MR is an essential business process and an integral part of marketing management, a process by which marketing information is collected, analyzed, disseminated, and acted upon. Course provides the tools, techniques, data sources and research approaches commonly used for market research and analysis. Hands-on analysis of marketing data sets is provided by using leading statistical software packages. Prereq: ADMN 585 or ADMN 651 or equivalent.

### **MKTG 753 - Consumer/Buyer Behavior**

**Credits:** 4.00

Covers concepts, models, and theories from the behavioral sciences applied to consumer decision making and purchasing behavior. Examines consumer behavior from economic, psychological, sociological, and anthropological perspectives. Topic coverage includes discussion of marketing strategies and tactics to influence consumer choice. Prereq: ADMN 585 or ADMN 651. Writing intensive.

### **MKTG #754 - Retail Management**

**Credits:** 4.00

Analysis of managerial problems in retailing establishments. Focuses on operational problems, retail store organization, location analysis, buying and inventory management, retail financial management, and selling and sales promotion. Other areas include environmental effects on retailing, the formulation of retail strategy, human resource issues, and customer service. Prereq: ADMN 585 or ADMN 651.

### **MKTG 756 - International Franchising**

**Credits:** 4.00

Designed to provide an understanding of franchising as a system of distribution and business expansion.



Franchising is studied from both the perspectives of the franchise and the franchiser. In addition, economic, financial, and legal issues associated with franchising are covered. By the end of the course, students have skills and sources of information that permit sound assessment of the business opportunities available in franchising. Prereq: ADMN 585 or ADMN 651; or HMG 600. (Also offered as HMG 756.)

### **MKTG 757 - Integrated Marketing Communication**

**Credits:** 4.00

Provides balanced coverage of all marketing communication tools: advertising, sales promotion, public relations, direct marketing, personal selling, POP, packaging, sponsorships, licensing, customer service. Emphasizes the integration of these tools to send target audiences a consistent, persuasive message that promotes the organization's goals. Prereq: ADMN 585 or ADMN 651.

### **MKTG 760 - International Marketing**

**Credits:** 4.00

Environmental factors affecting international trade: culture and business customs, political and legal factors and constraints, economic and technological development, and the international monetary system. Integration of these with the marketing management functions of market research and segmentation; product, promotion, distribution, and pricing decisions. Prereq: ADMN 585 or ADMN 651.

### **MKTG 762 - Marketing Workshop**

**Credits:** 4.00

Integrative study of a real marketing situation in a business, nonprofit institution, or government agency. Student teams identify problem, collect appropriate data, suggest alternative solutions, and submit a recommended course of action. Prereq: senior standing; at least two of MKTG 752, 753, and 763. Writing intensive.

### **MKTG 763 - Market Opportunity Analysis**

**Credits:** 4.00

Introduces students to the analysis of the business environment in which a company operates and provides key inputs into strategic marketing planning and decision-making. Students learn the process, concepts, and techniques commonly used in the identification, assessment, and forecasting of market opportunities. Prereq: ADMN 585 or ADMN 651. Pre- or Coreq: ADMN 580 or ADMN 640.

### **MKTG 764 - New Product Development**

**Credits:** 4.00

Tactical and strategic issues concerned with the development and marketing of product and service innovations. Equips students with the concepts, tools, and approaches useful in the development, management, and marketing of products and services. Provides an integrated experience of the process of uncovering customer problems, understanding these problems, and providing superior solutions. Prereq: ADMN 585 or ADMN 651 or equivalent. Pre- or Coreq: ADMN 580 or ADMN 640.

### **MKTG 798 - Topics**

**Credits:** 4.00

Special topics; may be repeated. Prereq: a basic marketing course and permission. Special fee on some topics.

### **MKTG 798W - Topics**

**Credits:** 4.00

Special topics; may be repeated. Prereq: a basic marketing course and permission. Writing intensive.

## Materials Science

### **MS 401 - Science of Stuff**

**Credits:** 4.00

Materials Science is a relatively new and fast growing field that studies all types of materials, including metals, ceramics, polymers, semiconductors, and composites. Material Science explores how stuff is put together, how to change stuff and make it better, the properties and applications of stuff, and even how to make totally brand new stuff. This course explores materials from various topic areas, including sports, forensics, medicine and health, fashion, architecture and construction, music and art, food and transportation from the perspective of materials science. Students explore additional materials independently as well as practice the process of science through simple experimentation and data analysis. Special fee.

### **MS 762 - Electronic Materials Science**

**Credits:** 4.00

Provides students with a foundation in the materials science of modern electronic devices. Examples are taken primarily from the fields of semiconductor electronics and nanotechnology. Prereq: PHYS 408, MATH 527.

## Mathematics

### **MATH 301 - Elementary Math I**

**Credits:** 4.00

Beginning algebra including integer operations, solving linear equations, graphing linear functions, solving linear inequalities, systems of linear equations, polynomials, rational expressions and equations, and exponents and radicals. May not be taken for credit toward a bachelor's degree.

### **MATH 302 - Elementary Math II**

**Credits:** 4.00

Review of elementary algebra, exponents, polynomials, factoring, rational exponents, and absolute value. Solving linear and quadratic equations and inequalities; systems of equations; radical equations. Linear functions and related notions; quadratic functions. May not be taken for credit toward a bachelor's degree. Prereq: MATH 301 or the equivalent.

### **MATH 400 - Freshman Seminar**

**Credits:** 1.00

A seminar experience that presents a mathematical culture associated with first-year college mathematics, including the ideas of abstraction, theorem and proof, and that provides a perspective of the diversity of mathematical areas of research and their interrelationships. Emphasis is on reading and writing mathematics. Cr/F.

### **MATH 418 - Analysis and Applications of Functions**

**Credits:** 4.00

Analysis and applications of algebraic and transcendental functions, with special emphasis on exponential, logarithmic, and trigonometric functions. Graphical analysis. Written projects are required on some or all of the following topics: rates of change, optimization, logarithmic or exponential modeling, and trigonometric functions. Intended for students planning to take MATH 425. Prereq: MATH 302 or equivalent. Not offered for credit if credit is received for MATH 424 or MATH 425.

### **MATH 420 - Finite Mathematics**

**Credits:** 4.00

Topics selected from probability, systems of linear equations, matrix algebra, linear programming, mathematics of finance. Not a preparation for calculus. Prereq: MATH 302 or the equivalent. Not offered for credit to mathematics majors.

### **MATH 424A - Calculus for Social Sciences**

**Credits:** 4.00

Rational, exponential and logarithmic functions; associated derivatives and their applications; associated antiderivatives and their applications. Applications focus on contexts relevant to majors in the College of Liberal Arts and the Whittemore School of Business and Economics. Students wanting a two-semester calculus course are strongly advised to take MATH 425-426. Those students who successfully complete MATH 424A and subsequently wish to continue their study of mathematics with MATH 426 are encouraged to complete supplementary modules available from the Mathematics Center (MaC). Prereq: MATH 418 or equivalent. Not offered for credit to CEPS majors. Not offered for credit if credit is received for MATH 425.

### **MATH 424B - Calculus for Life Sciences**

**Credits:** 4.00

Rational, exponential and logarithmic functions; associated with derivatives and their applications;

associated with antiderivatives and their applications. Applications focus on contexts relevant to majors in the College of Life Sciences and Agriculture. Students wanting a two-semester calculus course are strongly advised to take MATH 425-426. Those students who successfully complete MATH 424B and subsequently wish to continue their study of mathematics with MATH 426 are encouraged to complete supplementary modules available from the Mathematics Center (MaC). Prereq: Math 418 or qualification through the placement evaluation. Students enrolling in MATH 424B are required to take a placement evaluation. Those unprepared for MATH 424B will be required to take MATH 418. Not offered for credit for CEPS majors. Not offered for credit if credit is received for MATH 425.

### **MATH 425 - Calculus I**

**Credits:** 4.00

Calculus of one variable covering limits, derivatives of algebraic, trigonometric, exponential, and logarithmic functions; applications include curve sketching, max-min problems, related rates, and volume and area problems. Prereq: completing MATH 418 with a grade of C or better or qualifying with the placement evaluation. (Not offered for credit if credit is received for MATH 424.)

### **MATH 425H - Honors/Calculus I**

**Credits:** 4.00

Calculus of one variable covering limits, derivatives of algebraic, trigonometric, exponential, and logarithmic functions; applications include curve sketching, max-min problems, related rates, and volume and area problems. Prereq: completing MATH 418 with a grade of C or better or qualifying with the placement evaluation. (Not offered for credit if credit is received for MATH 424.) Enrollment in MATH 425H requires concurrent enrollment in PHYS 407H.

### **MATH 426 - Calculus II**

**Credits:** 4.00

Second course in calculus of one argument, techniques and applications of integration, polar coordinates, and series. Prereq: MATH 425.

### **MATH 426H - Honors/Calculus II**

**Credits:** 4.00

Second course in calculus of one argument, techniques and applications of integration, polar coordinates, and series. Prereq: MATH 425. Enrollment in MATH 426H requires concurrent enrollment in PHYS 408H.

### **MATH 439 - Statistical Discovery for Everyone**

**Credits:** 4.00

Introduces the framework and concepts for learning with data. Emphasis on statistical discovery in everyday life and on drawing valid conclusion from data. Topics include: good and bad data, data ethics, how to conduct a valid survey, how to describe a population distribution; when to believe a poll; how to design an experimental study; how to avoid ambiguous results caused by "lurking" variables; how to make inference about an entire population based on a sample; how to describe relationships among variables; an understanding of the question of causation and chance in everyday life and in scientific studies, as well as the use and misuse of statistics in explaining what is statistical significance. This course has an activity-based learning component with lab exercises using statistical software for calculations without assuming a calculus background. The course may be used as a preparation for a more technical introductory statistics course. Not offered for credit if credit is received for ADM 430, ADMN 420, BIOL 528, EREC 525, HHS 540, MATH 539, MATH 644, PSYC 402, SOC 502. Science and Engineering students should take MATH 539 or MATH 644 according to their programs.

### **MATH 444 - Excursions in Quantitative Reasoning**

**Credits:** 4.00

Problems involving quantitative reasoning (most are nontraditional, some are fun, while others are

interdisciplinary) designed to inspire curiosity encourages students to formulate and evaluate questions, all the while slowly drawing them into the process of scholarly investigation. In this regard, in addition to traditional mathematics homework, students need to do research outside of class to write and present projects.

### **MATH 445 - Mathematics and Applications with MATLAB**

**Credits:** 4.00

Through the use of the MATLAB computation software, this course reinforces and builds on a student's mathematics foundation and previews more advanced mathematical concepts. The power and limitations of modern computational algorithms to solve real world problems are introduced and shown to influence nearly every aspect of modern society. The state-of-the-art computational tools afforded by MATLAB provide the student with a strategy for enhancing their knowledge and comprehension in subsequent Science, Engineering, or Technology themed courses. Prereq: MATH 418 or permission.

### **MATH 525 - Linearity I**

**Credits:** 6.00

Examines the fundamental role that linear models play in science and engineering; and the role of linearization in understanding nonlinear phenomena. Models are considered along several conceptual axes: discrete to continuous, one-dimensional to multidimensional, and static to dynamic, with an emphasis on the former. Mathematical areas of coverage include matrix algebra, concepts from calculus of several variables, difference equations, and linear transformations. Prereq: MATH 426, permission. Lab.

### **MATH 526 - Linearity II**

**Credits:** 6.00

Continuation of study of linear models and the process of linearization begun in MATH 525, with an emphasis on models of dynamic phenomena. Additional mathematical areas of coverage include differential equations, eigenvalue and eigenvector analysis, phase plane analysis, and additional concepts from vector calculus. Prereq: MATH 525, permission. Lab.

### **MATH 527 - Differential Equations with Linear Algebra**

**Credits:** 4.00

Fundamental methods of solving first-order equations, essentials of matrix algebra; higher-order linear equations, and linear systems; series solutions; Laplace transforms; selected applications. Prereq: MATH 426.

### **MATH 528 - Multidimensional Calculus**

**Credits:** 4.00

Partial differentiation; composite functions and chain rules; maximum and minimum; transformations; vector algebra; vector functions; gradient, divergence, and curl; curves and surfaces; multiple, line, and surface integrals; divergence, Green's and Stoke's theorem. Prereq: MATH 426.

### **MATH 531 - Mathematical Proof**

**Credits:** 4.00

Introduces reading and writing proofs in mathematics. The basic language of mathematics common to all branches of the subject, especially set theory and basic logic. Prereq: MATH 425; or permission. Writing intensive.

### **MATH 532 - Discrete Mathematics**

**Credits:** 4.00

Counting principles (including permutations, combinations, pigeonhole principle, inclusion-exclusion principle); big-O relation; graphs, trees, and related topics. Prereq: MATH 531.

### **MATH 539 - Introduction to Statistical Analysis**

**Credits:** 4.00

A first course introducing concepts of probability and scientific methods for data analysis. Exploratory data analysis, survey sampling, probability, discrete and continuous distributions, confidence intervals, hypothesis testing, comparing samples, linear regression, analysis of variance. Statistical software is used. Prereq: MATH 425; or permission. Offered primarily for mathematics majors at the sophomore level; engineering majors are urged to take MATH 644. Not offered for credit if credit is received for MATH 644.

### **MATH 545 - Intro to Linear Algebra**

**Credits:** 4.00

Designed to reinforce ideas seen throughout the mathematics curriculum. Centered on a study of vector spaces and linear systems, beginning with a brief focus of four systems of linear equations and progressing to a full discussion of linear transformation and vector spaces. The course includes a survey of properties of matrices, such as rank, kernel, eigenvalues, eigenvectors, and diagonalization. Prereq: MATH 426 Writing intensive. No credit offered if credit is received for MATH 645 or MATH 762.

### **MATH 601 - Exploring Mathematics for Teachers I**

**Credits:** 4.00

Provides prospective elementary teachers with the opportunity to explore and master concepts involving number systems and operations, data analysis and probability. Mathematical reasoning, problem solving, and the use of appropriate manipulatives and technology are integrated throughout the course. Readings, class discussions, and assignments focus on mathematics content as well as applicable theories of learning, curriculum resources, and state and national recommendations. The course models instructional techniques that can be adapted to the elementary curricula. Prereq: EDUC 500. (Not offered for credit if credit is received for MATH 621, 623, 721, and/or 723; not offered for credit to CEPS majors.)

### **MATH 602 - Exploring Mathematics for Teachers II**

**Credits:** 4.00

Provides prospective elementary teachers with the opportunity to explore and master concepts involving geometry, measurement, and algebraic thinking. Mathematical reasoning, problem solving, and the use of appropriate manipulatives and technology are integrated throughout the course. Readings, class discussions, and assignments focus on mathematics content as well as applicable theories of learning, curriculum resources, and state and national recommendations. The course models instructional techniques that can be adapted to the elementary curricula. Prereq: EDUC 500. (Not offered for credit if credit is received for MATH 621, 622, 721, and/or 722; not offered for credit to CEPS majors.)

### **MATH 619 - Historical Foundations of Mathematics**

**Credits:** 4.00

Historical development of number theory, geometry, probability, algebra, and analysis. Study of the significant mathematical contributions to these topics made by prominent mathematicians spanning several historical periods. Prereq: MATH 531 or 545.

### **MATH 621 - Number Systems for Teachers**

**Credits:** 4.00

Problem solving; counting and set concepts, number systems (whole numbers, integers, rational, and real numbers); number theory; estimation and mental calculation techniques; and applications requiring calculators and computers. Manipulatives and models are used in a lab setting to illustrate the concepts and properties of the number systems and teach number sense. (Not offered for credit to mathematics majors, except those in elementary or middle school options of the B.S. in Mathematic Education degree program.) Offered in alternate years in the fall semester. Prereq: permission.

### **MATH 622 - Geometry for Teachers**

**Credits:** 4.00

Properties of plane and space figures; tessellations; symmetry; LOGO computer language; nonstandard, English, and metric units of measure; area and perimeter; volume and surface area; estimations and approximations of measurements; constructions; congruence and similarity mappings; problem solving using geometric and algebraic skills, and applications requiring calculators and computers. Manipulatives and models are used in a lab setting to illustrate concepts and properties of geometry. (Not offered for credit to mathematics majors, except those in the elementary or middle school options of the B.S. in Mathematic Education degree program.) Offered in alternate years in the spring semester following MATH 621. Prereq: MATH 621 or permission.

**MATH 623 - Topics in Mathematics for Teachers****Credits:** 4.00

Logic (valid and invalid forms of reasoning); descriptive statistics (graphs, measures of central tendency, measures of variation); inferential statistics (samplings, distributions, measures of relative standing, simulations); probability (experimental, geometrical, and theoretical); permutations and combinations; probability simulations; problem solving using skills from statistics and probability; mathematical connections and communication review of computer software; and applications requiring calculators and computers. (Not offered for credit to mathematics majors, except those in the elementary or middle school options of the B.S. in Mathematics Education degree program.) Offered in alternate years in the fall semester following MATH 622. Prereq: MATH 621 of permission.

**MATH 624 - Analysis for Secondary School Teachers****Credits:** 4.00

Examines concepts from calculus and pre-calculus mathematics with an emphasis on connecting and logically refining the concepts of function, limit, sequences, series, and probability. Includes a deeper analysis of problems and topics drawn from secondary school mathematics with the kind of mathematical knowledge and sophistication that the student has gained from other collegiate mathematics courses. Proofs for many of the theorems that are typically introduced in a non-rigorous fashion in calculus are studied. Prereq: MATH 425, 545 or equivalent, EDUC 500 or by permission. Offered in alternate years in the spring semester following MATH 623.

**MATH 644 - Statistics for Engineers and Scientists****Credits:** 4.00

Introduces the design of controlled experiments and the collection and analysis of scientific data. Use of a statistical software package is an integral part of the course; interpreting and drawing conclusions from standard software output is emphasized. Graphical data analysis, statistical process control, regression and correlation, multifactor experimental designs, confidence intervals, hypothesis testing. Not offered for credit if credit is received for MATH 539. Prereq: MATH 426.

**MATH 645 - Linear Algebra for Applications****Credits:** 4.00

Fundamental notions of vector space theory, linear independence, basis, span, scalar product, orthogonal bases. Includes a survey of matrix algebra, solution of systems linear equations, rank, kernel, eigenvalues and eigenvectors, the LU- and QR-factorizations, and least squares approximation. Selected applications in mathematics, science, engineering and business. Prereq: MATH 426. (Not offered for credit if credit is received for MATH 545 or MATH 762.)

**MATH 646 - Introduction to Partial Differential Equations****Credits:** 4.00

Introduces the solution of partial differential equations. Models arising from initial-boundary-value problems of mathematical physics and Sturm-Liouville problems are examined; solution techniques include separation of variables, Bessel functions, series expansions by orthogonal functions, and numerical

methods. Prereq: CS 410 or 415; MATH 527; 528; 645; /or permission.

### **MATH 647 - Complex Analysis for Applications**

**Credits:** 4.00

Complex numbers, analytic functions, Cauchy-Riemann equations, conformal mapping, contour integration, Cauchy's integral formula, infinite series, residue calculus, Fourier and Laplace transforms. Prereq: MATH 528. (Not offered for credit if credit is received for MATH 788.)

### **MATH 656 - Introduction to Number Theory**

**Credits:** 4.00

Unique factorization, arithmetic functions, linear and quadratic congruence's, quadratic reciprocity law, quadratic forms, introduction to algebraic numbers. Prereq: MATH 531. Offered in alternate years.

### **MATH 657 - Geometry**

**Credits:** 4.00

Advanced approach to fundamental properties of Euclidean and other geometries. Prereq: MATH 531. Writing intensive.

### **MATH 658 - Topics in Geometry**

**Credits:** 4.00

Topics selected from among projective geometry, finite geometrics, convexity, transformational geometry, non-Euclidean geometry, and other areas of elementary geometry within the framework of modern mathematics. Prereq: MATH 657. Offered in alternate years.

### **MATH 696 - Independent Study**

**Credits:** 1.00 to 4.00

Individual projects of study developed by the student and a faculty sponsor. Intended for students with superior scholastic achievement. May be repeated up to 8 credits. May be taken as writing intensive. Prereq: a written proposal, including goals and assessment, endorsed by a faculty sponsor and approved by the department chairperson.

### **MATH 696W - Independent Study**

**Credits:** 1.00 to 4.00

Individual projects of study developed by the student and a faculty sponsor. Intended for students with superior scholastic achievement. May be repeated up to 8 credits. May be taken as writing intensive. Prereq: a written proposal, including goals and assessment, endorsed by a faculty sponsor and approved by the department chairperson. Writing intensive.

### **MATH 700 - Introduction to Mathematics Education**

**Credits:** 4.00

General background information about mathematics education, such as theories of learning and teaching mathematics, mathematics curricula, classroom management, and techniques for the teaching and learning of mathematics that are common to all levels of mathematics education K-12. Prereq: MATH 426 and EDUC 500; or permission.

### **MATH 701 - Exploring Mathematics for Teachers I**

**Credits:** 4.00

Provides prospective elementary teachers with the opportunity to explore and master concepts involving number systems and operations, data analysis and probability. Mathematical reasoning, problem solving and the use of appropriate manipulatives and technology are integrated throughout the course. Readings, class discussions, and assignments focus on mathematics content as well as applicable theories of learning, curriculum resources, and state and national recommendations. The course models instructional



techniques that can be adapted to the elementary curricula. Credit offered only to M.Ed. and M.A.T., certificate-only students, and in-service teachers. Prereq: EDUC 500. (Not offered for credit if credit is received for MATH 621, 623, 721, and/or 723.)

### **MATH 702 - Exploring Mathematics for Teachers II**

**Credits:** 4.00

Provides prospective elementary teachers with the opportunity to explore and master concepts involving geometry, measurement, and algebraic thinking. Mathematical reasoning, problem solving and the use of appropriate manipulatives and technology are integrated throughout the course. Readings, class discussions, and assignments will focus on mathematics content as well as applicable theories of learning, curriculum resources, and state and national recommendations. The course models instructional techniques that can be adapted to the elementary curricula. Credit offered only to M.Ed. and M.A.T., certificate-only students, and in-service teachers. Prereq: EDUC 500. (Not offered for credit if credit is received for MATH 621, 622, 721, and/or 722.)

### **MATH 703 - Teaching of Mathematics, K-6**

**Credits:** 4.00

Methods of teaching mathematics at the elementary school level; uses of technology, manipulatives, models, and diagrams; developing unit and lesson plans; assessment; instructional formats; teaching reading and writing in mathematics. Prereq: MATH 621 (or MATH 601, MATH 701, MATH 721) and MATH 700; or permission.

### **MATH 708 - Teaching Middle School Mathematics**

**Credits:** 4.00

Methods of teaching mathematics at the middle school level; uses of technology, manipulatives, models, and diagrams; developing unit and lesson plans; assessment; instructional formats; teaching reading and writing in mathematics. Prereq: MATH 700; or permission. Offered in alternate years in the spring semester.

### **MATH 709 - Teaching of Mathematics, 7-12**

**Credits:** 4.00

Methods of teaching content at the secondary school level; uses of technology, manipulatives, models, and diagrams; developing unit and lesson plans; assessment; instructional formats; teaching reading and writing in mathematics. Prereq: MATH 700; or permission. Offered in alternate years in the spring semester.

### **MATH 721 - Number Systems for Teachers**

**Credits:** 4.00

Problem solving; counting and set concepts, number systems (whole numbers, integers, rational, and real numbers); number theory; estimation and mental calculation techniques; and applications requiring calculators and computers. Manipulatives and models are used in a lab setting to illustrate the concepts and properties of the number systems. Credit offered only to M.Ed. and M.A.T., certificate-only students, and in-service teachers. Prereq: permission. Offered in alternate years in the fall semester.

### **MATH 722 - Geometry for Teachers**

**Credits:** 4.00

Properties of two- and three-dimensional figures; tessellations; symmetry; nonstandard, English, and metric units of measure; area and perimeter; volume and surface area; estimations and approximations of measurements; constructions; congruence and similarity mappings; applications requiring calculators and computers. Manipulatives and models are used in a lab setting to illustrate concepts and properties of geometry. Credit offered only to M.Ed. and M.A.T., certificate-only students, and in-service teachers. Prereq: 721 or permission. Offered in alternate years in the spring semester following MATH 721.

### **MATH 723 - Topics in Mathematics for Teachers**

**Credits:** 4.00

Descriptive statistics; inferential statistics; simulations; probability (experimental, geometrical, and theoretical); permutations and combinations; problem solving using skills from statistics and probability; applications requiring calculators and computers. Credit offered only to M.Ed. and M.A.T., certificate-only students, and in-service teachers. Prereq: 721 or permission. Offered in alternate years in the fall semester following MATH 722.

### **MATH 736 - Advanced Statistical Methods for Research**

**Credits:** 4.00

An introduction to multivariate statistical methods, including principal components, discriminant analysis, cluster analysis, factor analysis, multidimensional scaling, and MANOVA. Additional topics include generalized linear models, general additive models, depending on the interests of class participants. The use of statistical software, such as JMP, S PLUS, or R, is fully integrated into the course. Prereq: MATH 739.

### **MATH 737 - Statistical Methods for Quality Improvement**

**Credits:** 4.00

Introduces scientific data collection and analysis with an emphasis on industrial and service provider applications. Topics include: descriptive and graphical statistical methods; confidence intervals and hypothesis testing; regression; ANOVA; statistical process control (SPC); failure modes and effects analysis (FMEA); Six-Sigma concepts and methods; introduction to Reliability; quality tools, MSA, and process capability studies; introduction to Lean methodology, such as 5S, Kaizen, and VSM. Use of a software package is an integral part of the course. Prereq: MATH 644.

### **MATH 739 - Applied Regression Analysis**

**Credits:** 4.00

Statistical methods for the analysis of relationships between response and input variables: simple linear regression, multiple regression analysis, residual analysis and model selection, multi-collinearity, nonlinear curve fitting, categorical predictors, analysis of variance, analysis of covariance, examination of validity of underlying assumptions, logistic regression analysis. Emphasizes real applications with use of statistical software. Prereq: MATH 539 (or 644). Writing intensive.

### **MATH 740 - Design of Experiments I**

**Credits:** 4.00

Course in design of experiments with applications to quality improvement in industrial manufacturing, engineering research and development, or research in physical and biological sciences. Experimental factor identification, statistical analysis and modeling of experimental results, randomization and blocking, full factorial designs, random and mixed effects models, replication and sub-sampling strategies, fractional factorial designs, response surface methods, mixture designs, and screening designs. Focuses on various treatment structures for designed experimentation and the associated statistical analyses. Use of statistical software. Prereq: MATH 539 (or 644); or permission.

### **MATH 741 - Survival Analysis**

**Credits:** 4.00

Explorations of models and data-analytic methods used in medical, biological, and reliability studies. Event-time data, censored data, reliability models and methods, Kaplan-Meier estimator, proportional hazards, Poisson models, loglinear models. The use of statistical software, such as SAS, JMP, or R, is fully integrated into the course. Prereq: MATH 739. (Offered in alternate years.)

### **MATH 743 - Time Series Analysis**

**Credits:** 4.00

An introduction to univariate time series models and associated methods of data analysis and inference in the time domain and frequency domain. Topics include: auto regressive (AR), moving average (MA), ARMA and ARIMA processes, stationary and non-stationary processes, seasonal ARIMA processes, auto-correlation and partial auto-correlation functions, identification of models, estimation of parameters, diagnostic checking of fitted models, forecasting, spectral density function, periodogram and discrete Fournier transform, linear filters, parametric spectral estimation, dynamic Fournier analysis. Additional topics may include wavelets and long memory processes (FARIMA) and GARCH Models. The use of statistical software, such as JMP, or R, is fully integrated into the course. Prereq: MATH 739. Offered in alternate years in the spring semester.

### **MATH 744 - Design of Experiments II**

**Credits:** 4.00

A second course in design of experiments, with applications in quality improvement and industrial manufacturing, engineering research and development, research in physical and biological sciences. Covers experimental design strategies and issues that are often encountered in practice: complete and incomplete blocking, partially balanced incomplete blocking (PBIB), partial confounding, intra and inter block information, split plotting and strip plotting, repeated measures, crossover designs, Latin squares and rectangles, Youden squares, crossed and nested treatment structures, variance components, mixed effects models, analysis of covariance, optimizations, space filling designs, and modern screening design strategies. Prereq: MATH 740; or permission.

### **MATH 745 - Foundations of Applied Mathematics I**

**Credits:** 4.00

An introduction to Partial Differential Equations (PDEs) and associated mathematical methods and the analytical foundation for applied mathematics. Topics include: PDE classification, superposition, separation of variables, orthonormal functions, completeness, convergence, Fourier Series, Sturm-Liouville eigenvalue problems, and eigenfunctions. Methods are introduced for the analysis and solution of boundary value problems, in particular, the Heat, Wave, and Laplace equations. Prereq: MATH 527 and 528; or equivalent.

### **MATH 746 - Foundations of Applied Mathematics II**

**Credits:** 4.00

An introduction to special functions, asymptotic analysis, and transform methods applied to partial differential equations. Topics include: Boundary value problems in cylindrical coordinates, the Bessel equation and Bessel functions, Fourier-Bessel expansions in cylindrically symmetric spatial domains, the Fourier Transform, the Hilbert Transform, Cosine and Sine Transforms, problems on semi-infinite intervals, and Asymptotic Analysis. Prereq: MATH 527 and MATH 528; or equivalent.

### **MATH 747 - Introduction to Nonlinear Dynamics and Chaos**

**Credits:** 4.00

The mathematics of chaos and nonlinear dynamics. Topics include linear and nonlinear systems of ordinary differential equations, discrete maps, chaos, phase plane analysis, bifurcations and computer simulations. Prereq: MATH 527, 528, and 645.

### **MATH 753 - Introduction to Numerical Methods I**

**Credits:** 4.00

Introduces mathematical algorithms and methods of approximation. Topics include a wide survey of approximation methods. Methods examined include polynomial interpolation, root finding, numerical linear algebra, numerical integration, and the approximation of differential equations. Included in each case is a study of the accuracy and stability of a given technique, as well as its efficiency. Prereq: MATH 426; CS 410.

### **MATH #754 - Introduction to Numerical Methods II**

**Credits:** 4.00

Introduces the tools and methodology of scientific computing through the examination of interdisciplinary case studies from science and engineering. Emphasizes numerical approaches to solving linear systems, eigenvalue-eigenvector Problems and ordinary and partial differential equations problems are solved on various hardware platforms using a combination of application software and data visualization packages. Prereq: CS 410 or 415; MATH 527, 645, 753; or permission.

**MATH 755 - Probability with Applications****Credits:** 4.00

Introduces the theory, methods, and applications of randomness and random processes. Probability concepts, random variable, expectation, discrete and continuous probability distributions, joint distributions, conditional distributions; moment-generating functions, convergence of random variables. Prereq: MATH 528 and 539 (or 644).

**MATH 756 - Principles of Statistical Inference****Credits:** 4.00

Introduces the basic principles and methods of statistical estimation and model fitting. One- and two-sample procedures, consistency and efficiency, likelihood methods, confidence regions, significance testing, Bayesian inference, nonparametric and re-sampling methods, decision theory. Prereq: MATH 755; or permission.

**MATH 761 - Abstract Algebra****Credits:** 4.00

Basic properties of groups, rings, fields, and their homomorphism's. Prereq: MATH 531. Writing intensive.

**MATH 762 - Linear Algebra****Credits:** 4.00

Vector spaces over arbitrary fields, linear transformations and their relationship with matrices, eigenvalues and eigenvectors, the rational and Jordan canonical forms for linear transformations. Prereq: MATH 761

**MATH 767 - One-Dimensional Real Analysis****Credits:** 4.00

Theory of limits, continuity, differentiability, and integrability. Prereq: MATH 531. Writing intensive.

**MATH 776 - Logic****Credits:** 4.00

Examination of the basic notions of soundness and completeness, first for sentential and then for propositional logic. Turning to the question of decision procedures for logical formulae, the concept of recursive function, which emerges in the work of Church and Turing, provides the essential link between logic and theory of computation. The course culminates with Godel's Incompleteness Theorems, which demonstrate the intrinsic limitations of the logical method. Prereq: MATH 531. Offered in alternate years.

**MATH 783 - Set Theory****Credits:** 4.00

Axiomatic set theory, including its history. Cantor's theory of infinite cardinal and ordinal numbers seemed laden with contradictions and paradoxes. A satisfactory treatment of these difficulties came with the axiomatic set theory of Zermelo and Fraenkel. This course develops the Zermelo-Fraenkel axioms and examines cardinal and ordinal arithmetic in the context they provide. The course then investigates the consequences of various additional axioms extending Zermelo-Fraenkel, such as the Axiom of Choice, the Continuum Hypothesis, large cardinal axioms of determinacy. Prereq: MATH 531. Offered in alternate years.

**MATH 784 - Topology****Credits:** 4.00

Open sets, closure, base, and continuous functions; connectedness, compactness, separation axioms, and metrizability. Prereq: MATH 531. Writing intensive.

**MATH 788 - Complex Analysis****Credits:** 4.00

Complex functions, sequences, limits, differentiation and Cauchy-Riemann equations, elementary functions, Cauchy's theorem and formula, Taylor's and Laurent's series, residues, conformal mapping. Prereq: MATH 767. Not offered for credit if credit is received for MATH 647.

**MATH 796 - Topics****Credits:** 1.00 to 4.00

New or specialized courses not covered in regular course offerings. Prereq: permission of instructor. May be repeated.

**MATH 797 - Senior Seminar****Credits:** 4.00

Exploration of mathematical topics beyond the student's previous coursework in the seminar format. The course focus is on independent research, collaborative work and classroom engagement; oral presentations and written work are required. Prereq: senior standing.

**MATH 798 - Senior Project****Credits:** 4.00

Students work either individually or as a group under the direction of a faculty sponsor to plan and carry out an independent research project resulting in a written report and presentation to the department. Prereq: Senior standing in the department; a written proposal approved by a faculty sponsor and by the department chairperson (or designee).

**MATH 799 - Senior Thesis****Credits:** 2.00 or 4.00

Students work under the direction of a faculty sponsor to plan and carry out independent research resulting in a written thesis. Required for honors-in-major. Prereq: senior standing; a written proposal endorsed by a faculty sponsor and approved by the department chairperson (or designee). May be repeated up to 4 credits. Writing intensive.

## Mechanical Engineering

### **ME 441 - Introduction to Engineering Design and Solid Modeling**

**Credits:** 4.00

Why are some products better than others? What is the definition of "better"? This course uses an inquiry-guided approach to explore the product design process via team design projects and laboratory exercises. Everyday products are examined from historical, societal, design, safety and manufacturing perspectives. Topics include ideation, sketching, design constraints, solid modeling, decision making, statistical quality control, manufacturing methods and engineering analysis. Students develop an appreciation for good design and the ability to communicate design ideas via 3-D solid models, written and oral reports. Writing intensive.

### **ME 442 - Manufacturing Engineering and Design**

**Credits:** 4.00

Introduces basic manufacturing processes associated with mechanical, electrical, and electronic systems through classroom lectures, seminars, laboratory exercises, field trips, and student projects. Prereq: ME 441.

### **ME 503 - Thermodynamics**

**Credits:** 3.00

Properties of a pure substance, work and heat, laws of thermodynamics, entropy, thermodynamic relations, cycles. Prereq: PHYS 407. Pre- or Coreq: MATH 528.

### **ME 523 - Introduction to Statics and Dynamics**

**Credits:** 3.00

Overview of statics and dynamics applying concepts to particles then to rigid bodies. Topics include two- and three-dimensional force systems; laws of equilibrium; analyses of trusses and frames; friction; relative motion; impulse-momentum principles; work-energy relationships. Prereq: MATH 426; PHYS 407. Not for ME majors.

### **ME 525 - Statics**

**Credits:** 3.00

Introduces statics. Two- and three-dimensional force systems, the concept of equilibrium, analysis of trusses and frames, centroids, bending moment and shear force diagrams, and friction. Prereq: PHYS 407. Pre- or Coreq: MATH 426. Writing intensive.

**Co-requisites:**

### **ME 526 - Mechanics of Materials**

**Credits:** 3.00

Introduces strength of materials. Analysis of members under torsion, axial, shear and bending stresses, superposition of stresses, stability of columns. Prereq: ME 525. Writing intensive.

### **ME 542 - Mechanical Dissection and Design Analysis**

**Credits:** 4.00

Engineering design and analysis of mechanical systems through in-depth dissection experiences. Relationships between functional specifications and design solutions, role of engineering analysis in design, and the importance of manufacturing constraints. Lab experiences include team dissections of mechanical artifacts, e.g., fishing reel, bike, electric drill. Introduces basic metal working operations. Prereq: ME 441. Coreq: ME 525 and permission. No credit if credit received for ME 442.

**ME 561 - Introduction to Materials Science****Credits:** 4.00

The concepts of materials science and the relation of structure of material properties. Atomic structure, bonding material transport, mechanical properties of materials, solidification, phase diagrams, solid state transformations, and corrosion and oxidation. Laboratory exercises are carried out to demonstrate the basic concepts of the course. Prereq: one semester of introductory chemistry with a lab or equivalent. Writing intensive.

**ME 603 - Heat Transfer****Credits:** 3.00

Analysis of phenomena; steady-state and transient conduction, radiation, and convection; engineering applications. Prereq: MATH 527, ME 608. Pre- or Coreq: CS 410.

**ME 608 - Fluid Dynamics****Credits:** 3.00

Dynamics and thermodynamics of compressible and incompressible fluid flow; behavior of fluids as expressed by hydrostatic, continuity, momentum, and energy equations. Prereq: ME 503.

**Co-requisites:** ME 627**ME 627 - Mechanics III****Credits:** 3.00

Introduction to particle and rigid body dynamics. Rectilinear and curvilinear motion, translation and rotation, momentum and impulse principles, and work-energy relationships. Prereq: ME 525 or permission. Writing intensive.

**ME 629 - Kinematics and Dynamics of Machines****Credits:** 3.00

Kinematic and dynamic analysis of mechanisms and their synthesis. Applications to reciprocating engines; balancing and cam dynamics are developed. Prereq: ME 627.

**ME 643 - Elements of Design****Credits:** 3.00

Analysis, synthesis, and design of machine elements and systems. Development of engineering judgment; selection of materials stress and failure analysis; kinematic arrangement design for finite and infinite life. Open-ended design problems unify course topics. Prereq: ME 526. Writing intensive.

**ME 646 - Experimental Measurement and Data Analysis****Credits:** 4.00

Basic and advanced techniques of engineering and scientific parameter measurement including statistical data and error analysis, curve fitting, calibration and application of transducers, and technical writing. Laboratory experiments draw on concepts from mechanics, thermodynamics, and fluid mechanics. Prereq: ME 526; 608. Writing intensive.

**ME 670 - Systems Modeling, Simulation, and Control****Credits:** 4.00

Lumped parameter models for mechanical, electrical, thermal, fluid, and mixed systems. Matrix representation, eigenvalues, eigenvectors, time domain solutions, frequency response plots, and computer simulations are used to explore system response. Design of system for desired responses. Introduces feedback control, stability, and performance criteria. Prereq: ECE 537, ME 608, MATH 527. Writing intensive.

**ME 695 - Special Topics**

**Credits:** 2.00 to 4.00

Course topics not offered in other courses. May be repeated for credit. Lab. Prereq: permission.

### **ME 696 - Projects**

**Credits:** 1.00 to 4.00

Analytical, experimental, or design projects undertaken individually or in teams under faculty guidance. May be repeated for credit.

### **ME 699 - Engineering Internship**

**Credits:** 1.00

Internship experience provides on-the-job reinforcement of academic programs in mechanical engineering. Contact the Mechanical Engineering department office for guidelines. May be repeated to a maximum of 3 credits. Prereq: appropriate class standing in major, 2.5 grade point average, and permission. Cr/F.

### **ME 705 - Thermal System Analysis and Design**

**Credits:** 4.00

Engineering design of thermal systems that involve real problems and analysis of performance of the design. Design criteria include function, performance, optimization, economy, safety, and others as appropriate for the system. Required for ME seniors. Prereq: ME 603. Writing intensive.

### **ME 707 - Analytical Fluid Dynamics**

**Credits:** 4.00

Kinematics of flow; constitutive relationships; development of the Navier-Stokes equations; vorticity theorems; potential flow. Prereq: ME 608.

### **ME 709 - Computational Fluid Dynamics**

**Credits:** 3.00

Review of matrix methods; basics of finite differences, basics of spectral methods, stability, accuracy, Navier-Stokes solvers. Prereq: ME 603 or permission.

### **ME 712 - Waves in Fluids**

**Credits:** 3.00

Linear and nonlinear dynamics of hyperbolic and dispersive wave systems with application to acoustic waves, surface and internal gravity waves, Rossby waves, and capillary waves. Key physical concepts include wave-generation mechanisms, wavelength and amplitude dispersion, group velocity and energy propagation, steady streaming, and mode interactions. Prereq: ME 608 or equivalent.

### **ME 724 - Vibration Theory and Applications**

**Credits:** 4.00

Discrete vibrating systems. Linear system concepts; single-degree-of-freedom system with general excitation. Matrix theory and eigenvalue problems. Many degrees of freedom, normal mode theory for free and forced vibration. Numerical methods; introduction to continuous systems; applications to structural and mechanical systems. Prereq: ME 526; 627 or permission.

### **ME 727 - Advanced Mechanics of Solids**

**Credits:** 4.00

Stress, strain, stress-strain relations, anisotropic behavior, introduction to elasticity, plane stress/strain, bending and torsion of members with general cross-sections introduction to thin plates and shells, energy methods. Prereq: ME 526 or permission.

### **ME 730 - Mechanical Behavior of Materials**

**Credits:** 4.00



Elastic and inelastic behavior of materials in terms of micro- and macro-mechanics. Stress, strain, and constitutive relations related to recent developments in dislocation theory and other phenomena on the atomic scale and to the continuum mechanics on the macroscopic scale. Elasticity, plasticity, viscoelasticity, creep, fracture, and damping. Anisotropic and heterogeneous materials. Prereq: ME 526; 561 or permission.

### **ME 731 - Fracture and Fatigue Engineering Material**

**Credits:** 4.00

Reviews fundamentals of linear elastic fracture mechanics and strain energy release rate analyses. Discusses basic methods of design for prevention of failure by fast fracture and fatigue for metals, ceramics, and polymers with attention to the effect of material properties and subsequent property modification on each design approach. Prereq: ME 526; 561 or permission.

### **ME 735 - Mechanics of Composite Materials**

**Credits:** 4.00

Classification of composites. Anisotropy of composite materials. Micromechanical predictions of elastic and hygrothermal properties. Strength and failure of composite materials. Analysis of laminates. Experimental methods for characterization of composites. Prereq: ME 526; ME 603; or permission.

### **ME 743 - Satellite Systems, Dynamics, and Control**

**Credits:** 3.00

General satellite systems with emphasis on spacecraft dynamics and control. Topics include general satellite information such as types of satellites, missions, and orbits, as well as satellite subsystems. Basic spacecraft dynamics and orbital mechanics topics are covered. Advanced topics include attitude and orbit estimation, and automatic attitude control. Prereq: ME 670 or permission.

### **ME 744 - Corrosion**

**Credits:** 4.00

The course is split into three parts. The first part reviews and develops basic concepts of electro-chemistry, kinetics, and measurement methods. The second part covers the details of specific corrosion mechanisms and phenomena including passivity, galvanic corrosion, concentration cell corrosion, pitting and crevice corrosion, and environmentally induced cracking. The third part focuses on the effects of metallurgical structure on corrosion, corrosion in selected environments, corrosion prevention methods, and materials selection and design. Prereq: CHEM 405 or 403; ME 561 or permission. Lab. (Also listed as OE 744.)

### **ME 747 - Experimental Measurement and Modeling of Complex Systems**

**Credits:** 4.00

Experimental measurements for evaluation, design, and control of mechanical, electrical, and thermal/fluid phenomena. Emphasizes the dynamic response of both sensors and systems and the interactions between physical processes. Experimental examples are drawn from mechanics, material science, thermal-fluid science and controls. Prereq: ME 561; 646; 670. Writing intensive.

### **ME 755 - Senior Design Project I**

**Credits:** 2.00

Part I of this two-part sequence emphasizes problem definition, analysis, development of alternative concepts, decision-making processes, synthesis of an optimum solution and the development of a conceptual design. Lectures on these and other topics are combined with seminars given by professionals from industry, government, and academia. Related topics include ISO9000 quality systems, engineering management, design review process, engineering economics, team building and communications. Students are organized into project teams to develop a conceptual design. Formal design reviews are conducted. A formal proposal documents the semester's work. Prereq: Senior standing in ME. Lab. Writing intensive.

## **ME 756 - Senior Design Project II**

**Credits:** 2.00

Continuation of Senior Design Project I, in which the proposal submitted in the previous course is developed into a prototype system. Part II emphasizes the development, assembly, testing and evaluation of the system designed in Part I. Lectures and seminars focus on the prototype development process, design verification and industry practices. A formal report documents the semester's work. Prereq: ME 755. Writing intensive.

## **ME 757 - Coastal Engineering and Processes**

**Credits:** 3.00

Introduces small amplitude and finite amplitude wave theories. Wave forecasting by significant wave method and wave spectrum method. Coastal processes and shoreline protection. Wave forces and wave structure interaction. Introduces mathematical and physical modeling. Prereq: ME 608 or permission. (Also offered as CIE 757 and OE 757.)

## **ME 760 - Physical Metallurgy I**

**Credits:** 4.00

Introduction to physical metallurgy; dislocations; thermodynamics of materials, diffusion, phase transformations, and strengthening mechanisms in solids. Prereq: ME 561 or permission. Lab.

## **ME 761 - Diffraction and Imaging Methods in Materials Science**

**Credits:** 4.00

Introduces x-ray diffraction and electron microscopy. Basic crystallography, reciprocal lattice, x-ray and electron diffraction, x-ray methods, transmission and scanning electron microscopy. Prereq: CHEM 403; PHYS 408 or permission. Lab.

## **ME 763 - Thin Film Science and Technology**

**Credits:** 4.00

The processing, structure, and properties of thin solid films. Vacuum technology, deposition methods, film formation mechanisms, characterization of thin films, and thin-film reactions. Mechanical, electrical and optical properties of thin films. Prereq: ME 561 or permission.

## **ME 770 - Design with Microprocessors**

**Credits:** 4.00

Basic operation of microprocessors and micro-controllers is explained, and interfacing these devices to sensors, displays and mechanical systems is explored. Topics include: number systems, architecture, registers, memory mapping, interrupts and interfacing for system design. Methods of programming and interfacing with mechanical/electrical systems are covered in class, and then implemented in lab. Prereq: ECE 537 or permission. Lab.

## **ME 772 - Control Systems**

**Credits:** 4.00

Development of advanced control system design concepts such as Nyquist analysis, lead-lag compensation, state feedback, parameter sensitivity, controllability, observability, introduction to non-linear and modern control. Includes interactive computer-aided design and real-time digital control. Prereq: ME 747 or permission. (Also offered as ECE 772.) Lab.

## **ME 773 - Electromechanical Analysis and Design**

**Credits:** 4.00

Analysis and design of electromechanical systems using lumped parameter models and magnetic finite element analysis (FEA). Electrostatic and magnetic field equations are discussed and used to derive

magnetic and electric lumped model elements. Brushless dc motor is analyzed using lumped models and FEA. Various drive types are discussed and the motor system analyzed to obtain torque-speed curves. Design principles are given and utilized in a design project. Prereq: ME 670 or permission.

### **ME 776 - Product Design**

**Credits:** 4.00

Provides a thorough overview of the steps in the engineering design process. Topics include product planning, need identification, specification formulation, benchmarking, concept generation and selection, design for manufacture, assembly, and environment. Students develop a product as part of a team. Prereq: ME 441 or equivalent CAD experience; ME 542 (Mechanical Dissection) or ME 442 (Manufacturing).

### **ME 777 - Computer Aided Engineering**

**Credits:** 4.00

In this course, modules of Solid Works (beyond its basic solid modeling capabilities) and other software is used to demonstrate how computer based tools can be used in engineering practice, in particular design analysis and optimization. Emphasis placed on using knowledge from past engineering courses to obtain theoretical calculations to compare with the results from the computer software package. Prereq: ME 526 Strength of Materials; ME 627 Mechanics III; ME 603 Heat Transfer; and ME 608 Fluid Dynamics (or equivalent).

### **ME 785 - Solid Mechanics in Manufacturing**

**Credits:** 4.00

Characterization of material properties are studied with emphasis on plastic deformation. Also, numerical approaches to solve for the forces, stresses, and strains in manufacturing processes are covered. In particular, two prominent mass production manufacturing areas, metal forming and cutting, are examined. Prereq: ME 561; ME 627.

### **ME 786 - Introduction to Finite Element Analysis**

**Credits:** 4.00

Topics include basic matrix theory, potential energy approach, direct stiffness method, calculus of variations, development of finite element theory, and modeling techniques. Applications in solid mechanics, heat transfer, fluids, and electromagnetic devices, via both commercially available codes and student-written codes. Prereq: ME 526 or permission. Lab.

### **ME 795 - Special Topics**

**Credits:** 1.00 to 4.00

New or specialized courses and/or independent study. May be repeated for credit.

### **ME 797 - Honors Seminar**

**Credits:** 1.00

Course enrichment and/or additional independent study in subject matter pertaining to a 600- or 700-level ME course other than ME 695, 696, 697, or 795.

## **Military Science**

### **MILT 401 - Leadership Laboratory I**

**Credits:**

Open only to students taking another Military Science class, with different roles offered for students at different levels of the program. Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training programs. Students develop, practice and refine leadership skills by serving and being evaluated in a variety of supervisory positions. Specific events include a team-building leader reaction course, orientation to military weapons, basic tactical movement, and land navigation. Cr/F.

### **MILT 402 - Leadership Laboratory II**

**Credits:**

Open only to students taking another Military Science class, with different roles offered for students at different levels of the program. Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training programs. Students develop, practice and refine leadership skills by serving and being evaluated in a variety of supervisory positions. Specific events include basic marksmanship, advanced tactical movement, orienteering and land navigation. Cr/F.

### **MILT 413 - Introduction to ROTC**

**Credits:** 2.00

Make your first new peer group at college one committed to performing well and enjoying the experience. Increase self-confidence through team study and activities in physical fitness, rappelling, first aid, basic marksmanship, and basic drill. Learn fundamental concepts of leadership in both classroom and outdoor laboratory environments. One hour and a required leadership lab (MILT 401L) plus optional (mandatory for scholarship cadets) participation in three one-hour sessions of physical fitness per week. Participation in one weekend exercise is also required for all cadets. Open to all college students, no military commitment required.

### **MILT 414 - Introduction to ROTC II**

**Credits:** 2.00

Learn and apply principles of effective leadership. Reinforce self-confidence through participation in physically and mentally challenging exercises with other ROTC cadets. Continued activities in basic drill, physical fitness, rappelling, first aid, and basic marksmanship. Develop communication skills to improve individual performance and group interaction. One hour and a required leadership lab (MILT 402L) plus optional (mandatory for scholarship cadets) participation in three one-hour sessions for physical fitness per week. Participation in one weekend exercise is also required for all cadets. Open to all college students; no military commitment required.

### **MILT 501 - Self/Team Development I**

**Credits:** 2.00

Learn and apply ethics-based leadership skills that develop individual abilities and contribute to the building of effective teams of people. Develop skills in oral presentations, planning of events, advanced first aid, physical fitness, and land navigation. Learn techniques for training others as an aspect of continued leadership development. Two hours and a required leadership lab (MILT 401L), plus optional participation (mandatory for scholarship cadets) in three one-hour sessions of physical fitness per week. Participation in one weekend exercise is required. Additional weekend exercises may be offered for optional participation. Open to all college students, no military commitment required.

**Co-requisites:** MILT 401

### **MILT 502 - Individual/Team Military Tactics**

**Credits:** 2.00

Introduces individual and team aspects of military tactics in small unit operations. Includes use of radio communications, making safety assessments, movement techniques, planning for team safety/security, and methods of pre-execution checks. Practical exercises with other ROTC students. Learn techniques for training others as an aspect of continued leadership development. Two hours and a required leadership lab (MILT 402L), plus optional participation (mandatory for scholarship cadets) in three one-hour sessions of physical fitness per week. Participation in one weekend exercise is required. Additional weekend exercises may be offered for optional participation. Open to all college students, no military commitment required.

**Co-requisites:** MILT 402

### **MILT 550 - Camp Challenge**

**Credits:** 4.00

Five-week leadership training course at Fort Knox, Kentucky during the summer that exposes students to intensive leadership evaluation and development. Students learn fundamental military skills such as land navigation using a map and compass, principles of leadership, first aid, drill and ceremony, team building exercises, etc. in preparation for future training as ROTC cadets. Students gain professional knowledge in management and organization and experience group interaction and interpersonal communications through total immersion in a military type environment. Open only to students who have not completed all of the following: MILT 401, 402, 501, and 502. Airfare, lodging, and expenses are paid by the Army. Student incurs no military obligation; program offers opportunities to earn a two-year scholarship and qualifies students to take MILT 601.

### **MILT 601 - Leading Small Organizations I**

**Credits:** 4.00

Series of practical opportunities to lead small groups, receive personal assessments and encouragement, and lead again in situations of increasing complexity. Plan and conduct training for other ROTC students in small unit offensive and defensive operations. Three hours and required leadership lab (MILT 401L) plus required participation in three one-hour sessions of physical fitness per week. Participation in one weekend exercise is also required. Other weekend exercises are offered for optional participation. Prereq: Cadet completes MILT 550 or completes MILT 413, 414, 501, and 502.

### **MILT 602 - Leading Small Organizations II**

**Credits:** 4.00

Continues the methodology from MILT 601. Analyze tasks; prepare written and oral guidance for team members to accomplish tasks. Delegate tasks and supervise. Plan for and adapt to the unexpected in organizations under stress. Examine and apply lessons from leadership studies. Examine importance of ethical decision making in setting a positive climate that enhances team performance. Three hours and a required leadership lab (MILT 402L) plus required participation in three one-hour sessions for physical fitness per week. Participation in one weekend exercise is also required, and one or two more weekend exercises may be offered for optional participation.

### **MILT 611 - Seminar on Leadership and Management I**

**Credits:** 4.00

Plan, conduct and evaluate activities of the ROTC cadet organization. Articulate goals and put plans into action to attain them. Assess organizational cohesion and develop strategies to improve it. Develop confidence in skills to lead people and manage resources. Learn/apply various Army policies and programs in this effort. Three hours and a required leadership lab (MILT 401L) plus required participation in three one-hour sessions for physical fitness per week. Participation in one weekend exercise is also required, and one or two more weekend exercises may be offered for optional participation. Prereq: MILT 601 and MILT 602.

**MILT 612 - Transition to Lieutenant****Credits:** 4.00

Continues the methodology from MILT 611. Identify and resolve ethical dilemmas. Refine counseling and motivating techniques. Examine aspects of tradition and law as related to leading as an officer in the Army. Prepare for a future as a successful Army lieutenant. Three hours and a required leadership lab (MILT 402L) plus required participation in three one-hour sessions for physical fitness per week. Participation in one weekend exercise is also required, and one or two more weekend exercises may be offered for optional participation. Prereq: MILT 611.

**MILT 695 - Officer Internship****Credits:** 1.00 to 4.00

Experiential learning through fieldwork in a military-type unit. Written analysis required. Prereq: MILT 611 (may be taken concurrently). By permission only. Coreq: MILT 401. May be taken up to a total of 8 credits.

## Music

### **MUSI 401 - Introduction to Music**

**Credits:** 4.00

Fundamental approach to perceptive listening based on a detailed study of several masterpieces representing different periods and forms. Historical perspective, but main emphasis is on confronting significant works of musical art on their own terms. Some participation in musical life of the University required. Does not fulfill a major requirement.

### **MUSI 401H - Honors/Introduction to Music**

**Credits:** 4.00

Fundamental approach to perceptive listening based on a detailed study of several masterpieces representing different periods and forms. Historical perspective, but main emphasis is on confronting significant works of musical art on their own terms. Some participation in musical life of the University required. Does not fulfill a major requirement.

### **MUSI 402 - Survey of Music History**

**Credits:** 4.00

The study of the development of musical styles and idioms in the context of selected historical and cultural aspects of Western civilization.

### **MUSI 402H - Honors/Survey of Music History**

**Credits:** 4.00

The study of the development of musical styles and idioms in the context of selected historical and cultural aspects of Western civilization.

### **MUSI 411 - Fundamentals of Music Theory**

**Credits:** 4.00

Elements of music theory for the non-music major; principles of musical structure, analysis, elementary written counterpoint and harmony, and ear training. May not be counted for credit toward a music major. Prereq: ability to read music and permission of the instructor.

### **MUSI 412 - Fundamentals of Music Theory**

**Credits:** 4.00

Elements of music theory for the non-music major; principles of musical structure, analysis, elementary written counterpoint and harmony, and ear training. May not be counted for credit toward a music major. Prereq: ability to read music and permission of the instructor. Prereq: MUSI 411 or permission of instructor.

### **MUSI 441 - Concert Choir**

**Credits:** 1.00

A mixed chorus that studies and performs classical and modern literature. Recommended for voice majors. Open to all students. May be repeated for a maximum of 8 credits.

### **MUSI 442 - Chamber Singers**

**Credits:** 1.00

A specialized mixed chamber choir that concentrates on the a cappella repertoire from the Renaissance to the present. Prereq: Audition.

**Co-requisites:** MUSI 441

### **MUSI 444 - Music and Social Change in America**

**Credits: 4.00**

Focuses on music in the United States during the early to mid-twentieth century as it alternately reflected and led movements for social change. Course work consists of listening to selected repertoires, reading scholarly and popular essays about those repertoires, and extensive in-class (and on-line) discussion about issues raised by the listening and reading. The goal of the course is twofold: 1) to heighten critical listening skills so as to become more aware of ways in which music can express social attitudes; and 2) to introduce the social, cultural, and political issues surrounding the music being studied. Writing intensive.

**MUSI 448 - Opera Workshop****Credits: 1.00**

Operatic singing, acting, and production techniques; performance of both complete operas and operatic excerpts. Prereq: audition.

**MUSI 450 - Symphony****Credits: 1.00**

Presents several concerts during the year of repertoire ranging from the great, standard symphonic literature to large modern works. Prereq: audition.

**MUSI 451 - Concert Band****Credits: 1.00**

The Concert Band performs serious, concert music, ranging from transcriptions of works for other mediums, to the 20th century "classics" of the wind band repertoire and music written for wind band. Anyone with previous band experience is welcome. Auditions are for chair placement only. May be repeated up to a maximum of 12 credits.

**MUSI 452 - Wind Symphony****Credits: 1.00**

Select wind ensemble which performs difficult classical and contemporary literature. Prereq: audition.

**MUSI 453 - Symphonic Band****Credits: 1.00**

Original band music, transcription, marches, etc. For students whose program does not permit music as a major interest, but who are interested in maintaining their playing proficiency and continuing their study of music. May be repeated for a maximum of 8 credits. Prereq: audition

**MUSI 454 - UNH Marching Band****Credits: 1.00**

Open to all students; performs during football games. Rehearsals conclude at the end of the football season. May be repeated up to a maximum of 8 credits. 0 or 1 credit.

**MUSI 455 - Piano Ensemble****Credits: 1.00**

Drawing from available student instrumentalists and singers, pianists learn the art of performing in trios, duo sonatas, and two-piano works, and gain experience in Lieder accompaniment.

**MUSI 456 - String Ensemble****Credits: 1.00**

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble. Prereq: permission.

**MUSI 457 - Woodwind Ensemble****Credits: 1.00**



Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble.  
Prereq: permission.

### **MUSI 458 - Brass Ensemble**

**Credits:** 1.00

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble.  
Prereq: permission.

### **MUSI 459 - Percussion Ensemble**

**Credits:** 1.00

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble.  
Prereq: permission.

### **MUSI 460 - Jazz Band**

**Credits:** 1.00

Two jazz bands perform a wide spectrum of big band literature. May be repeated up to a maximum of 8 credits. Prereq: audition.

### **MUSI 462 - Pep Band**

**Credits:** 1.00

Rehearsal and performance of a broad range of band music at hockey and basketball games. May be repeated up to a maximum of 8 credits. 0 or 1 credit.

### **MUSI 463 - Jazz Combo**

**Credits:** 1.00

Groups of instrumentalists gain experience in the performance of literature for the smaller jazz ensemble. May be repeated up to a maximum of 9 credits. Prereq: permission.

### **MUSI 464 - Guitar Ensemble**

**Credits:** 1.00

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble. May be repeated up to a maximum of 9 credits. Prereq: permission.

### **MUSI 471 - Theory I**

**Credits:** 3.00

Introduces the tonal system; species counterpoint; principles of voice leading and harmonic progression through the analysis, realization, and composition of one-, two-, and four-voiced textures. Concept of triad inversion and consonant diatonic harmonies of the major and minor modes. Students should register for MUSI 473-474 concurrently. Prereq: permission.

### **MUSI 472 - Theory I**

**Credits:** 3.00

Introduces the tonal system; species counterpoint; principles of voice leading and harmonic progression through the analysis, realization, and composition of one-, two-, and four-voiced textures. Concept of triad inversion and consonant diatonic harmonies of the major and minor modes. Students should register for MUSI 473-474 concurrently. Prereq: permission. Prereq: MUSI 471.

### **MUSI 473 - Ear Training I**

**Credits:** 1.00

Laboratory exercises to develop aural skills; sight-singing and dictation. Students should register for MUSI 471-472 concurrently. Prereq: permission.

### **MUSI 474 - Ear Training I**

**Credits:** 1.00

Laboratory exercises to develop aural skills; sight-singing and dictation. Students should register for MUSI 471-472 concurrently. Prereq: permission. Prereq: MUSI 473.

### **MUSI 475 - Functional Piano I**

**Credits:** 1.00

Basic instruction for music majors with no previous keyboard training. Piano technique, keyboard harmony geared to the practical harmonization of simple melodies, sight reading, transposition, and modulation. May involve both class instruction and periodic short individual lessons. Prereq: permission.

**Co-requisites:** MUSI 471, MUSI 473

### **MUSI 476 - Functional Piano I**

**Credits:** 1.00

Basic instruction for music majors with no previous keyboard training. Piano technique, keyboard harmony geared to the practical harmonization of simple melodies, sight reading, transposition, and modulation. May involve both class instruction and periodic short individual lessons. Prereq: permission. Prereq: MUSI 475.

**Co-requisites:** MUSI 472, MUSI 474

### **MUSI 501 - History and Literature of Music**

**Credits:** 3.00

Styles, forms, and techniques of composition in Western music. Prereq: completion of MUSI 472 or MUSI 412; permission.

### **MUSI 502 - History and Literature of Music**

**Credits:** 3.00

Styles, forms, and techniques of composition in Western music. Prereq: completion of MUSI 472 or MUSI 412; permission.

### **MUSI 511 - Survey of Music in America**

**Credits:** 4.00

From colonial times to the present, including the various European influences, the quest for an American style, and the emergence of such indigenous phenomena as jazz.

### **MUSI 520 - Diction for Singers I**

**Credits:** 2.00

Application of International Phonetic Alphabet (IPA) to English, French, German, and Italian. Emphasizes both written and spoken performance.

### **MUSI 521 - Diction for Singers II**

**Credits:** 2.00

Application of International Phonetic Alphabet (IPA) to English, French, German, and Italian. Emphasizes both written and spoken performance. Prereq: MUSI 520.

### **MUSI 536 - Early Wind Instruments**

**Credits:** 1.00 to 4.00

Private instruction in Renaissance and Baroque wind instruments. May be repeated. Special fee.

### **MUSI 541 - Piano**

**Credits:** 1.00 to 4.00

Private instruction in piano. May be repeated. Special fee for non-majors.

**MUSI 545 - Voice****Credits:** 1.00 to 4.00

Private instruction in voice. May be repeated. Special fee for non-majors.

**MUSI 546 - Violin****Credits:** 1.00 to 4.00

Private instruction in violin. May be repeated. Special fee for non-majors.

**MUSI 547 - Viola****Credits:** 1.00 to 4.00

Private instruction in viola. May be repeated. Special fee for non-majors.

**MUSI 548 - Violoncello****Credits:** 1.00 to 4.00

Private instruction in violoncello. May be repeated. Special fee for non-majors.

**MUSI 549 - String Bass****Credits:** 1.00 to 4.00

Private instruction in string bass. May be repeated. Special fee for non-majors.

**MUSI 551 - Flute****Credits:** 1.00 to 4.00

Private instruction in flute. May be repeated. Special fee for non-majors.

**MUSI 552 - Clarinet****Credits:** 1.00 to 4.00

Private instruction in clarinet. May be repeated. Special fee for non-majors.

**MUSI 553 - Saxophone****Credits:** 1.00 to 4.00

Private instruction in saxophone. May be repeated. Special fee for non-majors.

**MUSI 554 - Oboe****Credits:** 1.00 to 4.00

Private instruction in oboe. May be repeated. Special fee for non-majors.

**MUSI 555 - Bassoon****Credits:** 1.00 to 4.00

Private instruction in bassoon. May be repeated. Special fee for non-majors.

**MUSI 556 - French Horn****Credits:** 1.00 to 4.00

Private instruction in French horn. May be repeated. Special fee for non-majors.

**MUSI 557 - Trumpet****Credits:** 1.00 to 4.00

Private instruction in trumpet. May be repeated. Special fee for non-majors.

**MUSI 558 - Trombone****Credits:** 1.00 to 4.00

Private instruction in trombone. May be repeated. Special fee for non-majors.

**MUSI 559 - Euphonium**

**Credits:** 1.00 to 4.00

Private instruction in euphonium. May be repeated. Special fee for non-majors.

**MUSI 560 - Tuba**

**Credits:** 1.00 to 4.00

Private instruction in tuba. May be repeated. Special fee for non-majors.

**MUSI 561 - Percussion**

**Credits:** 1.00 to 4.00

Private instruction in percussion. May be repeated. Special fee for non-majors.

**MUSI 562 - Jazz Piano**

**Credits:** 1.00 to 4.00

Private instruction in jazz piano. May be repeated. Special fee for non-majors. Permission required.

**MUSI 563 - Jazz Guitar**

**Credits:** 1.00 to 4.00

Private instruction in jazz guitar. May be repeated. Special fee for non-majors.

**MUSI 564 - Drum Set**

**Credits:** 1.00 to 4.00

Private instruction in drum set. May be repeated. Special fee for non-majors.

**MUSI 571 - Theory II**

**Credits:** 3.00

Continuation of MUSI 471-472. Compositional and analytical work stresses the treatment of dissonance within the tonal system; accessory tones, seventh chords, tonicization, modulation, basic principles of chromatic harmony, and harmonization of chorale melodies are covered. Students should register for MUSI 573-574 concurrently. Prereq: MUSI 472; 474.

**MUSI 572 - Theory II**

**Credits:** 3.00

Continuation of MUSI 471-472. Compositional and analytical work stresses the treatment of dissonance within the tonal system; accessory tones, seventh chords, tonicization, modulation, basic principles of chromatic harmony, and harmonization of chorale melodies are covered. Students should register for MUSI 573-574 concurrently. Prereq: MUSI 472; 474. Prereq: MUSI 571.

**MUSI 573 - Ear Training II**

**Credits:** 1.00

Laboratory exercises to develop aural skills further. Students should register for MUSI 571-572 concurrently. Prereq: MUSI 472; 474; permission.

**MUSI 574 - Ear Training II**

**Credits:** 1.00

Laboratory exercises to develop aural skills further. Students should register for MUSI 571-572 concurrently. Prereq: MUSI 472; 474; permission.

**MUSI 575 - Functional Piano II**

**Credits:** 1.00

Basic instruction for music majors with no previous keyboard training. Piano technique, keyboard harmony geared to the practical harmonization of simple melodies, sight reading, transposition, and modulation. May involve both class instruction and periodic short individual lessons. Prereq: permission. Prereq: MUSI 476.

**Co-requisites:** MUSI 571, MUSI 573

### **MUSI 576 - Functional Piano II**

**Credits:** 1.00

Basic instruction for music majors with no previous keyboard training. Piano technique, keyboard harmony geared to the practical harmonization of simple melodies, sight reading, transposition, and modulation. May involve both class instruction and periodic short individual lessons. Prereq: permission. Prereq: MUSI 575.

**Co-requisites:** MUSI 572, MUSI 574

### **MUSI 595 - Special Topics in Music Literature**

**Credits:** 1.00 to 4.00

Open to music majors and non-majors; topics in areas not easily covered in historical courses. Prereq: permission. May be repeated for credit.

### **MUSI 703 - Music of the Renaissance**

**Credits:** 3.00

Works of the 15th- and 16th-century composers from Dunstable to Palestrina. Prereq: MUSI 501 and 502 or permission. Writing intensive.

### **MUSI 705 - Music of the Baroque**

**Credits:** 3.00

Music of Europe from de Rore to Bach. Prereq: MUSI 501 and 502 or permission. Writing intensive.

### **MUSI 707 - Music of the Classical Period**

**Credits:** 3.00

Growth of musical styles and forms from early classicism through the high classicism of Haydn, Mozart, and the young Beethoven. Prereq: MUSI 501 and 502 or permission. Writing intensive.

### **MUSI 709 - Music of the Romantic Period**

**Credits:** 3.00

A survey of romanticism in music from Beethoven's late period to the end of the 19th century. The works of Schubert, Berlioz, Schumann, Mendelssohn, Chopin, Wagner, Verdi, Brahms, Austrian symphonists, French pre-impressionists, and national styles in European music. Prereq: MUSI 501 and 502 or permission. Writing intensive.

### **MUSI 711 - Music of the 20th and 21st Centuries**

**Credits:** 3.00

Styles and techniques of composers from Debussy to the present. Special emphasis on tonal music before World War I, neoclassical trends, the emergence of atonality and serial techniques, electronic music. Prereq: MUSI 501 and 502 or permission. Writing intensive.

### **MUSI 713 - Art Song**

**Credits:** 3.00

History and literature of the solo song with piano accompaniment. Survey of national styles of the 19th and 20th centuries and deeper study of the central core of the art song--the German Lied. Prereq: MUSI 501 and 502 or permission. Writing intensive.

### **MUSI #715 - Survey of Opera**

**Credits:** 3.00

History of the genre from Monteverdi to the present. Prereq: MUSI 501 and 502 or permission. Writing intensive.

**MUSI 731 - Conducting****Credits:** 2.00

Physical aspects, equipment of conductor, fundamental gestures and beats, baton techniques. Reading and analysis of full and condensed scores, study of transposition, psychology of rehearsal. Prereq: MUSI 571.

**MUSI 732 - Conducting****Credits:** 2.00

Physical aspects, equipment of conductor, fundamental gestures and beats, baton techniques. Reading and analysis of full and condensed scores, study of transposition, psychology of rehearsal. Prereq: MUSI 571. Prereq: MUSI 731.

**MUSI 736 - Early Wind Instruments****Credits:** 1.00 to 4.00

Private instruction in Renaissance and Baroque wind instruments. May be repeated. Special fee.

**MUSI 741 - Piano****Credits:** 1.00 to 4.00

Private instruction in piano. May be repeated. Special fee for non-majors.

**MUSI 745 - Voice****Credits:** 1.00 to 4.00

Private instruction in voice. May be repeated. Special fee for non-majors.

**MUSI 746 - Violin****Credits:** 1.00 to 4.00

Private instruction in violin. May be repeated. Special fee for non-majors.

**MUSI 747 - Viola****Credits:** 1.00 to 4.00

Private instruction in viola. May be repeated. Special fee for non-majors.

**MUSI 748 - Violoncello****Credits:** 1.00 to 4.00

Private instruction in violoncello. May be repeated. Special fee for non-majors.

**MUSI 749 - String Bass****Credits:** 1.00 to 4.00

Private instruction in string bass. May be repeated. Special fee for non-majors.

**MUSI 751 - Flute****Credits:** 1.00 to 4.00

Private instruction in flute. May be repeated. Special fee for non-majors.

**MUSI 752 - Clarinet****Credits:** 1.00 to 4.00

Private instruction in clarinet. May be repeated. Special fee for non-majors.

**MUSI 753 - Saxophone****Credits:** 1.00 to 4.00

Private instruction in saxophone. May be repeated. Special fee for non-majors.

**MUSI 754 - Oboe**

**Credits:** 1.00 to 4.00

Private instruction in oboe. May be repeated. Special fee for non-majors.

**MUSI 755 - Bassoon**

**Credits:** 1.00 to 4.00

Private instruction in bassoon. May be repeated. Special fee for non-majors.

**MUSI 756 - French Horn**

**Credits:** 1.00 to 4.00

Private instruction in French horn. May be repeated. Special fee for non-majors.

**MUSI 757 - Trumpet**

**Credits:** 1.00 to 4.00

Private instruction in trumpet. May be repeated. Special fee for non-majors.

**MUSI 758 - Trombone**

**Credits:** 1.00 to 4.00

Private instruction in trombone. May be repeated. Special fee for non-majors.

**MUSI 759 - Euphonium**

**Credits:** 1.00 to 4.00

Private instruction in euphonium. May be repeated. Special fee for non-majors.

**MUSI 760 - Tuba**

**Credits:** 1.00 to 4.00

Private instruction in tuba. May be repeated. Special fee for non-majors.

**MUSI 761 - Percussion**

**Credits:** 1.00 to 4.00

Private instruction in percussion. May be repeated. Special fee for non-majors.

**MUSI 762 - Jazz Piano**

**Credits:** 1.00 to 4.00

Private instruction in jazz piano. May be repeated. Special fee for non-majors. Permission required.

**MUSI 763 - Jazz Guitar**

**Credits:** 1.00 to 4.00

Private instruction in jazz guitar. May be repeated. Special fee for non-majors.

**MUSI 764 - Drum Set**

**Credits:** 1.00 to 4.00

Private instruction in drum set. May be repeated. Special fee for non-majors.

**MUSI 771 - Counterpoint**

**Credits:** 3.00

Contrapuntal techniques of tonal music. Melodic construction and dissonance treatment through work in species counterpoint and studies in harmonic elaboration and prolongation. Analysis of selected compositions emphasizes the connection between fundamental contrapuntal techniques and the voice-leading of composition. Prereq: MUSI 572 or permission.

**MUSI 775 - Composition**

**Credits:** 3.00

Construction of phrases, periods, and short compositions following classical models. Problems of text-

setting. Prereq MUSI 572 or permission.

### **MUSI 776 - Composition**

**Credits:** 3.00

Construction of phrases, periods, and short compositions following classical models. Problems of text-setting. Prereq MUSI 572 or permission. Prereq: MUSI 775 or permission.

### **MUSI 777 - Advanced Composition**

**Credits:** 3.00

Continuation of MUSI 776. Individual compositional projects. Prereq: MUSI 776 and permission. May be repeated for credit.

### **MUSI 779 - Orchestration**

**Credits:** 3.00

Characteristics of band and orchestral instruments both individually and in small (homogeneous) and large mixed groupings. Students study scores, write assignments, and have arrangements performed if possible. Prereq: MUSI 572 or permission.

### **MUSI 781 - Analysis: Form and Structure**

**Credits:** 3.00

Introduces analytical techniques through the study of representative masterworks: formal and structural elements and their interrelationships. Analysis of 18th- and 19th century works. Prereq: MUSI 572 or permission.

### **MUSI 781W - Analysis: Form and Structure**

**Credits:** 3.00

Introduces analytical techniques through the study of representative masterworks: formal and structural elements and their interrelationships. Analysis of 18th- and 19th century works. Prereq: MUSI 572 or permission. Writing intensive.

### **MUSI 782 - Analysis: Form and Structure**

**Credits:** 3.00

Introduction to analytical techniques through the study of representative masterworks: formal and structural elements and their interrelationships. Analysis of 20th- and 21st-century works. Prereq: MUSI 572 or permission.

### **MUSI 782W - Analysis: Form and Structure**

**Credits:** 3.00

Introduction to analytical techniques through the study of representative masterworks: formal and structural elements and their interrelationships. Analysis of 20th- and 21st-century works. Prereq: MUSI 572 or permission. Writing intensive.

### **MUSI 795 - Special Studies**

**Credits:** 1.00 to 4.00

A) J.S. Bach, B) Franz Schubert, C) Debussy and Ravel, D) the world of jazz, E) piano literature, F) 19th century French music, G) advanced analysis, H) advanced study in electronic music, I) composition through computer-generated sound, J) woodwind literature, K) brass literature, L) string literature, M) medieval performance practice, N) renaissance performance practice, O) baroque performance practice, P) classical performance practice, Q) 19th century performance practice, R) 20th century performance practice, S) woodwind repair, T) string repair, U) advanced jazz improvisation, V) advanced piano pedagogy, W) advanced accompanying, X) advanced conducting, Y) independent study. Prereq: permission. May be repeated for credit with permission.





## Music Education

### **MUED 595 - Special Projects**

**Credits:** 1.00 to 4.00

Individual investigation, research, or study. Creative projects may be included. Prereq: permission.

### **MUED 741 - Techniques and Methods in Choral Music**

**Credits:** 2.00

Problems in the organization and performance of high school, college, and community choruses. Techniques of choral conducting and rehearsal, repertory and materials.

### **MUED 743 - Materials and Methods in Piano Music**

**Credits:** 2.00

Gives potential piano teachers a coherent but flexible approach to the instruction of students of different ages and levels of talent through evaluation of methods and materials and discussion of the role of the private teacher.

### **MUED 745 - Techniques and Methods in String Instruments**

**Credits:** 2.00

Class and individual instruction. Intensive training on the violin, viola, cello, and double bass. Classroom procedures, establishment of string programs, and evaluation of available methods materials. Permission required.

### **MUED 746 - Techniques and Methods in String Instruments**

**Credits:** 2.00

Class and individual instruction. Intensive training on the violin, viola, cello, and double bass. Classroom procedures, establishment of string programs, and evaluation of available methods materials. Permission required.

### **MUED 747 - Techniques and Methods in Woodwind Instruments**

**Credits:** 2.00 or 3.00

Basic course in embouchure formation, tone production, tonguing, fingering and instrument care as applied to each of the woodwinds: flute, oboe, clarinet, bassoon and saxophone. Methods, studies, solos and ensembles most useful with school players of woodwind instruments. Permission required.

### **MUED 749 - Techniques and Methods in Brass Instruments**

**Credits:** 2.00

Basic course in embouchure formation, tone, tonguing, fingering, flexibility, accuracy, and range development as applied to the trumpet or baritone horn, French horn, and trombone. Methods, studies, solos, and ensembles most likely to be useful with school players of brass instruments. Permission required.

### **MUED 751 - Techniques and Methods in Percussion Instruments**

**Credits:** 2.00

Basic performance skills on snare drum, timpani, mallet instruments, and other percussion instruments used in bands and orchestras. Materials and methods of instruction. Permission required.

### **MUED 755 - Vocal Pedagogy**

**Credits:** 2.00

A study of vocal anatomy, vocal function, and teaching methods, with an emphasis on application for

singers and voice teachers.

**MUED #763 - Jazz Music Methods**

**Credits:** 2.00

Organization and delivery of instruction in jazz. Historical development of jazz styles and the role of each instrument/voice in jazz combos and large ensembles. Reading jazz notation and teaching improvisation. Examination of appropriate literature. Prereq: piano proficiency. Permission required.

**MUED 765 - Instrumental Music Methods**

**Credits:** 2.00

Organization and delivery of instruction to groups of instrumental music students. Examination of appropriate curricula and materials, application of instrumental and conducting techniques, structure of rehearsals, assessment of student progress. Prereq: junior standing.

**MUED 771 - Marching Band Methods**

**Credits:** 2.00

Role of marching band in the school music program. Design and execution of field shows and parade marching. Understanding of marching percussion and auxiliary units. Examination of appropriate music. Prereq: MUSI 454 and 571.

**MUED 790 - Teaching Elementary School Music**

**Credits:** 3.00

Experiential approach toward learning creative strategies for teaching elementary school music. Includes various curricula and methods; philosophy and psychology of music; demonstration of materials and instruments. Observation and teaching in schools. Prereq: piano proficiency.

**MUED 791 - Teaching Secondary School Music**

**Credits:** 2.00

Assembling, managing, and teaching junior/senior high school music curriculum. Academic issues of philosophy, curriculum building, application of learning theories, administration, evaluation, motivation, and classroom management combined with field experience in lesson planning and teaching/rehearsal techniques. Prereq: piano proficiency; MUSI 731-732.

**MUED 795 - Special Studies**

**Credits:** 1.00 to 4.00

Allows upper-level students to explore individually or in groups areas related to their specific professional interests. Prereq: permission.

## Natural Resources

### **NR 400 - Professional Perspectives in Natural Resources**

**Credits:** 1.00

Lectures by departmental faculty provide an informal look at the various natural resource disciplines and professions represented by the Department of Natural Resources. These presentations acquaint students with our faculty and inform them of some of the exciting research being undertaken in the department. Students also learn of opportunities for professional involvement. Required for all first-semester Natural Resources majors. Cr/F.

### **NR 401 - Introduction to Natural Resources**

**Credits:** 4.00

Overview of the history, politics, economics, ethics, and ecology involved with the conservation and management of living and non-living natural resources. Sets the stage for subsequent natural resource courses by introducing the scientific basis for natural resource conservation and management. Labs build confidence in map and compass work and provide hands on field experience within the various natural resource disciplines. Debates and discussions of natural resource related hot topics provide opportunities to practice public speaking, problem solving, and critical thinking skills. Restricted to NR majors or by Permission. Lab. Special fee.

### **NR 403 - Introduction to Environmental Science**

**Credits:** 3.00

A multi-disciplinary introduction to Environmental Sciences, presenting basic concepts and controversies in geology, meteorology/hydrology, global biology and biogeochemistry, integrated through the study of the Earth as system. Intended primarily for declared or perspective majors in Environmental Sciences and related programs. Combines lecture and discussion with discovery and presentation experiences to address the history of ideas, and major questions and controversies, both settled and active.

### **NR 410 - Insects and Society**

**Credits:** 4.00

Insects have had a major impact on human culture throughout the centuries as source of food, an inspiration in literature and art, and a driving force behind social change. We study basic insect biology and ecology with a focus on their relationships to humans. Special fee. Lab.

### **NR 415 - Global Biological Change**

**Credits:** 4.00

Introduces the biological aspects of global change. Includes historical and physical setting and emphasizes current global biological issues including population growth, land use and deforestation, biodiversity loss, introduced species, industrial nitrogen fixation, changes to the carbon cycle, and important interactions between the biosphere hydrosphere and atmosphere.

### **NR 415H - Honors/Global Biological Change**

**Credits:** 4.00

Introduces the biological aspects of global change. Includes historical and physical setting and emphasizes current global biological issues including population growth, land use and deforestation, biodiversity loss, introduced species, industrial N fixation, changes to the carbon cycle, and important interactions between the biosphere hydrosphere and atmosphere.

### **NR 425 - Field Dendrology**

**Credits:** 4.00

Students study forest trees in natural communities and urban settings. Identification and nomenclature of important North American trees and shrubs is emphasized. Environmental factors influencing tree growth, combined with study of disturbance history, provide the context for understanding why tree species grow where they do. Students are introduced to the major forest regions of North America. Restricted to NR majors; others by permission. Special fee.

**NR 426 - Wood Science and Technology****Credits:** 4.00

Wood microstructure and identification: physical, chemical, and mechanical properties; characteristics of wood including those produced by growth and form (e.g., knots, cross-grain) and those produced by degradation (e.g., stain, decay); focused on native and local species of both softwoods and hardwoods; and the role of forests in carbon storage. Special fee. Lab.

**NR 433 - Wildlife Ecology****Credits:** 4.00

Historical, biological, ecological, and sociological factors influencing the wildlife resource and its management. Concepts in populations, communities, habitat, and contemporary wildlife issues. Special fee. Lab.

**NR 435 - Contemporary Conservation Issues and Environmental Awareness****Credits:** 4.00

Explores the impacts of technology and human activity on our environment and natural resources. Key conservation issues are used as examples of past and present biological, social, and environmental conflicts.

**NR 435H - Honors/Contemporary Conservation Issues and Environmental Awareness****Credits:** 4.00

Explores the impacts of technology and human activity on our environment and natural resources. Key conservation issues are used as examples of past and present biological, social, and environmental conflicts.

**NR 435W - Contemporary Conservation Issues and Environmental Awareness****Credits:** 4.00

Explores the impacts of technology and human activity on our environment and natural resources. Key conservation issues are used as examples of past and present biological, social, and environmental conflicts. Writing intensive.

**NR 444B - The Real Dirt****Credits:** 4.00

Explores sustainable agriculture, regional and local food supply and systems, land ethics and agrarian thought as a natural resource and environmental conservation issue. Focusing on northern and central New England, the course uses the teaching of Aldo Leopold and includes hands-on study of UNH's new initiatives in sustainable and organic agriculture and the on-campus food system. A visit to University farms is included. Writing intensive.

**NR #444C - Dynamics of a Changing Earth****Credits:** 4.00

The history and dynamics of the Earth as a system, considered in 4 general areas: 1. The Solid Earth (age of the Earth, plate tectonics and meteor impacts), 2. The Climate System (general circulation, ice ages, El Nino), 3. The Vegetated Surface (distribution of biomes, biodiversity, human land use), and 4. Element cycles (carbon, nitrogen, oxygen). The human role in modifying natural processes is a crosscutting theme,

leading to discussions of current environmental issues. Writing intensive.

### **NR 444E - Eye of Newt and Toe of Frog: The World of Poisonous Animals**

**Credits:** 4.00

Course examines a variety of animal poisons and venoms in different contexts. Historical, cultural, physiological, pharmacological, and evolutionary viewpoints are explored. Readings, guest lectures, and peer blog entries are used to refine critical thinking skills and form the basis of in-class discussions.

### **NR 501 - Studio Soils**

**Credits:** 4.00

An overview of physical, chemical, and biological properties of soil. Sub-disciplines of soil chemistry, soil physics, soil microbiology, soil genesis, and classification. Prereq: CHEM 403 or equivalent. Special fee. Lab.

### **NR 502 - Forest Ecosystems and Environmental Change**

**Credits:** 4.00

Forest ecosystems cover a large fraction of the Earth's land surface and account for most of its terrestrial biological productivity. This course introduces forest ecosystems around the world and explores both the natural processes that regulate them and the environmental factors that cause change over time. Topics include tree growth strategies, successional change, nutrient cycling, and human-induced stressors such as air pollution and climate change. Special fee.

### **NR 504 - Freshwater Resources**

**Credits:** 4.00

Major determinants of freshwater resources including hydrologic cycle and water balance, precipitation, stream-flow measurement, pollution, water supply and sewage treatment, water resource management and regulation. Special fee. Lab/field trips.

### **NR 506 - Forest Entomology**

**Credits:** 4.00

Introduces insect biology, behavior, ecology, and control, focusing on the forest environment. Labs include identification to the family level and an insect collection. Special fee. Lab. Writing intensive.

### **NR 527 - Forest Ecology**

**Credits:** 4.00

Introduces basic and applied ecology of forests, with emphasis on ecosystem processes, including water, energy, and nutrient cycles; biological interactions, including biodiversity and plant-plant, plant-animal, and plant-microbe relationships; and human impacts, including forest management, land-use/land cover-change, and changes in atmospheric chemistry. Prereq: P BIO 412 or BIOL 411. Restricted to NR majors or by Permission. Special fee. Lab.

### **NR 542 - Forestland Measurement and Mapping**

**Credits:** 1.00

Elementary measuring equipment and techniques; preparation of maps; public land survey; court-house deed search. (Forestry and Wildlife majors only.) Special fee.

### **NR 599 - Work Experience**

**Credits:**

Work in the field of forestry; must be performed under professional supervision or approved by natural resources faculty. Students are responsible for arranging their own experience. Restricted to Forestry majors. Permission. Cr/F.

### **NR 601 - Environmental Conservation and Sustainable Living Internship**

**Credits:** 4.00

Practical internship and field experience in a location removed from the University milieu to give the environmental conservation student a dimension and insight into sustainable resource management systems not available in the campus experience. Prereq: permission. Cr/F.

### **NR 602 - Natural Resources and Environmental Policy**

**Credits:** 4.00

Contemporary natural resource and environmental policy problems/issues are addressed from a policy sciences perspective with emphasis on domestic policy solutions. Critical assessment of major policy initiatives and their implementation toward sustainable resource use and a healthy environment. Public policies are analyzed to determine the extent to which their implementation strategies have succeeded, and to assess their adequacy within a bioregional or ecosystem approach, and/or capacity to integrate economic and environmental decisions. Cases include national and local policies in their global context. Students apply public policy analysis and decision tools in laboratory sessions. Prereq: junior/senior; Restricted to NR majors or by Permission. Special fee. Writing intensive.

### **NR 615 - Wildlife Habitats**

**Credits:** 4.00

Introduces animal-habitat associations, including an examination of spatial and temporal features of wildlife habitat, the evolution of habitat selection, and how habitat suitability/productivity is evaluated. Prereq: woody plant identification; limited to wildlife management majors and minors. Permission. Special fee. Writing intensive.

### **NR 620 - Farm to Table: A Case Study in the Northern Beauce Region of France**

**Credits:** 4.00

Course provides students a unique study abroad experience that blends the study of agroecology with an on-farm stay that allows them to see how food moves from the field to table. Students participate in lectures, fieldtrips, readings, and discussions on topics including agricultural sustainability, agriculture and environmental health (soil/water quality, biodeversity), the influence of agriculture on the local ecology, and the relationship between French agriculture and the current local food movement in the U.S. They also get practical, on-farm experience by assisting with the harvest and transport of vegetables and edible flowers for the Paris market. Permission required. Special fee.

### **NR 621 - Field Description of Soils**

**Credits:** 3.00

Description of soils in the field. Application of soils properties to forestry, plant science, and community planning. Strong orientation to fieldwork. Special fee. Lab.

### **NR 625 - Physiological Ecology**

**Credits:** 4.00

Course examines the physiological mechanisms and adaptive responses of organisms that facilitate their survival in changing natural environments. Following an introduction to homeostasis and general physiological principles, topics focus on adaptations to the marine and freshwater environments, to estuarine challenges, and the specific requirements of terrestrial and aerial environments. Additional topics center on adaptations to extreme habitats and to parasitic life styles. Furthermore, the physiological bases of migrations, sleep, and mating/life history strategies are also explored. Examples are drawn from invertebrates, vertebrates, and plants. Prereq: one year college level biology.

### **NR 637 - Practicum in Environmental Conservation**

**Credits:** 4.00

Independent participation in an environmental conservation activity in the area of the student's

specialization. Individual or group projects may be developed under the supervision of any faculty member within or outside natural resources or with supervisors in public and private agencies, upon approval of the course instructor. Research projects not acceptable. Prereq: senior standing in the environmental conservation program. Cr/F.

### **NR 640 - Wildlife Population Ecology**

**Credits:** 3.00

An overview of the mechanisms that influence the characteristics of terrestrial wildlife populations, especially factors that influence rates of natality and mortality. Additional attention paid to community interactions (especially predation, competition, and invasive species) the roles of exploitation and the influences of habitat loss and fragmentation. The course concludes with an examination of populations and efforts to restore them. Prereq: one course in general ecology; wildlife major or permission of the instructor.

### **NR 642 - Introduction to Biogeography**

**Credits:** 4.00

Biogeography is an integrative field of inquiry that unites concepts and information from evolutionary biology, ecology, systematics, geology, and physical geography. Students are introduced to the distribution patterns of wild animals and plants and to the factors that determine these patterns. In this course, the emphasis is on evolutionary aspects of biogeography, biodiversity, and implications for conservation issues.

### **NR 643 - Economics of Forestry**

**Credits:** 4.00

Intermediate-level analysis of supply and demand for forest-based goods and services, managerial economics, taxation, capital investments. Prereq: EREC 411 or ECON 402.

### **NR 650 - Principles of Conservation Biology**

**Credits:** 4.00

Examines the major issues relevant to conservation of biodiversity from the genetic to the ecosystem level. In addition to addressing ecological and biological principles, the interdisciplinary nature and challenges of managing for conservation biology, including the role of economic and social factors are examined. Prereq: one semester of biology, botany, or zoology.

### **NR 655 - Vertebrate Biology**

**Credits:** 4.00

Introduces the diversity and evolution of vertebrates. Topics span the morphological, physiological, behavioral, and ecological diversity among the major vertebrate taxa. Labs stress identification of vertebrate taxa based on specimens and morphological structures. Permission. Prereq: BIOL 411; 412; or equivalent. Special fee. Lab.

### **NR 658 - Introduction to Geographic Information Systems**

**Credits:** 4.00

Introduces the use of geographic information systems (GIS) for natural resources and related fields. Data models/structures, map projections, data input/output/storage, data analysis/modeling, interpolation, and data quality/standards. Hands-on lab using ArcGIS software. Restricted to NR majors or permission. (Also offered as GEOG 658.)

### **NR 660 - Ecology and Biogeography of New Zealand**

**Credits:** 5.00

Covers the principles of ecology and biogeography, with a distinct focus on New Zealand. Students investigate the processes that have shaped the New Zealand landmass and its biota. Impact of human settlement on New Zealand's ecosystems is explored in-depth. Methods and techniques of scientific



research are incorporated in this course. Field exercises focus on topical case studies in a variety of ecosystems and are designed to strengthen students' conceptual knowledge, enable students to apply this knowledge, as well as develop field skills including classification systems, mapping, habitat assessment, field identification, and sampling techniques. Prereq: junior/senior; permission. Coreq: NR 661, NR 662, and NR 663. Special fee.

**Co-requisites:** NR 661, NR 662, NR 663

### **NR 661 - Restoration Ecology and Ecosystem Management in New Zealand**

**Credits:** 4.00

Current restoration projects and strategies for management of natural resources in New Zealand form the framework for this course. Solving problems related to introduced species, changes in habitat, the preservation of ecological processes and watershed management are the major foci of this course.

Management of resources for multiple uses, as well as primary and extractive industries is included. Field exercises focus on topical case studies in a variety of terrestrial and coastal-marine ecosystems and include the identification of habitats and communities, stresses on the environment, and risk analysis.

Prereq: junior/senior; permission. Coreq: NR 660, NR 662, and NR 663.

**Co-requisites:** NR 660, NR 662, NR 663

### **NR 662 - Environmental Policy, Planning and Sustainability in New Zealand**

**Credits:** 3.00

Introduces students to politics in New Zealand. Investigating policy pathways and planning forms part of the curriculum. Students assess scope of legislation, including the Resource Management Act (1991), for the economic and socio-political environment in New Zealand. Government obligations to the Treaty of Waitangi, and customary uses of resources are included as part of this course. Students are exposed to diverse perspectives of local authority planners and policy makers, local iwi (tribes), the Department of Conservation, and community groups. Students examine case studies involving the resource consent process at several levels of decision-making. Case studies provide a comprehensive overview of the interactions between the environment and people and their cultural and socio-economic needs. Prereq: junior/senior; permission. Coreq: NR 660, NR 661, and NR 663

**Co-requisites:** NR 660, NR 661, NR 663

### **NR 663 - Applied Directed Research in New Zealand**

**Credits:** 4.00

Working closely with faculty, student teams investigate selected ecological, resource management or policy issues. All projects have scientific and societal relevance, and contribute to ongoing/existing projects in the region. Students use the scientific method to design and carry out their projects. Development of rigorous field investigations, experimental design, data analysis, and scientific writing are emphasized. Students prepare a research report and present their findings in a seminar that includes stakeholders and people from the local community. Prereq: junior/senior; permission. Coreq: NR 660, NR 661, and NR 662. Writing intensive.

**Co-requisites:** NR 660, NR 661, NR 662

### **NR 664 - Conservation Genetics**

**Credits:** 4.00

Conservation genetics is the application of genetics to preserve species as dynamic entities capable of coping with environmental change. Includes genetic management of small populations, resolution of taxonomic uncertainties, defining management units within species, and the use of molecular genetic analyses to forensics and the understanding of the biology of species. Topics include methods of measuring genetic diversity in populations, identification of the units of biodiversity to which conservation efforts are directed, genetics of population fragmentation, genetic management of wild and captive populations, reintroduction of organisms back into the wild, and the role of forensics in enforcement and

development of species recovery plans. Recitation. No credit if credit received for GEN 705 or ZOOL 705.

### **NR 701 - Ecological Sustainability and Values**

**Credits:** 4.00

Deeper more fundamental philosophical questions, including spiritual values questions, are being asked concerning the ecological/environmental challenge of our time; its causes and resolution. Aspects of this challenge--environmental education, energy, food, agriculture, and natural resources--analyzed with ethics and values approaches. Students develop ways of responding to problem identification and resolution. Writing intensive.

### **NR 702 - Workshops**

**Credits:** 1.00 to 4.00

Short-term courses (generally a few days to two weeks) offered off campus, covering a broad variety of environmental and natural resource topics. May be repeated. Special fee required depending on topic. Prereq: permission required.

### **NR 703 - Watershed Water Quality Management**

**Credits:** 4.00

Principles of land use as they relate to water quality and quantity. Lectures focus on biogeochemical cycles and the watershed approach to land and water resource management. Labs and field trips focus on methods of water sampling and analysis. One year of chemistry is recommended. Prereq: NR 504 or 604 or permission. Special fee. Lab/field trips. Writing intensive.

### **NR 706 - Soil Ecology**

**Credits:** 4.00

Examines the ecological relationships between soil microorganisms and their biotic and abiotic environment, with emphasis on the role of soil microorganisms in biogeochemical cycling. Specific objectives are to examine the biodiversity present in soil systems, factors controlling microbial community composition and diversity, and linkages between soil microbial communities, soil physical properties, and soil organic matter and nutrient cycling dynamics. Prereq: BIOL 412 or P BIO 412, CHEM 403, or equivalent, or permission. Special fee. Lab. Writing intensive.

### **NR 707 - Environmental Modeling**

**Credits:** 4.00

Environmental Modeling introduces students to a range of key mathematical and computer modeling concepts and the ways they can be used to address important scientific questions. The course is divided into four topical sections: Population and Community Ecology, Hydrology, Biogeochemistry, and Ecosystems. In each section, modeling concepts and skills are presented together with environmental information to emphasize the linkage between quantitative methods and relevant scientific results. Prereq: MATH 425.

### **NR 710 - Endangered Species Seminar**

**Credits:** 2.00

Provides students with an interactive class of student presentations and guest lectures by endangered-species biologists. Emphasizes on biological, sociological, economic, and political factors that influence endangered-species policy. Prereq: basic ecology/biology; permission. Special fee.

### **NR 711 - Wetland Ecology and Management**

**Credits:** 4.00

Analysis of the natural resources of coastal and inland wetlands and environmental problems caused by human use and misuse of these ecosystems. Groups collect field data to summarize the structure and function of four wetland types within a management context. Special fee. Lab. Prereq: BIOL 541, or NR

703, or permission. Writing intensive.

### **NR 713 - Quantitative Ecology**

**Credits:** 4.00

Applied quantitative techniques: basic concepts in probability and statistics applied to ecological systems, population dynamics, spatial patterns, species abundance and diversity, classification and ordination, production, and energy and nutrient flow. Additional credit for in-depth mathematical analysis of a particular topic. Prereq: intro. courses in calculus, statistics, and ecology. (Not offered every year.) Writing intensive.

### **NR 716 - Wetland Delineation**

**Credits:** 4.00

Examines the soils, vegetation, and hydraulic functions of coastal and central New England wetlands. Students are responsible for the collection and identification of aquatic plant species, description of wetland soils, and delineation of wetland boundaries. Lectures and fieldwork. For juniors, seniors, and working professionals. Field trips. Special fee. (Offered summer session only.)

### **NR 718 - Law of Natural Resources and Environment**

**Credits:** 3.00

Federal and state environment statutory and administrative law, its application, strengths and weaknesses, and options for future amendment.

### **NR 719 - Wetlands Restoration and Mitigation**

**Credits:** 3.00

Assesses the problems of wetlands loss and learning how to repair the damage. Asks what steps can be taken. Does restoration work, can habitat value be replaced, what constitutes equivalent mitigation? Field experience and theoretical background in restoring marine and freshwater environments. First half of course involves field trips to visit and sample mitigation and restoration sites. Second half focuses on student projects using the scientific method to address wetlands issues. Prereq: NR 711 or permission. Special fee. Lab/field trips. (Not offered every year.)

### **NR 720 - International Environmental Politics and Policies for the 21st Century**

**Credits:** 4.00

Students examine policies for managing human activities to sustain the health of regional ecosystems and planetary life-support systems. Selected problems of the international commons (oceans, marine resources, atmosphere, migratory species); global and regional carrying capacity (population, resource consumption), internationally shared ecosystems (transboundary watersheds and waterbodies, tropical forests); and the relevant international institutions and politics for policy formation, conflict resolution, and implementation. Using a policy-analytic framework, students develop case studies to assess international policies and institutional arrangements to achieve the objectives of Agenda 21--Earth Summit Strategy to Save the Planet. Prereq: permission. Writing intensive.

### **NR 724 - Resolving Environmental Conflicts**

**Credits:** 4.00

Theories and practices of environmental dispute settlement. Roles of public, non-governmental and governmental organizations. Effectiveness of public participation initiatives in influencing public policy decisions and/or resolving environmental conflicts. Alternative approaches to consensus (policy dialogues, joint problem solving; strategic planning; negotiation, mediation) as well as litigation. Specific cases are critiqued and evaluated; conflict resolution skills are developed. Students observe and/or participate in ongoing local decision processes. Prereq: second-semester juniors, seniors; permission. Lab. Special fee. Writing intensive.

### **NR 729 - Silviculture**

**Credits: 4.00**

The science and art of establishing, growing, and tending forests to meet multiple objectives. Basics of forest stand dynamics applied to the problems of timber management, wildlife habitat, water quality, and carbon sequestration. Prereq: NR 425 and NR 527 or permission. Special fee.

**NR 730 - Terrestrial Ecosystems****Credits: 4.00**

Processes controlling the energy, water, and nutrient dynamics of terrestrial ecosystems; concepts of study at the ecosystem level, controls on primary production, transpiration, decomposition, herbivory; links to earth-system science, acid deposition, agriculture. Prereq: NR 527 and P BIO 412 or BIOL 411, or permission.

**NR #731 - Ecosystem Based Governance: Policies and Management Strategies****Credits: 4.00**

Human stresses have and are taking their toll on the health and integrity of ecosystems worldwide. More and more commentators are stressing the need to switch from traditional top-down natural resource governance strategies to a broader ecosystem-based management (EBM) approach. This class explores current strategies and trends, examines EBM in theory and practice, and ultimately puts theory into practice with a collaborative effort to design an EBM governance strategy for a geographical region chosen by the class. Prereq: permission.

**NR 734 - Tropical Ecology****Credits: 4.00**

This course introduces students to the ecology of different tropical ecosystems, and involves students in analyzing and interpreting ecological field data and remotely sensed data. An important emphasis is to understand patterns and processes across scales - from individual plants to ecosystems and landscapes. The course also addresses important global issues in the tropics, including climate change, land use change, diverse ecosystem services, and sustainable resource management.

**NR 735 - Land Conservation Principles and Practices****Credits: 4.00**

Students gain practical knowledge, understanding and experience in land conservation planning and implementation of options for land protection based on current practice in New Hampshire. By interacting with practitioners, students learn what it takes to implement successful land conservation projects, and conservation stewardship requirements and practices. Prereq: senior standing in the Department of Natural Resources and permission. Special fee. Lab. Writing intensive.

**NR 738 - Wildlife Policy and Management****Credits: 4.00**

Local, regional, and national issues and strategies in policy and administration. Contemporary issues including land management, commercialization of wildlife, overpopulation, endangered species, wildlife diseases, and professionalism. Prereq: senior wildlife majors or permission. Special fee. Lab. Writing intensive.

**NR 740 - Inventory and Monitoring of Ecological Communities****Credits: 4.00**

Provides an introduction to the major concepts associated with monitoring change in ecological communities. Students develop an appreciation for such issues as: identification of appropriate baselines for comparison; use of indicator species; the tools used to inventory common, rare, and secretive species; how trend data are analyzed; and the implications of failing to detect an indicator species. Restricted to senior wildlife majors others by premission. Special fee. Lab.

## **NR 741 - Demographic Methods in Conservation Biology and Wildlife Ecology**

**Credits:** 3.00

A survey of quantitative methods used to characterize vertebrate populations. Emphasis placed on application rather than theory. Estimators of survival, responses to exploitation, and evaluation of physiological condition relative to carrying capacity are reviewed. Atudents are also introduced to computer models that are used to simulate age-, stage-, and spatially-structured populations, and how these models can be used to evaluate population viability. Prereq: concurrent or previous enrollment in a course in population ecology or conservation, one course in statistics. Lab. Special fee.

## **NR 744 - Biogeochemistry**

**Credits:** 4.00

Examines the influence of biological and physical processes on elemental cycling and geochemical transformations from the molecular to the global scale, involving microorganisms, higher plants and animals and whole ecosystems; factors that regulate element cycles including soils, climate, disturbance and human activities; interactions among the biosphere, hydrosphere, lithosphere, and atmosphere; transformations of C, N, S, and trace elements. Prereq: one semester biology and two semesters of chemistry or permission.

## **NR 745 - Forest Management**

**Credits:** 4.00

Forest land ownership, management objectives, forest inventory regulation and policy, forest administration, professional responsibilities and opportunities. Restricted to Natural Resources majors. Lab. Special fee.

## **NR 749 - Forest Inventory and Modeling**

**Credits:** 4.00

Applied sampling and statistical techniques for assessing current forest conditions and predicting future growth, yield, and structure. Topics include plot and point sampling, ecological inventory, and evaluation of site quality and stand density. Prereq: MATH 420 and BIOL 528. Special fee.

## **NR 751 - Aquatic Ecosystems**

**Credits:** 4.00

Energy flow and nutrient cycling in streams, rivers and lakes, with an emphasis on understanding the control of primary productivity, decomposition and community structure by both hydrologic and biotic drivers. Role of aquatic ecosystems in carbon and nitrogen budgets at watershed, regional, and global scales. Impacts of environmental changes such as global climate change and suburbanization on aquatic ecosystems. Prereq: General Ecology. Lab. Special fee.

## **NR 757 - Remote Sensing of the Environment**

**Credits:** 4.00

Practical and conceptual presentation of the use of remote sensing and other geospatial technologies for mapping and monitoring the environment. This course begins with the use of aerial photographs (photogrammetry, and photo interpretation) and includes measures of photo scale and area, parallax and stereo viewing, object heights, flight planning, photo geometry, the electromagnetic spectrum, camera systems and vegetation/land cover mapping. The course concludes with an introduction to other geospatial technologies including digital image analysis, global positioning (GPS), and geographic information systems (GIS). Conceptual lectures are augmented with practical homework assignments and hands-on lab exercises. Prereq: algebra. Special fee. Lab. (Also offered as GEOG 757.)

## **NR 759 - Digital Image Processing for Natural Resources**

**Credits:** 4.00

Introduces digital remote sensing including multispectral scanners (Landsat and SPOT) radar, and thermal

imagery. Hands-on image processing including filtering, image display, ratios, classification, registration, and accuracy assessment. GIS as it applies to image processing. Discussion of practical applications. Use of ERDAS image-processing software. Knowledge of PCs required. Prereq: NR 757 or equivalent and permission. (Also offered as GEOG 759.)

### **NR 760 - Geographic Information Systems in Natural Resources**

**Credits:** 4.00

Theory, concepts, and applications of geographic information systems (GIS) for use in natural resources and related fields. Discussion of database structures, sources of data, spatial data manipulation/analysis/modeling, data quality standards and assessment, and data display/map production including many examples and practical applications. Hands-on lab exercises using ArcGIS 8.x software. Permission. Lab. (Also offered as GEOG 760.)

### **NR 765 - Community Ecology**

**Credits:** 4.00

Properties of biotic communities, especially biodiversity. Effects of physical stress, disturbance, competition, predation, positive interactions, and dispersal on community properties. Community dynamics, including succession and stability. Prereq: applied biostatistics and general ecology. Lecture and discussion.

### **NR 767 - Earth System Science**

**Credits:** 4.00

Introduces the study of Earth as an integrated system. Investigates the major components (e.g., atmosphere, biosphere, cryosphere, hydrosphere, and lithosphere), dynamics (e.g., energy balance, water cycle, biogeochemical cycles), and changes within the earth system. Emphasizes the interactions and feedbacks within the system. The links between components are presented by examining present day processes and selected events in Earth's history. The lab portion examines these concepts through the development and use of computer models of Earth system processes. Prereq: MATH 424B; MATH 425; or permission. Lab.

### **NR 782 - Monitoring Forest Health**

**Credits:** 4.00

Provides the field and remote sensing tools and experience needed by students to assess forest conditions at the individual tree and stand levels, as well as to conduct independent research projects on specific topics of interest. May include assessing change-over-time, landscape-level impacts of urban developments, severe weather events, and other natural and anthropogenic perturbations affecting the health of forests. Forest damage due to insects, air pollution (primarily ground-level ozone), drought, the 1998 ice storm, and others are investigated. Lab. Special fee. Permission.

### **NR 783 - Forest Communities of New Hampshire**

**Credits:** 4.00

A hands-on field course designed to introduce students to the diverse forest community types of New Hampshire. Topics include 1) field identification of forest types using different classification systems and keys; 2) identification of characteristic plant and animal species; 3) the roles of climate, geology, soils, natural disturbance, forest management, and biotic factors in determining forest community type; 4) primary and secondary succession, including old-growth. Prereq: one course in ecology or environmental biology or permission. Special fee.

### **NR 784 - Sustainable Living**

**Credits:** 4.00

Concepts of sustainability are explored in a learning-community format. The importance of human communication, sense of place and time, and the health and longevity of the human species as part of

natural systems is emphasized. Students develop measures for sustainable living, including ecological foot-printing, and gain an understanding of system conditions necessary to move toward sustainable living. Two required field trips. Special fee.

### **NR 785 - Systems Thinking for Sustainable Living**

**Credits:** 4.00

Introduces systems thinking from a sustainable living perspective. The course is a collaborative inquiry using a problem-solving approach. After studying different types of systems and learning a variety of tools useful in systems analysis, we ask "In what ways can systems thinking be employed to understand and begin to resolve the complex problems that face us as we move toward living within limits of natural systems?"

### **NR 791 - Project in Environmental Science I**

**Credits:** 1.00

First part of a two-course capstone project sequence for Environmental Science majors. Intended for second semester juniors, this course requires selection of a topic area, and initial library and background research, leading to a statement of the problem to be addressed. To be followed by NR 792. Restricted to Environmental Science majors. Cr/F.

### **NR 795 - Investigations**

**Credits:** 1.00 to 4.00

Investigations in Natural Resources may include topics in environmental conservation, forestry, soil and watershed management, ecosystems, and wildlife management. Permission required. Special fee on some topics.

### **NR 795W - Investigations**

**Credits:** 1.00 to 4.00

Investigations in Natural Resources may include topics in environmental conservation, forestry, soil and watershed management, ecosystems, and wildlife management. Permission required. Writing intensive.

### **NR 797 - Special Topics**

**Credits:** 1.00 to 4.00

An experimental course for the purpose of introducing a new course or teaching a special topic for a semester in an area of specialization in natural resources. Permission required. Special fee on some sections.

### **NR 799 - Honors Senior Thesis**

**Credits:** 4.00

Honor/thesis students conduct an independent research project, relevant to the student's area of specialization in the major, under the direction of a faculty sponsor. Students submit a research proposal, write a final report, and provide an oral presentation. Two semester sequence; IA (continuous grading) grade given at the end of first semester. Restricted to Senior/Natural Resource Majors. Permission. Writing intensive.

## Neuroscience and Behavior

### **NSB 400 - Topics Neuroscience & Behavior**

**Credits:** 1.00

This seminar type course is designed as an introductory experience for incoming first-year students, although it may be taken by students transferring into the major. Topics covered will include sensory biology, learning and memory, homing and navigation, neuromodulators and stress, reproductive behaviors. The format will rely heavily on discussion, prompted either by assigned readings or presentations by program faculty on their areas of expertise. Credit/fail. 1 cr.

### **NSB 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience to settings associated with future professional employment or graduate opportunities. Must be approved by supervising faculty. 1-4 credits for a maximum of 8 credits. Cr/F. 600W is writing intensive.

### **NSB 795 - Special Investigations**

**Credits:** 1.00 to 4.00

Independent research with any member of the NSB faculty in various areas including but not limited to neuroscience, neuroendocrinology, animal behavior. Prereq: Permission of faculty concerned. Credits 1-4. 795W is writing intensive.

### **NSB 799H - Honors Senior Thesis**

**Credits:** 2.00 to 4.00

Working under the direction of a faculty sponsor, the student plans and executes independent research resulting in a written thesis and public presentation. Limited to student entering their senior year or under exceptional circumstances their junior year. Required for students working toward University Honors or Honors-in-Major. Prereq: permission. A two-semester sequence 2-4 credits each semester, 8 credits maximum. IA (continuous grading) given first semester. Writing intensive.



## Nursing

### **NURS 400 - Nursing Continuing Enrollment**

**Credits:**

RN-BS students are required to maintain continuous enrollment each semester of the academic year until their degree is formally awarded by registering for course credit at the University of New Hampshire Durham or Manchester or registering for NURS 400, Continuing Enrollment. Students registering to NURS 400 will pay a continuing enrollment fee. No credit. Special fee.

### **NURS 450 - Making Babies: Technology, Nature, and Social Context**

**Credits:** 4.00

Examines the process of human birth focusing on the emergent technologies of human genetics, assisted fertility technologies, prenatal diagnosis and treatment, as well as the appropriate and inappropriate use of technology through the labor, delivery, and post-partum experience. The social, cultural, political, and historical context for the development and application of these technologies is explored.

### **NURS 500 - Introduction to Professional Nursing**

**Credits:** 2.00

The course provides an overview of professional nursing with a focus on reflective thinking. A synthesis of current and projected trends in nursing practice and education, with an introduction to topics on ethical, social, and legislative issues, are explored. This course is divided into five modules: nursing as a career, nursing as a profession, nursing as art and science, nursing as communication, and nursing and relationship-centered care. Prereq: BMS 507-508; majors only. Pre- or Coreq: BMS 501. Special fee.

**Co-requisites:** NURS 504, NURS 512

### **NURS 501 - Introduction to Nursing**

**Credits:** 4.00

Examines the values and philosophy of the Department of Nursing. Explores the four domain concepts of nursing: health and how it is defined, the diverse clients served by nursing, nursing as a profession, and the complex environment within which nursing is practiced. The nature of nurse-client encounters is explored with an emphasis on teaching students the skills to interact in a caring, facilitative manner. Prereq: permission. Special fee.

### **NURS 502 - Concepts of Pathophysiology/Pharmacology**

**Credits:** 4.00

Focuses on concepts of pathophysiology/pharmacology relevant to nursing practice. The physiologic response and manifestations of alterations in normal body functioning are analyzed and the effects of pharmacological agents on these alterations are examined. Prereq: ZOOL 507-508; MICR 501; majors only.

### **NURS 504 - Disease and Drugs I**

**Credits:** 4.00

The two semester course advances knowledge of human physiology and the pathophysiological variations in selected global disease states in adults and children. Student explore how the human body uses its adaptive powers to maintain a steady state and how alterations affect normal processes. Pharmacological agents used on these alterations are examined. Prereq: BMS 507-508; majors only. Pre- or Coreq: BMS 501.

**Co-requisites:** NURS 500, NURS 512

## **NURS 505 - Diseases and Drugs II**

**Credits:** 4.00

The two semester course advances knowledge of human physiology and the pathopsychological variations in selected global disease states in adults and children. Students explore how the human body uses its adaptive powers to maintain a steady state and how alterations affect normal processes. Pharmacological agents used on these alterations are examined. Prereq: NURS 500; majors only.

**Co-requisites:** NURS 506, NURS 601

## **NURS 506 - Human Development, Interaction and Learning Across the Lifespan**

**Credits:** 4.00

The course emphasizes human development, interaction and learning across the lifespan as essential to safe, effective relationship-centered care. An exploration of selected theoretical perspectives on human development, education and learning and group development prepares students to engage in professional practice. Prereq: NURS 500; or by permission.

**Co-requisites:** NURS 505, NURS 601

## **NURS 508 - Foundations of Nursing Judgment**

**Credits:** 4.00

Focuses on the knowledge and analytical skills required to adequately assess the health status of individuals. Students learn how to collect data using an assessment framework, analyze the data, and identify client resources and problems. Emphasizes the implications of the individual's developmental status, culture, and biologic variations at all points in the assessment process. Prereq: ZOOL 507-508; NUTR 400; MICR 501; PSYC 401; NURS 501; majors only.

**Co-requisites:** NURS 502, NURS 514

## **NURS 512 - Introduction to Nursing Assessments and Interventions**

**Credits:** 4.00

This course focuses on developing knowledge, skills, and attitudes necessary for completing health assessments across the lifespan. History taking and assessment skills are utilized to identify and prioritize healthcare needs in order to develop appropriate interventions to assist clients within their situational contexts to promote health and make lifestyle changes. Students explore principles of health promotion throughout the lifespan in a variety of settings across the healthcare continuum. Prereq: BMS 507-508. Majors only. Pre- or Coreq: BMS 501. Special fee.

**Co-requisites:** NURS 500, NURS 504

## **NURS 514 - Techniques of Clinical Nursing**

**Credits:** 4.00

Focuses on the acquisition of psychomotor and assessment skills required for the delivery of safe nursing care. Students begin by learning clinical skills in the simulation setting and then using those skills with supervision in the clinical setting. An additional focus of this course is understanding fundamental nursing concepts as they pertain to providing safe, effective care. Prereq: ZOOL 507-508; NURS 501; majors only. Lab. Special fee.

**Co-requisites:** NURS 508

## **NURS 535 - Death and Dying**

**Credits:** 4.00

Encompasses peoples' responses to death throughout the lifecycle. Theories of death, dying, and grieving discussed. Students explore cultural influences, legal, and ethical dilemmas; the biopsychosocial needs of people facing life-threatening situations; resources for care of the dying; death rituals; and surviving a major loss. Writing intensive.

## **NURS 595 - Women's Health**

**Credits:** 4.00

Examines women's health and women's health care from historical, political, and social perspectives. Discussion of societal and health-care constraints that hinder women from achieving their full health potential. Also presents information on women's health care practices, including the concept of self-care, and relates this to development of educated consumerism in the health-care system.

**NURS 601 - Function and Wellbeing of Older Adults****Credits:** 4.00

This course focuses on developing knowledge necessary for promoting healthy aging and wellness across the lifespan. Multidimensional assessment skills are utilized to develop appropriate evidence-based interventions to assist individuals and families to maintain wellness and promote healthy lifestyles and enhance the quality of life for older adults with acute and chronic conditions. Students will explore nursing issues and principles of promoting wellness across the health care continuum including end of life and palliative care. Prereq: NURS 500; majors only. Special fee.

**Co-requisites:** NURS 505, NURS 506

**NURS 606 - Seminar on Professional Nursing****Credits:** 7.00

The role of health professionals from historical, social, political, economic and technical view points. Individual student examinations of values, attitudes and beliefs regarding professional role in relation to current nursing theory and practice. Open to RN students only by permission. Prereq: NURS 645. Writing intensive.

**NURS 611 - Care of the Adult with Acute Illness I****Credits:** 4.00

The first of two courses focused on adult health nursing of clients with commonly occurring disease states in the acute care setting. Course builds on previously learned knowledge of physical assessment and technical skills to focus on key components of acute care nursing. Special emphasis placed on the etiology, clinical evaluation and use of evidence-based nursing interventions to manage specific health problems related to cardiovascular, hematologic, pulmonary, endocrine and renal systems. The advanced skills and techniques required to care for clients with commonly occurring disease states is included. Prereq: NURS 505; majors only.

**Co-requisites:** NURS 611C, NURS 626, NURS 641

**NURS 611C - Care Adult Acute Ill I Clinic****Credits:** 2.00

Designed to provide the student with opportunities to apply the nursing process and clinical judgment within an acute care setting to clients with commonly occurring disease states. The experience focuses on the application of knowledge and skills, evidence-based practice, clinical judgment and relationship-centered care. Prereq: NURS 505; majors only. Special fee.

**Co-requisites:** NURS 611, NURS 626, NURS 641

**NURS 612 - Care of the Adult with Acute Illness II****Credits:** 4.00

This is the second of two courses focused on adult health nursing of clients with commonly occurring disease states in acute care nursing. The course builds on previously learned knowledge of physical assessment and technical skills to focus on key components of acute care nursing. Special emphasis is placed on the etiology, clinical evaluation and use of evidence-based nursing interventions to manage specific health problems related to gastrointestinal, neurological, musculoskeletal systems and clients undergoing surgery. Complex client issues related to oncologic, immunologic and shock states are introduced. The advanced skills and interventions required to care for clients with commonly occurring disease states and those undergoing surgery are included. Prereq: NURS 611; majors only.

**Co-requisites:** NURS 612C, NURS 627

### **NURS 612C - Care of the Adult with Acute Illness II Clinical**

**Credits:** 2.00

Course is designed to provide the student with opportunities to apply the nursing process and clinical judgment within an acute care setting to clients with commonly occurring disease states and those undergoing surgery. The experience focuses on the application of knowledge and skills, evidence-based practice, clinical judgment and relationship-centered care. Prereq: NURS 611; majors only. Special fee.

**Co-requisites:** NURS 612, NURS 627

### **NURS 613C - Care of the Adult with Acute Illness III, Clinical Concentration**

**Credits:** 2.00

Designed to provide the student with an intensive and concentrated opportunity to apply the nursing process and clinical judgment within an acute care setting to clients with multiple health deviations and polypharmaceutical interventions. Students refine organizational skills in delivering comprehensive nursing care to two or more clients. In addition, students enhance their communication and teaching/learning skills by assuming a leadership role in the care of a client group. Prereq: NURS 612; majors only. Pre- or Coreq: NURS 612C. Special fee.

**Co-requisites:** NURS 627

### **NURS 615 - Adult Health Nursing**

**Credits:** 4.00

Addresses the professional nursing practice, decision making processes, strategies and interventions as they relate to the care of adults who are experiencing chronic illnesses, acute illnesses, or impending death. The perspective adopted emphasizes the functional issues of daily living that these illnesses impose and the meanings these illnesses have for adults and their families within cultural, socioeconomic, sociopolitical, physical, and personal contexts. Prereq: first semester junior nursing major. Prereq: NURS 502, 508, 514. Special fee.

**Co-requisites:** NURS 615C

### **NURS 615C - Adult Health Nursing Clinical**

**Credits:** 4.00

Prereq: NURS 502, 508, 514. **Co-requisites:** NURS 615

### **NURS 616 - Relationship-Centered Care: Living with Mental Illness Across the Lifespan**

**Credits:** 4.00

This course is designed to provide an understanding of acute and chronic mental illness across the lifespan. Neurobiological sciences, psychosocial concepts and current traditional/nontraditional somatherapies are explored. Emphasis is placed on evidence-based practice in the field of psychiatric nursing supported by the Scope and Standards of Psychiatric - Mental Health Nursing Practice. The hallmark of this course is founded on relationship-centered care as a vehicle for healthcare delivery. Prereq: NURS 505; majors only.

### **NURS 617 - Nursing and Healthcare Policy**

**Credits:** 3.00

Examines the nature and quality of health care delivery systems and health related social programs from a nursing perspective. Critical thinking skills and strategies needed by professional nurses to participate in health care planning and health care consumer advocacy for improved health services emphasized. Prereq: for R.N.s with at least one year of clinical experience or permission.

### **NURS 618 - Caring for People with Alterations in Mental Health**

**Credits:** 2.00

Provides an understanding of the concepts of mental health and major factors affecting human behavior and interaction. Specific theoretical concepts guiding nurse-client interactions are used as a vehicle for supporting the person's and family's optimum state of well-being. Prereq: NURS 622.

**Co-requisites:** NURS 618C, NURS 624, NURS 624C

### **NURS 618C - Caring for People with Alterations in Mental Health**

**Credits:** 2.00

Emphasis on the practice of psychiatric nursing as being grounded on certain empirical, aesthetic, personal, and ethical knowledge. Nursing process and a situation-based interpretive approach serve as a framework for professional action. Through a variety of clinical experiences, the student applies mental health concepts/principles of interaction. Prereq: NURS 622.

**Co-requisites:** NURS 618, NURS 624, NURS 624C

### **NURS 619 - Clinical Decision Making I**

**Credits:** 4.00

To practice effectively nurses must be able to gather data, interpret its meaning, take actions based on an understanding of the data, and evaluate outcomes. They also must be aware of the processes used to reach conclusions and be prepared to revise, adapt, or reject them. The course focuses on teaching learning theory, ethical decision making, and helping clients and families deal with situational and maturational crises, using a critical thinking framework. Prereq: first-semester junior nursing majors; NURS 501; 502; 508; 514 Special fee. Writing intensive.

**Co-requisites:** NURS 615

### **NURS 620 - Caring for the Childbearing and Childrearing Family**

**Credits:** 4.00

This course has family as the focus for nursing practice, introducing the student to the care of young families throughout pregnancy, birth and child-rearing periods. Healthy transitions and physical alterations occurring from conception through adolescence are examined. The health needs of the family are discussed in terms of major morbidity/mortality and contemporary issues. Experience in various clinical settings provides opportunities for the development of professional practice roles. Prereq: second semester junior nursing major.

**Co-requisites:** NURS 620C

### **NURS 620C - Caring for the Childbearing and Childrearing Family Clinical**

**Credits:** 3.00

Special fee.**Co-requisites:** NURS 620

### **NURS 621 - Maternal and Newborn Nursing**

**Credits:** 4.00

The students will integrate evidence using a holistic framework in the provision of safe nursing care to child-bearing families. Emphasis placed on prenatal, intra- and post-partal processes. Student assimilate knowledge and skills in a variety of care settings. Prereq: NURS 505; majors only. Special fee.

### **NURS 621C - Maternity Nursing Clinical**

**Credits:** 3.00

This clinical component of NURS 620, a course that has family as the focus for nursing practice, introducing the student to the care of young families throughout pregnancy, birth, and child-rearing periods. The health needs of the young family are discussed in terms of major morbidity/mortality and contemporary issues. This survey course offers students experiences in various clinical settings in order to provide opportunities for the development of professional practice roles in maternal health.

**Co-requisites:** NURS 621

## **NURS 622 - Clinical Decision Making II**

**Credits:** 4.00

Emphasizes the clinical decision making process in the nursing care of individuals, families, and communities across the lifespan and from diverse backgrounds. Builds upon the theoretical foundation developed in 619, Clinical Decision Making I. Students strengthen expertise in developing clinical judgments, interventions, and outcome evaluations. Skills predicated upon attending to and processing relevant information from clinical situations. Students apply knowledge from clinical nursing courses in a variety of ways. Prereq: second-semester junior nursing majors; NURS 619; or RN student.

## **NURS 624 - Nursing in the Community**

**Credits:** 2.00

Explores the role of community health nursing in health promotion, disease prevention, and long-term care. Analyzes contemporary community health problems with implications for community health nursing. Explores a variety of clinical and population-focused roles in primary, secondary, and tertiary prevention of health problems. Prereq: second semester junior nursing major.

**Co-requisites:** NURS 624C

## **NURS 624C - Nursing in the Community**

**Credits:** 2.00

Special fee.**Co-requisites:** NURS 618C, NURS 624

## **NURS 626 - Clinical Judgment in Nursing I**

**Credits:** 4.00

First of two courses designed to apply and analyze clinical reasoning and judgment in a variety of situations, focusing on the ability to prioritize and individualize evidence-based nursing interventions. Prereq: NURS 505; majors only. Special fee.

**Co-requisites:** NURS 611, NURS 611C, NURS 641

## **NURS 627 - Clinical Judgment in Nursing II**

**Credits:** 2.00

Second of two courses designed to apply and analyze clinical reasoning and judgment in a variety of situations, focusing on the ability to prioritize and individualize evidence-based nursing interventions. Prereq: NURS 626; majors only.

**Co-requisites:** NURS 612, NURS 612C

## **NURS 641 - Translating Research for Practice**

**Credits:** 4.00

The course focuses on the translation of current evidence into nursing practice through the identification of practice issues, appraisal and application of evidence, and the evaluation of outcomes. Development of evidence is examined using the research process. Concepts explored include research ethics and legal precepts, clinical judgment in knowledge development and application, and the integration of client values and preferences. Students learn to use reliable evidence to inform practice and make clinical judgments to promote nursing best practice. Prereq: NURS 505; majors only.

**Co-requisites:** NURS 611, NURS 611C, NURS 626

## **NURS 645 - Research**

**Credits:** 4.00

Focuses on enhancing the student's ability to evaluate, read, comprehend, participate in, and apply research to the practice of nursing. Pre or Coreq: statistics.

## **NURS 645W - Research**

**Credits:** 4.00

Focuses on enhancing the student's ability to evaluate, read, comprehend, participate in, and apply research to the practice of nursing. Pre or Coreq: statistics. Writing intensive.

### **NURS 655 - Community Health Nursing I**

**Credits:** 3.00

Explores role of community health nursing in health promotion, disease prevention and long term care at the population level. Identifies population at risk and implications for aggregate level nursing care. Open to RN students only by permission. Prereq: NURS 606.

### **NURS 656 - Community Health Nursing II: Individuals, Families, and Aggregates**

**Credits:** 2.00

Explores a variety of contemporary topics relevant to community health and community health nursing practice at the individual, family, and aggregate levels. Students have the opportunity to explore clinical focused roles of the community health nurse in primary, secondary, and tertiary prevention of health problems in individuals, families, and aggregates at risk across the life span. Evolving roles and responsibilities of a variety of community health nurse specialists introduced. Students collaborate with multidisciplinary health professionals in planning, providing, and evaluating health services to these specific at risk populations. May be repeated. Prereq: registered nurses only; NURS 606; permission.

**Co-requisites:** NURS 656C

### **NURS 656C - Community Health Nursing II/Clinical**

**Credits:** 1.00

Experience in various clinical settings to provide opportunities for the development of the community health nursing role. Students collaborate with multidisciplinary health professionals in planning, providing, and evaluating health services to population at risk. Prereq: open to RN students only by permission.

**Co-requisites:** NURS 656

### **NURS 694 - Special Topics**

**Credits:** 1.00 to 4.00

Specialized courses covering information not normally presented in regular course offerings. Description of topics will vary. May be repeated but not duplicate areas of content. Prereq: permission. (Not offered every year.)

### **NURS 695 - Independent Study**

**Credits:** 2.00 to 4.00

In-depth study with faculty supervision. Prereq: junior standing and approval of adviser and faculty of the area concerned. May be repeated for different topics.

### **NURS 702 - Child Health Nursing**

**Credits:** 2.00

The course considers the child in the context of family as the focus for nursing practice, introducing the student to the care of children using a developmental approach. Commonly occurring health transitions and alterations occurring from infancy through adolescence are examined. A survey of child health explores both professional practice roles of the pediatric nurse in health promotion and illness as well as acute and chronic conditions that impact children at various stages of development. Prereq: NURS 613C; majors only.

**Co-requisites:** NURS 704, NURS 704C

### **NURS 703 - Nursing Leadership/Management and the Organizational Context**

**Credits:** 4.00

Focuses on understanding ways in which the nurse can affect the organizations in which practice occurs and ways in which the organizations affect the individual's practice. Emphasizes issues of leadership;

management; power; change; motivation; and interfacing of autonomous, dependent, and interdependent nursing functions in current and future health care delivery systems. Prereq: first-semester senior nursing majors; NURS 622. RN students should take NURS 703W.

### **NURS 703W - Nursing Leadership/Management and the Organizational Context**

**Credits:** 4.00

Focuses on understanding ways in which the nurse can affect the organizations in which practice occurs and ways in which the organizations affect the individual's practice. Emphasizes issues of leadership; management; power; change; motivation; and interfacing of autonomous, dependent, and interdependent nursing functions in current and future health care delivery systems. Prereq: first-semester senior nursing majors; NURS 622. RN students should take NURS 703W. Writing intensive.

### **NURS 704 - 21st Century Public Health Nursing**

**Credits:** 4.00

This writing intensive course prepares the student for population focused practice. Emphasis is placed on the synthesis of concepts, theories, knowledge and practice from nursing and public health sciences. Students explore the concepts of: community as client, community assessment, health promotion, health protection, illness prevention and vulnerability from a public health nursing perspective. Prereq: NURS 613C; majors only.

**Co-requisites:** NURS 702, NURS 704C

### **NURS 704C - 21st Century Public Health Nursing Clinical**

**Credits:** 4.00

Students are prepared for population focused practice. Emphasis is placed on the application of concepts, theories, knowledge and practice from nursing and public health sciences. Students conduct a comprehensive community assessment to develop, implement and evaluate populations focused interventions. Prere: NURS 613C; majors onyl.

**Co-requisites:** NURS 702, NURS 704

### **NURS 705 - Contemporary Leadership within Health Care Systems**

**Credits:** 4.00

The course explores the dynamic nature of the healthcare system and practice environments that impact nursing. Emphasis is placed on relationship of ethics, power, change, conflict, communication and politics in health care systems. Focus is placed on the use of models of leadership and management to effectively negotiate change, provide safe quality care, and promote professional practice in the delivery of relationship-centered care. Prereq: NURS 702; NURS 704; NURS 704C; majors only.

**Co-requisites:** NURS 721

### **NURS #710 - Families in Health and Illness**

**Credits:** 4.00

Seminar focuses on the family environment as a context for the experience of health and illness. Current middle-range theories and research from nursing and other disciplines analyzed for their application to family health. Public policy initiatives related to family health explored.

### **NURS 719 - Professional Nursing Practice: Transitions**

**Credits:** 7.00

Provides opportunity for students to refine and integrate previously learned knowledge and skills into professional practice through a cooperatively designed learning experience/environment. Open to R.N. students only, by permission. Prereq: NURS 606, 655, 656, 656C.

### **NURS 720 - Clinical Decision-Making III**

**Credits:** 6.00



Provides the student with the opportunity to integrate prior learning and experience, reflect on individual practice, and transition to professional practice in a career as a Registered Nurse. Emphasizes the refinement of professional skills related to leadership, management, problem solving, clinical and ethical decision-making, critical thinking, interpersonal communication, information management, and working as a productive team member. The weekly seminar provides an opportunity for the analysis, synthesis, refinement, and integration of nursing knowledge and practice. Regularly scheduled standardized tests are used to assess student progress and to provide timely feedback to facilitate the student's transition to professional practice. Prereq: all nursing major courses.

**Co-requisites:** NURS 720C

### **NURS 720C - Clinical Decision-Making III Clinical**

**Credits:** 6.00

Refine and integrate previously learned knowledge and skills into professional practice through a cooperatively designed learning experience/environment.

**Co-requisites:** NURS 720

### **NURS 721 - Integrating Professional Nursing Practice**

**Credits:** 2.00

The course provides students with the opportunity to advance their ability to synthesize and apply knowledge of concepts and theories to demonstrate nursing program competencies. Prereq: NURS 702, 704, 704C; majors only. Special fee.

**Co-requisites:** NURS 705

### **NURS 794 - Special Topics**

**Credits:** 1.00 to 4.00

Specialized courses covering information not normally presented in regular course offerings. Description of topics varies. May be repeated but not in duplicate areas of content. Prereq: permission. Special fee on some sections

### **NURS 794W - Special Topics**

**Credits:** 1.00 to 4.00

Specialized courses covering information not normally presented in regular course offerings. Description of topics varies. May be repeated but not in duplicate areas of content. Prereq: permission. Special fee on some sections. Writing intensive.

### **NURS 797 - Honors Thesis**

**Credits:** 1.00 to 4.00

Honors seminar designed to expand the knowledge and skills presented in previous honors in major courses. Focuses on a project relevant to the discipline of nursing under the direction of a faculty adviser. Open to honors-in-major and senior nursing majors. Students must complete two semesters of work 1cr. in fall, and 4cr. in spring. Writing intensive.

## Nutrition

### **NUTR 400 - Nutrition in Health and Well Being**

**Credits:** 4.00

This course is designed to teach the scientific principles of human biology using nutritional concepts to promote personal health and well being. Special fee. Students cannot earn credit for this course if they have taken ANSC 400 or NUTR 475.

**Co-requisites:**

### **NUTR 400H - Honors/Nutrition in Health and Well Being**

**Credits:** 4.00

This course is designed to teach the scientific principles of human biology using nutritional concepts to promote personal health and well being. Special fee. Students cannot earn credit for this course if they have taken ANSC 400 or NUTR 475.

### **NUTR 401 - Professional Perspectives on Nutrition**

**Credits:** 1.00

This survey course examines the many opportunities for dietitians and nutrition science professionals, from farm to fork, to health and nutrition outcomes. Students have the opportunity to meet and interact with department and university faculty. They explore the many career paths and nutrition strategies used by those in the food and nutrition science fields. Legal and ethical considerations for these professionals are discussed. Content areas for specialization in nutrition sciences, dietetics, nutrition and wellness are reviewed as well as those topics explored via the Ecogastronomy dual major. Prereq: NUTR major. Cr/F. (Fall semester only).

### **NUTR 405 - Food and Society**

**Credits:** 4.00

Consideration of the cultural significance of food, emphasizing historical, psychological, social, political, and economic aspects. (Spring semester only.)

### **NUTR 405W - Food and Society**

**Credits:** 4.00

Consideration of the cultural significance of food, emphasizing historical, psychological, social, political, and economic aspects. (Spring semester only.) Writing intensive.

### **NUTR 476 - Nutritional Assessment**

**Credits:** 4.00

Designed for the student who plans to enter the health care profession. Introduces the concepts of nutritional assessment and the practical application of these concepts in the nutritional care of clients in clinical, community, and research settings. Prereq: NUTR 400.

### **NUTR 504 - Managerial Skills in Dietetics**

**Credits:** 4.00

Emphasizes the basic principles of managing clinical, community, and food service operations, including personnel management, in-service and on-the-job training, policies and procedures development, and financial management. (Spring semester only.)

### **NUTR 505 - ServSafe**

**Credits:** 1.00

Topical area include: risk management, equipment selection, negotiation skills, and purchasing. Special fee.

### **NUTR 506 - Nutrition and Wellness**

**Credits:** 4.00

This course assists students in making informed decisions affecting personal and societal wellness. It emphasizes the dimensions of wellness, including the impact of psychological, emotional and physical health, as well as environmental influences that affect behavior. Nutrition majors only or by permission. (Spring semester only.)

### **NUTR 546 - Nutrition in Exercise and Fitness**

**Credits:** 4.00

Advanced nutritional strategies to optimize health, fitness, and athletic performance. Emphasis is on nutrition before, during, and after exercise for fitness, training, and competitions. Topics include optimal amounts of timing of dietary carbohydrates and proteins around the training period. Vitamins, minerals, and other dietary supplements are discussed. So are healthy strategies for building muscle and losing body fat. Classes are held live using online software through the internet. No presence on campus is required.

### **NUTR #547 - Nutrition and Athletic Performance**

**Credits:** 4.00

Practical applications of nutritional strategies that maximize athletic performance. Intended for college athletes, trainers, and coaches, as well as high-school coaches and physical education instructors. Topics include: the role of nutrition in athletic performance; training diets; nutritional strategies before, during, and after athletic events; nutritional strategies before, during, and after athletic events; nutritional strategies to support muscle building and body fat reduction; evaluation of performance enhancing supplements. No previous formal training in nutrition is necessary, as long as the student is highly motivated. General nutrition for general health and wellness is not covered. No credit for students who have completed NUTR 546. No prerequisite. Classes are presented with web-based software through the internet.

### **NUTR 550 - Food Science: Principle and Practice**

**Credits:** 4.00

Principles of food composition structure and properties and the chemical changes foods undergo in preparation and processing. Study of the laws and regulations that are applied to marketing food systems; principle and practice in food preservation. Application of scientific principles and interpretations of laboratory findings. Prereq: HMGY 403, NUTR 400, CHEM 403-404, and CHEM 545-546. Special fee. Lab.

### **NUTR 595 - Mediterranean Diet and Culture**

**Credits:** 4.00

Is there a diet that allows one to eat, drink, and still be healthy? While Americans struggle with rising rates of obesity and related health conditions, inhabitants of the Mediterranean region enjoy relatively low rates of heart disease, cancer, and obesity. Offers a unique on-site experience in Ascoli Piceno, Italy to investigate the cultural and scientific importance of the Mediterranean Diet. Students review basic nutrition concepts as well as the history and evolution of the Mediterranean diet. Combining lecture, discussion, and experiential activities, NUTR 595 is offered through the UNH Italy Study Abroad Program during the summer session.

### **NUTR 600 - Field Experience in Nutrition**

**Credits:** 1.00 to 4.00

Supervised field experience in public and private agencies with planned learning objectives related to the areas of clinical and community nutrition and food service management. Students are responsible for their own transportation; faculty member coordinates arrangements with fieldwork sites. Prereq: NUTR majors and minors only; permission; NUTR 400. May be repeated for a maximum of 6 credits. Cr/F.

### **NUTR 600W - Field Experience in Nutrition**

**Credits:** 1.00 to 4.00

Supervised field experience in public and private agencies with planned learning objectives related to the areas of clinical and community nutrition and food service management. Students are responsible for their own transportation; faculty member coordinates arrangements with fieldwork sites. Prereq: NUTR majors and minors only; permission; NUTR 400. May be repeated for a maximum of 6 credits. Cr/F. Writing intensive.

### **NUTR 610 - Nutrition Education and Counseling**

**Credits:** 4.00

This course focuses on the principles, methods and materials needed to apply nutrition education and counseling processes. Emphasis is placed on behavior change and developing the skills needed to be an effective nutrition educator and counselor. Prereq: NUTR 400 and NUTR 476. Section 1 is restricted to Nutrition majors in Dietetics option, section 2 is restricted to Nutrition majors in Nutrition and Wellness option, or by permission. (Fall semester only.)

### **NUTR 650 - Life Cycle Nutrition**

**Credits:** 4.00

Comprehensive review of the nutritional issues related to the life cycle. The nutrient requirements of each stage of the life cycle are analyzed in the context of their metabolic functions. The course also involves the practical application of theory at each stage of the life cycle through projects and discussion. Prereq: NUTR 400. Nutrition majors only or by permission. (Spring semester only.)

### **NUTR 699 - Independent Study**

**Credits:** 1.00 to 4.00

Scholarly research project in an area of the nutritional sciences under the guidance of a faculty adviser. May be repeated. Prereq: permission. Cr/F.

### **NUTR 699W - Independent Study**

**Credits:** 1.00 to 4.00

Scholarly research project in an area of the nutritional sciences under the guidance of a faculty adviser. May be repeated. Prereq: permission. Cr/F. Writing intensive.

### **NUTR 700 - Career Development in Dietetics**

**Credits:** 1.00

This course prepares the student for a dietetic internship through investigation of supervised practice concentrations that meet their career goals. Course also emphasizes resume writing, interviewing, and professional skills.

### **NUTR 720 - Community Nutrition**

**Credits:** 4.00

Solutions to the complex public health nutrition problems require cost-effective, community-based interventions that identify and address their multiple causes. From food insecurity to the challenges of escalating obesity rates, the community nutritionist is a key player in designing prevention, intervention and health promotion programs and policies. Provides the skills and tools needed to assess, implement, and evaluate community nutrition interventions. Prereq: NUTR 400. Nutrition majors only, or by permission. Writing intensive.

### **NUTR #725 - Metabolic Adaptations to Exercise II**

**Credits:** 4.00

Examines the regulation of cellular metabolism in muscle, liver, adipose and other tissues of the body by

enzymes, effectors, and hormones in response to exercise. Focuses on the exercise-induced mechanisms for controlling metabolic pathway flow, techniques for studying metabolism, and up-to-date molecular and cellular exercise physiology research. Prereq: BMCB 658 or KIN 724.

### **NUTR 733 - Inv Diet Supplements & Herbs**

**Credits:** 4.00

Investigations into the potential benefits to human health of medicinal herbs and other dietary supplements. Students demonstrate their capacity to critically evaluate the potential effectiveness of dietary supplements by relying on peer-reviewed nutrition and medical journals. Topics include: traditional use of dietary supplements, integration of supplements with modern medical treatments, industry regulations, and marketing approaches. Several exemplary dietary supplements will be examined in detail, excepting most vitamins and minerals. Prereq: NUTR Senior.

### **NUTR 740 - Nutrition for Children with Special Needs**

**Credits:** 2.00

Nutritional assessment and care of children with special needs resulting in feeding difficulties requiring medical nutrition therapy. Prereq: NUTR 400.

### **NUTR 750 - Nutritional Biochemistry**

**Credits:** 4.00

Detailed analysis of the digestion, absorption, transport, and intermediary metabolism of nutrients. Nutrient requirements are evaluated in the context of their physiological and biochemical functions. Prereq: ANSC 511-512; BMCB 658; or equivalents. Writing intensive.

### **NUTR 751 - Nutritional Biochemistry of Micronutrients**

**Credits:** 4.00

Investigation of the biochemical and clinical aspects of micronutrient metabolism. All of the essential vitamins and minerals are explored in depth. Some representative phyto-nutrients and quasi-nutrients are also explored. The nutrients are examined for their molecular, cellular, and biomedical functions and intermediary metabolism, as well as the biochemical and clinical consequences of their deficiency or excess. Prereq: Nutritional biochemistry (NUTR 750/850 or equivalent.) Spring semester only.

### **NUTR 755 - Treatment of Adult Obesity**

**Credits:** 4.00

Overview of the risk factors associated with obesity; evidence-based recommendations for assessment and treatment of obesity. Counseling skills important to successful weight management and non-diet approaches are also explored. Open to Junior and Senior Nutrition majors, or by permission. Special fee.

### **NUTR 758 - Practicum in Weight Management**

**Credits:** 2.00

Practicum in Weight Management is a sequel to Treatment of Adult Obesity, a senior capstone course for Wellness majors. Students in the course are assigned individual clients in the CHE Weight Management Program whom they assist in making lifestyle and dietary changes over the 10 weeks of the program. Students also are required to give a presentation to the participants on one of the course topics. Prereq: NUTR 400, 476, and 610.

### **NUTR 770 - Nutrition and Gender Based Health Concerns**

**Credits:** 4.00

Offers a comprehensive review of the health issues facing adult men and women today. Students read and evaluate the current literature and document their reactions to group discussion in reaction papers on the topic. Students also present a topic of interest to the class.

### **NUTR 773 - Clinical Nutrition**

**Credits:** 4.00

Application of principles of normal nutrition and physiology to clinical problems; altered nutrient requirements in human disease. Prereq: basic nutrition, anatomy and physiology, and biochemistry. Nutrition majors only or by permission. (Fall semester only.)

**Co-requisites:** NUTR 775

### **NUTR 775 - Practical Applications in Medical Nutrition Therapy**

**Credits:** 4.00

Supervised practical experience in therapeutic dietetic in one of several cooperating New Hampshire hospitals. Emphasizes nutritional counseling, assessment, and instruction of patients with nutrition-related disorders. Prereq: basic nutrition, anatomy and physiology, and biochemistry. (Fall semester only.)

**Co-requisites:** NUTR 773

### **NUTR 780 - Critical Issues in Nutrition**

**Credits:** 4.00

Critical review and analysis of controversial topics in nutrition; emphasis on developing oral and written communication skills and analytical reasoning skills. Prereq: permission. (Spring semester only.) Writing intensive.

### **NUTR 790 - Undergraduate Teaching Experience**

**Credits:** 1.00 to 2.00

Students assist graduate teaching assistants or faculty in preparing, presenting, and executing NUTR courses/laboratories. May be repeated up to a maximum of 4 credits.

### **NUTR 795 - Investigations**

**Credits:** 1.00 to 4.00

Prereq: permission.

### **NUTR 795W - Investigations**

**Credits:** 1.00 to 4.00

Prereq: permission. Writing intensive.

### **NUTR 799 - Senior Thesis**

**Credits:** 1.00 to 4.00

A special project conducted under faculty supervision and resulting in a written honors thesis. Students must initiate discussion of the project with an appropriate faculty member. Offered both semesters. Prereq: Junior or Senior major with cum. GPA of 3.20; permission. Writing intensive.

### **NUTR 799H - Honors Senior Thesis**

**Credits:** 1.00 to 4.00

A special project conducted under faculty supervision and resulting in a written honors thesis. Students must initiate discussion of the project with an appropriate faculty member. Offered both semesters. Prereq: Junior or Senior major with cum. GPA of 3.20; permission. Writing intensive.

## Occupational Therapy

### **OT 444 - Living and Doing with Technology**

**Credits:** 4.00

Course consists of: a) exploring the impact that technology has on human lives; when technology becomes assistive technology, and when assistive technology becomes universally designed technology for all, b) exploring technology, using hands-on exploration of hundreds of assistive technology solutions, c) analyzing case studies of individuals whose lives have been affected by this technology, and d) developing creative problem-solving skills for everyday life challenges. Special fee.

### **OT 500 - Behavior and Development of Children**

**Credits:** 4.00

Introduces to the biological, psychosocial, and cultural aspects of human development from birth through adolescence. Emphasizes theories that help explain human behavior; discusses implications of developmental research.

### **OT 501 - Developmental Tasks of Adulthood**

**Credits:** 4.00

Includes the biological and psychosocial context of development. Developmental tasks as they relate to the accomplishment of prior tasks, physiological change, socioeconomic status, and psychosocial development. Prereq: child development course or permission.

### **OT 510 - Exploring Occupational Therapy and Occupation**

**Credits:** 4.00

Occupational therapy is introduced as a human service profession through experiential and academic activities, which illustrate the personal and professional skills required to practice in a variety of settings and roles. Basic concepts of human occupation and the therapeutic use of occupation are explored. Comparisons are made to related human service careers. Students are encouraged to do a personal assessment of their interest and potential for further study of occupational therapy. Students are required to complete a community service learning assignment

### **OT 513 - Stressed Out: The Science and Nature of Human Stress**

**Credits:** 4.00

The human stress response system, research investigating the sequelae of stress on health, protective strategies for stress, managing personal stress effectively, and strategizing stress modulation as an intervention technique. Course format includes two hours of weekly lecture/discussion followed by one hour of experiential laboratory in which students research and/or apply new information. Special fee.

### **OT 595 - Special Topics**

**Credits:** 4.00

Explores areas related to occupational therapy theory, practice, and/or research. Special fee on topic: College as Transition.

### **OT 610 - Occupation, Identity, Disability**

**Credits:** 4.00

Students develop skills and knowledge for analyzing daily existence, patterns of activity and the occupational choices pursued by humans. Students explore how the self-identity of individuals with and without disability is influenced by participation in everyday activities, and contextual factor: through reading, reflective writing and collecting personal narratives of individuals with disability, students examine the

relations among engagement in daily occupations and the orchestration of routines and social participation with self identity and well-being. Prereq: OT 510. Writing intensive.

### **OT 685 - Psychosocial Disorders and Everyday Life**

**Credits:** 4.00

The study of abnormal behavior in the context of its effect on everyday function. Provides background information on adult psychosocial disorders commonly seen by service providers in the mental health system. Students learn to observe and describe behavior in terms of functional impairment, diagnostic criteria, and causative factors. General psychosocial and biological treatments are studied. This course or its equivalent is a prerequisite for entry to the professional masters degree program in occupational therapy. Students are expected to bring to this course a basic knowledge of psychosocial aspects of human development. Prereq: PSYC 401. No credit earned if credit received for PSYC 561.

### **OT 695 - Independent Study**

**Credits:** 2.00 to 4.00

In-depth study with faculty supervision. Prereq: junior standing in OT major; approval of major adviser and faculty of area concerned. May be repeated for a maximum of 8 credits.

### **OT 710 - OT Practice and Professional Roles**

**Credits:** 4.00

Students are introduced to foundation knowledge, values and philosophy of occupational therapy practice. Students learn skills to apply professional behaviors and skills required to be ethical practitioners. They learn about various practice settings and systems within which occupational therapists practice to prepare them to begin to make decisions regarding their fieldwork site selections. They are introduced to models of OT practice. Special fee.

### **OT 722 - Introduction to Assistive Technology**

**Credits:** 4.00

Hands on course provides participants with an overview of the application of assistive technology in all life settings for individuals affected by physical, sensory, or cognitive limitations. Methods, materials, and resources for obtaining and providing assistive technology services will also be discussed. Special fee.

### **OT 724 - Assistive Technology and Physical Disabilities**

**Credits:** 4.00

An advanced course that focuses on the specialized assistive technology needs of persons with physical impairments. Topics include seating and positioning needs, prosthetic devices, manual powered mobility devices, ergonomics and computer access. Special fee.

### **OT 726 - Assistive Technology and Sensory, Communicative, and Cognitive Disabilities**

**Credits:** 4.00

Explores the application of various technologies for individuals with visual, auditory, cognitive and communication impairments. Included are: blind and low vision aides, assistive listening devices, alternative and augmentative communication devices, memory aides, and prompting aides. Special fee.

### **OT 730 - Assistive Technology for Enhancing Occupational Performance**

**Credits:** 3.00

This course provides instruction on how occupational therapy practitioners use and apply assistive technology in the context of client evaluation and intervention, to improve quality of life and functional capacities. Students learn and apply clinical reasoning skills related to the selection, procurement, modification and training in the use of assistive technology solutions.

**Co-requisites:** OT 730L



### **OT 730L - Assistive Technology for Enhancing Occupational Performance Lab**

**Credits:** 2.00

Co-Requisite Laboratory for OT 730/830 Assistive Technology for Enhancing Occupational Performance. Students are provided hands-on learning experiences regarding the fabrication, identification, adaptation and training in the use of assistive technology for individuals with functional problems associated with disability or impairment. OT evaluation and interventions related to the application of assistive technology are addressed.

**Co-requisites:** OT 730

### **OT 741 - Human Occupation**

**Credits:** 4.00

Students have three hours of classroom contact and regular contact with a mentor who is a master of a particular occupational activity. Students learn the activity with support of the mentor and other relevant experiences. Assignments include a presentation and two papers. An honors in the major course. Writing intensive.

### **OT 745 - Administration and Policy for Occupational Therapy Practice**

**Credits:** 4.00

This course aims to increase the student's understanding of systems of practice, and to business fundamentals associated with occupational therapy service delivery. Specific topics covered include and analysis of practice settings, reimbursement, supervision of professional and non-professional staff, program evaluation methods, ethics, OT management practices, marketing, health policy including medicare, Human Rights and Education Legislation, and the impact of policy decisions for the delivery of OT services.

### **OT 751 - Mind Body Systems/Neurologically Based Function and Dysfunction**

**Credits:** 4.00

Students study neurologically related disorders commonly seen by occupational therapists. A problem-based learning method is used to examine the perceptual, cognitive, biopsychosocial basis of these disorders. A basic overview of human body-mind systems is provided with an emphasis on pathology, the recognition of symptoms, their causes and the occupational implications of the disorders. Selected theoretical frames of reference for assessment and intervention are discussed in terms of general, holistic methods of practice. The course is a prerequisite for courses in specific occupational therapy assessment and intervention.

### **OT 752 - Human Movement and Environmental Effects on Everyday Occupations**

**Credits:** 4.00

Integrates the student's prerequisite knowledge of occupation. Develops skills required for interpretation of biomechanical analysis for creating successful occupational performance for individuals with varied musculoskeletal, cardiac and respiratory dysfunction. Integration of the occupational therapy clinical reasoning process and the use of occupations as a therapeutic mechanism for change are emphasized. The analysis of environment as it relates to human movement and participation in desired occupations is explored. Special fee.

### **OT 752L - Human Movement Lab**

**Credits:** 1.00

**Cr/F.Co-requisites:** OT 752

### **OT 760 - Psychosocial Evaluation and Intervention**

**Credits:** 4.00

Examines the evaluation of psychosocial and psycho-emotional areas of occupational performance and the planning and implementation of occupation-based interventions across domains of practice and client

populations. Course addresses developing a client's occupational profile, narrative reasoning and therapeutic use of self, behavioral change, illness representation, and adjustment to chronic disorders. A specific focus of the course is evaluation of and intervention for clients' presenting with mental health disorders. Open to OT majors only.

**Co-requisites:** OT 760L

### **OT 760L - Psychosocial Evaluation and Intervention Lab**

**Credits:** 1.00

This is the co-requisite lab for OT 760. Lab provides hands-on experiences regarding the evaluation and intervention of psychological and psycho-emotional areas of occupational performance. Course focuses on the evaluation and intervention for clients presenting with mental health disorders and also addresses narrative reasoning, therapeutic use of self, behavioral change, illness representation and adjustment to chronic disorders. Special fee. Cr/F.

**Co-requisites:** OT 760

### **OT 771 - Enabling Participation in Community Groups**

**Credits:** 2.00 or 3.00

Students will work in an organization, learn about the people served by this organization, conduct therapeutic groups within the organization. Emphasis of content includes group process, clinical documentation, intervention planning and OT services with adults with cognitive impairments.

**Co-requisites:** OT 771L

### **OT 771L - Enabling Participation in Community Groups Lab**

**Credits:** 2.00

Students will work in an organization, learn about the people served by this organization and conduct therapeutic groups. This lab serves as a Level I Fieldwork placement.

**Co-requisites:** OT 771

### **OT 771W - Enabl Participatn Comm Groups**

**Credits:** 3.00

Students will work in an organization, learn about the people served by this organization, conduct an assessment for occupation-based program or wellness program needs within the organization, and develop a proposal for this program to be implemented during the semester. Writing intensive.

### **OT 785 - Research Methods and Application to Practice**

**Credits:** 4.00

Research methods from qualitative, quantitative, and mixed perspectives are introduced and applied to relevant research questions in occupational therapy. Students critically analyze research articles, and systematically review efficacy research to examine the evidence associated with OT intervention outcomes. Students learn to synthesize research information for clinical practice.

### **OT 791 - Senior Honors Thesis**

**Credits:** 4.00

Completion of a research proposal based on a topic of relevance to the occupational therapy profession. Development of knowledge and skills in receiving and critiquing research and professional literature; research design and methodology; and the development of a research proposal. Required for graduation with honors in the major. Prereq: Completion of OT 741.

### **OT 792 - Level I Fieldwork**

**Credits:** 1.00

Provides occupational therapy students an opportunity to experience occupational therapy in a clinical setting. Students attend a seminar prior to beginning their placement. The Level I placement is scheduled

between the fall and spring semesters of the senior year. During fieldwork, students observe an occupational therapist as well as participate in the planning and implementing of the occupational therapy assessment or intervention process for a client. Cr/F.

**OT 795 - Special Topics**

**Credits:** 2.00 to 4.00

Explores areas related to occupational therapy theory, practice, and/or research. May repeat to 12 credits but not in duplicate subject areas. Prereq: permission. Special fee on some sections. Cr/F.

## Ocean Engineering

### **OE 690 - Introduction to Ocean Engineering**

**Credits:** 4.00

Survey of engineering applications in the ocean environment. Topics vary and include hydrodynamics, waves, tides, underwater sound, instrumentation, diving technology, marine geomechanics, and naval architecture. Taught by a team of faculty members from engineering departments. Prereq: PHYS 408; MATH 527.

### **OE 710 - Ocean Measurements Lab**

**Credits:** 4.00

Measurements of fundamental ocean processes and parameters. Emphasizes understanding typical offshore measurements, their applications, and the use of acquired data, in terms of the effects on structures and processes in the ocean.

### **OE 744 - Corrosion**

**Credits:** 4.00

Three-part course. First part reviews and develops basic concepts of electrochemistry, kinetics, and measurement methods. Second part covers details of specific corrosion mechanisms and phenomena including passivity, galvanic corrosion, concentration cell corrosion, pitting and crevice corrosion, and environmentally induced cracking. Third part focuses on the effects of metallurgical structure on corrosion, corrosion in selected environments, corrosion prevention methods, and materials selection and design. Prereq: CHEM 404 or 405; ME 561 or permission. Special fee. Lab. (Also listed as ME 744.)

### **OE 745 - Environmental Acoustics I: Air and Water**

**Credits:** 4.00

Sound and vibration; simple harmonic oscillators; characteristics and measurements of sound sources and receivers; acoustic wave equation (1D, 2D, 3D); sound reflection, transmission, refraction, and absorption in various media; room acoustics; basic sonar equation. Prereq: PHYS 408; MATH 527; ECE 544 or permission. Lab.

### **OE 753 - Ocean Hydrodynamics**

**Credits:** 3.00

Fundamental concepts of fluid mechanics as applied to the ocean, continuity, Euler and Navier-Stokes equations, Bernoulli equation, stream function, potential function, moment theorem, turbulence and boundary layers are developed with ocean applications. Prereq: permission.

### **OE 754 - Ocean Waves and Tides**

**Credits:** 4.00

Introduces waves: small amplitude, linear wave theory, standing and propagating waves, transformation in shallow water, energy and forces on structures, generation by wind and specification of a random sea, long waves with rotation, and internal waves. Introduces tides: description of tides in ocean tidal generation forces, equilibrium tide, and tidal analysis. Lab/project: field and lab measurements with computer analysis. Prereq: PHYS 407-408; MATH 527;/or permission. Lab.

### **OE 756 - Principles of Naval Architecture and Model Testing**

**Credits:** 4.00

Fundamentals of naval architecture presented, including hydrostatics, basics of resistance and propulsion, sea keeping and scaling. Concepts applied in experiments utilizing the tow/wave tank and associated

instrumentation. Prereq: ME 608 or equivalent; ME 627 or equivalent.

### **OE 757 - Coastal Engineering and Processes**

**Credits:** 3.00

Introduces small amplitude and finite amplitude wave theories. Wave forecasting by significant wave method and wave spectrum method. Coastal processes and shoreline protection. Wave forces and wave structure interaction. Introduction to mathematical and physical modeling. (Also offered as CIE 757; ME 757.) Prereq: fluid dynamics or permission.

### **OE 770 - Fundamentals of Ocean Mapping**

**Credits:** 4.00

Introduces the principles and practice of hydrography and ocean mapping. Methods for the measurement and definition of the configuration of the bottoms and adjacent land areas of the oceans, lakes, rivers, estuaries, harbors and other water areas, and tides or water levels and currents that occur in those bodies of water. Prereq: PHYS 407-408. (Also listed as ESCI 770.) Lab.

### **OE 771 - Geodesy and Positioning for Ocean Mapping**

**Credits:** 4.00

The science and technology of acquiring, managing, and displaying geographically-referenced information; the size and shape of the earth, datums and projections; determination of precise positioning of points on the earth and the sea, including classical terrestrial-based methods and satellite-based methods; shoreline mapping, nautical charting and electronic charts. Prereq: MATH 426, PHYS 408. (Also listed as ESCI 771.)

### **OE 795 - Special Topics**

**Credits:** 2.00 to 4.00

New or specialized courses and/or independent study. May be repeated for credit.

## Philosophy

### **PHIL 401 - General Introduction to Philosophy**

**Credits:** 4.00

Depending upon the instructor, emphasizes basic philosophic problems, recurrent types of philosophies, or selected readings from the history of philosophy.

### **PHIL 401H - Honors/General Introduction to Philosophy**

**Credits:** 4.00

Depending upon the instructor, emphasizes basic philosophic problems, recurrent types of philosophies, or selected readings from the history of philosophy. Writing intensive.

### **PHIL 401W - General Introduction to Philosophy**

**Credits:** 4.00

Depending upon the instructor, emphasizes basic philosophic problems, recurrent types of philosophies, or selected readings from the history of philosophy. Writing intensive.

### **PHIL 412 - Beginning Logic**

**Credits:** 4.00

Principles of reasoning and development of symbolic techniques for evaluating deductive and inductive arguments

### **PHIL 412H - Honors/Beginning Logic**

**Credits:** 4.00

Principles of reasoning and development of symbolic techniques for evaluating deductive and inductive arguments

### **PHIL 417 - Philosophical Reflections on Religion**

**Credits:** 4.00

Introduces philosophy of religion to help students become critically aware of philosophical issues involved in various forms of religious belief and some of the persisting philosophical understandings of those issues.

### **PHIL 421 - Philosophy and the Arts**

**Credits:** 4.00

Contemporary philosophic concerns and perspectives as reflected in one or more of the arts (literature, theatre, film, music, plastic art). Writing intensive.

### **PHIL 421H - Honors/Philosophy and the Arts**

**Credits:** 4.00

Contemporary philosophic concerns and perspectives as reflected in one or more of the arts (literature, theatre, film, music, plastic art). Writing intensive.

### **PHIL 424 - Science, Technology, and Society**

**Credits:** 4.00

Consideration of the scientific endeavor and its social import from a philosophical perspective.

### **PHIL 424H - Honors/Science, Technology and Society**

**Credits:** 4.00

### **PHIL 430 - Society and Morals**

**Credits: 4.00**

Critical study of principles and arguments advanced in discussion of current moral and social issues. Possible topics: violence, rules of warfare, sexual morality, human rights, punishment, abortion.

**PHIL 430H - Honors/Society and Morals****Credits: 4.00**

Critical study of principles and arguments advanced in discussion of current moral and social issues. Possible topics: violence, rules of warfare, sexual morality, human rights, punishment, abortion. Writing intensive.

**PHIL 430W - Society and Morals****Credits: 4.00**

Critical study of principles and arguments advanced in discussion of current moral and social issues. Possible topics: violence, rules of warfare, sexual morality, human rights, punishment, abortion. Writing intensive.

**PHIL 435 - Human Nature and Evolution****Credits: 4.00**

Philosophy of biology and the evolutionary process. Readings of scientists and philosophers' commentary on scientists. Examination of the differences between scientific debate and philosophic debate. Philosophical study of scientific theory stressing humans' place in the natural world and the ethical implication of humans as natural beings in the evolutionary process.

**PHIL 436 - Social and Political Philosophy****Credits: 4.00**

Examines social and political thought that may include texts from ancient through contemporary times, addressing topics such as natural rights, revolution, law, freedom, justice, power. Questions may include: What is a community, and how are individuals related to communities? Can any particular form of government be morally justified, and if so, what kind of government? Can anarchism work? Is there something wrong with a society in which there is private ownership of property? What is oppressive? What is freedom, and are we free? What roles should different forms of power play in a society? Could and should there be a genderless society? Is ethnic diversity valuable?

**PHIL 436H - Honors/Social and Political Philosophy****Credits: 4.00**

Examines social and political thought that may include texts from ancient through contemporary times, addressing topics such as natural rights, revolution, law, freedom, justice, power. Questions may include: What is a community, and how are individuals related to communities? Can any particular form of government be morally justified, and if so, what kind of government? Can anarchism work? Is there something wrong with a society in which there is private ownership of property? What is oppressive? What is freedom, and are we free? What roles should different forms of power play in a society? Could and should there be a genderless society? Is ethnic diversity valuable? Writing intensive.

**PHIL 436W - Social and Political Philosophy****Credits: 4.00**

See description for PHIL 436. Writing intensive.

**PHIL 444 - Remaking Nature/The Ethics and Politics of Genetic Engineering****Credits: 4.00**

Examines the biological, ethical, social, and political issues raised by genetic engineering. Students, acting as an "Advisory Council on Bioethics," formulate policy recommendations about whether or not there should be a Federal ban on research involving cloning of human embryos and genetically modifying plants

and animals for food. Writing intensive.

### **PHIL 444A - Concepts of Self**

**Credits:** 4.00

An inquiry into the nature of the self and into the conditions under which it may best flourish. Is the self fundamentally biological, spiritual, or social?. Draws on a variety of perspectives in an attempt to answer these questions, including East Asian as well as Western philosophical ideas, feminist theory, Existentialism, and others. Writing intensive.

### **PHIL 447 - Computer Power and Human Reason**

**Credits:** 4.00

The historical origins of the science of computation. The implications of the nature of information-processing for understanding the mind-body relation. Examines the possible social, economic, and educational consequences of the computer revolution.

### **PHIL 447H - Honors/Computer Power and Human Reason**

**Credits:** 4.00

The historical origins of the science of computation. The implications of the nature of information-processing for understanding the mind-body relation. Examines the possible social, economic, and educational consequences of the computer revolution.

### **PHIL 450 - Ecology and Values**

**Credits:** 4.00

Focuses on historical and contemporary philosophies of nature and their effects on human interaction with the environment. Issues include obligations to future generations and to animals, plants, and ecosystems; moral limits on consumption and reproduction; and the existence of objects of intrinsic value. Specific topics may include species loss and biological diversity, population growth, changes in the atmosphere, energy use, and sustainable development.

### **PHIL 450H - Honors/Ecology and Values**

**Credits:** 4.00

Focuses on historical and contemporary philosophies of nature and their effects on human interaction with the environment. Issues include obligations to future generations and to animals, plants, and ecosystems; moral limits on consumption and reproduction; and the existence of objects of intrinsic value. Specific topics may include species loss and biological diversity, population growth, changes in the atmosphere, energy use, and sustainable development.

### **PHIL 495 - Tutorial Reading**

**Credits:** 1.00 to 4.00

Basic introductory reading under faculty direction on topics of philosophical importance. Books offered for tutorial reading may be in any area the instructor chooses or on independent study basis up to a maximum of 8 credits. Prereq: permission.

### **PHIL 496 - Topics**

**Credits:** 4.00

Introductory-level seminar in specific topics or problems considered from a philosophic point of view.

### **PHIL 500 - Workshop**

**Credits:** 4.00

Introduces methods of studying philosophical texts. Emphasizes reading philosophical texts and arguments for comprehension, and on writing philosophically with accuracy and clarity. Open to PHIL majors only (PHIL minors may enroll if they receive permission). Writing intensive.



### **PHIL 510 - Philosophy and Feminism**

**Credits:** 4.00

Focuses on the philosophical issues in feminism primarily through the work of historical and contemporary philosophers. Topics include the question of the nature of women, feminism as an ethical and political theory, feminism as an exploration and transformation of the self, feminism as a philosophical methodology, the institutions of marriage and motherhood. Writing intensive.

### **PHIL 520 - Introduction to Eastern Philosophy**

**Credits:** 4.00

Major Eastern traditions of philosophy. Concentration on Indian, Chinese, and Japanese systems may vary from semester to semester.

### **PHIL 525 - Existentialism**

**Credits:** 4.00

Readings from existential philosophy and literature. Selections may be drawn from the works of Kierkegaard, Nietzsche, Heidegger, Sartre, Camus, de Beauvoir, Buber, Bultman, Merleau-Ponty, Tillich, Kafka, and others.

### **PHIL 525H - Honors/Existentialism**

**Credits:** 4.00

Readings from existential philosophy and literature. Selections may be drawn from the works of Kierkegaard, Nietzsche, Heidegger, Sartre, Camus, de Beauvoir, Buber, Bultman, Merleau-Ponty, Tillich, Kafka, and others.

### **PHIL 530 - Moral Philosophy**

**Credits:** 4.00

Critical examination of the development of philosophical thinking regarding human values, rights, and duties.

### **PHIL #550 - Symbolic Logic**

**Credits:** 2.00

Principles and techniques of modern logic. Topics: propositional logic, truth tables, predicate logic, and, time permitting, basic meta-theorems. Prereq: PHIL 412.

### **PHIL 560 - Philosophy Through Literature**

**Credits:** 4.00

Philosophical implications of representative literary works, read in tandem with philosophical works or articles. The content will vary. The literary works explored may be drawn from ancient times through modern times. For examples, the classic Greek tragedy "Antigone" might be explored for its implications regarding moral, political, and feminist philosophy, or the philosophical implications of an anti-utopian contemporary work like "Brave New World" might be explored, or short stories drawn from science fiction and other speculative fiction might be used to explore the possibility of time travel or of machines with mental lives. Writing intensive.

### **PHIL 565 - Philosophy Through Film**

**Credits:** 4.00

Philosophical exploration of film as a medium for developing philosophical ideas and for stimulating philosophical thinking about various issues reflected in film, from traditional philosophical issues to the pressing social and cultural issues of our time. The content will vary. Philosophical texts are read in tandem with screenings of a range of movies from Hollywood blockbusters and art house films to films made for TV. Philosophical issues such as the nature of consciousness, appearance and reality, God and evil, the good life, and time and memory might be explored. Film might also be used to examine representations of

race and gender or violence in society; and the power of movies to influence society might be explored through documentaries and propaganda films. Required evening film screenings in addition to regular class meetings. Writing intensive.

### **PHIL 570 - Ancient Philosophy**

**Credits:** 4.00

Development of Western philosophy from its beginnings in Greece to the Roman period, with particular emphasis on the thought of Plato and Aristotle.

### **PHIL 570H - Honors/Ancient Philosophy**

**Credits:** 4.00

Development of Western philosophy from its beginnings in Greece to the Roman period, with particular emphasis on the thought of Plato and Aristotle.

### **PHIL 571 - Medieval Philosophy**

**Credits:** 4.00

Philosophical thought of the Middle Ages from inception in the late Roman period with thinkers such as Plotinus and Augustine through the late medieval speculative mysticism of such figures as Meister Eckhart. Writings of Augustine and Thomas Aquinas.

### **PHIL 580 - Modern Philosophy from Descartes to Kant**

**Credits:** 4.00

The birth and development of distinctively modern philosophy in the thought of such creative minds as Galileo, Descartes, Hobbes, Leibniz, Spinoza, Locke, Berkeley, Hume, Rousseau, Reid, Kant, and others. Prereq: PHIL 570 or permission.

### **PHIL 610 - Advanced Topics in History of Philosophy**

**Credits:** 4.00

In-depth examination of a major figure or philosophical movement in the history of philosophy. Content will vary. Consult the Time and Room Schedule for topics. Course may be taken twice for credit (a third time with permission of the undergraduate program director) so long as the topic is different. May not be repeated to improve an earlier grade. Prereq: two courses in history of philosophy or permission. Writing intensive.

### **PHIL 616 - 19th Century Philosophy**

**Credits:** 4.00

Philosophical movements or philosophers associated with philosophical movements, such as later German idealism, French positivism, utilitarianism, Marxism, existentialism, and vitalism. Content will vary. Consult the Time and Room Schedule for topics. Course may be taken twice for credit (a third time with permission of the undergraduate program director) so long as the topic is different. May not be repeated to improve grade without approval from director of philosophy undergraduate program. Prereq: PHIL 574 or 575;/or permission. Writing intensive.

### **PHIL 618 - 20th Century Anglo-American Philosophy**

**Credits:** 4.00

Major figures in the analytic tradition in England and America. Content will vary. Consult the Time and Room Schedule for topics. Course may be taken twice for credit (a third time with permission of the undergraduate program director) so long as the topic is different. May not be repeated to improve grade without approval from director of philosophy undergraduate program. Prereq: two courses in history of philosophy (one of which may be concurrent);/or permission. Writing intensive.

### **PHIL 620 - 20th Century European Philosophy**

**Credits: 4.00**

Major figures or philosophical movements such as phenomenology, existentialism, critical social theory, and post-modernism. Content will vary. Consult Time and Room Schedule for topics. Course may be taken twice for credit (a third time with permission of the undergraduate program director) so long as the topic is different. May not be repeated to improve grade without approval from director of philosophy undergraduate program. Prereq: two courses in history of philosophy (one of which may be concurrent);/or permission. Writing intensive.

**PHIL 631 - Topics in the Philosophy of Science****Credits: 4.00**

Philosophical problems raised by the physical, biological, and social sciences. Content will vary. Topics may include the nature of scientific explanation, the role of mathematics in science, the relations of science to common sense, the relation of theory to observation, the nature of historical changes in scientific world view, claim to objectivity in the natural and social sciences, the role of values in scientific research, the relation of the logic of science to the philosophy and history of science. Prereq: two courses in history of philosophy;/or permission. Writing intensive.

**PHIL 635 - Philosophy of Law****Credits: 4.00**

Systematic study of salient features of legal systems. Possible topics: nature of law; concept of legal validity; law and morality; individual liberty and the law; legal punishment; legal responsibility and related concepts (for example, legal cause, harm, mens rea, negligence, strict liability, legal insanity). Writing intensive.

**PHIL 660 - Law, Medicine, and Morals****Credits: 4.00**

Critical examination of the diverse legal and moral issues facing the profession of health care. Variable topics. Possible topics: duty to provide care; nature of informed consent to treatment; problems of allocating limited health-care resources (e.g., withdrawal of life-support systems, quality-of-life decisions, etc.); patient's right to confidentiality. Problems relating to involuntary preventive care (e.g., involuntary sterilization, psycho-surgery, etc.). Writing intensive.

**PHIL 701 - Topics in Value Theory****Credits: 4.00**

Philosophical inquiry into the nature of value. Topics may include the grounds of right and wrong, various conceptions of morality, the nature of good and evil, theories about the meaning of life, the nature of the beautiful. Content will vary. Consult the Time and Room Schedule for topics. Course may be taken twice for credit (a third time with permission of the undergraduate program director) so long as the topic is different. May not be repeated to improve grade without approval from director of philosophy undergraduate program. Prereq: permission. Writing intensive.

**PHIL 702 - Topics in Metaphysics and Epistemology****Credits: 4.00**

Advanced study in one or more of the following topics: nature of reality, relationship of thought and reality, nature of knowledge and perception, theories of truth. Content will vary. Consult the Time and Room Schedule for topics. Course may be taken twice for credit (a third time with permission of the undergraduate program director) so long as the topic is different. May not be repeated to improve grade without approval from director of philosophy undergraduate program. Prereq: two courses in history of philosophy;/or permission. Writing intensive.

**PHIL #720 - Philosophical Psychology****Credits: 4.00**

Philosophical perspectives and problems concerning human nature or the human condition; e.g., the nature of "self," human action, the body-mind problem, freedom of the will, the meaning of "person," the nature of behavior, etc. Prereq: PHIL 500 and either PHIL 570 or PHIL 580; or permission. Writing intensive.

### **PHIL #730 - Theories of Justice**

**Credits:** 4.00

The idea of justice is central to social, political, and legal theory. Considerations of justice are appealed to in assessing the legitimacy of governments, and the fair distributions of goods, and opportunities both with nation-states and globally, and to address specific social concerns such as radical or gender discrimination or access to health care. Examine both historical sources and contemporary debates about the nature of justice. Prereq: PHIL 500, 530, or permission.

### **PHIL 740 - Advanced Topics in the Philosophy of Law**

**Credits:** 4.00

Content variable. In-depth examination of special topics (constitutional law, crime and punishment, international human rights and gender, sexual orientation, race and class in the law) or a major figure in the philosophy of law (Dworkin, Habermas and Rawls). May be repeated up to maximum of 8 credits. Prereq: PHIL 635 or permission. Writing intensive.

### **PHIL 780 - Special Topics**

**Credits:** 4.00

Advanced study of special topics: a problem, figure, or movement in the history of philosophy; or selected issues, thinkers, or developments in contemporary philosophy. Prereq: PHIL 500 and one course in the history of philosophy; or permission. May be repeated for credit. Writing intensive.

### **PHIL 795 - Independent Study**

**Credits:** 1.00 to 8.00

For students who are adequately prepared to do independent, advanced philosophical work; extensive reading and writing. Before registering, students must formulate a project and secure the consent of a department member who will supervise the work. Conferences and/or written work as required by the supervisor. May be repeated to a total of 8 credits. Writing intensive.

### **PHIL 798 - Senior Thesis**

**Credits:** 4.00

Two-course sequence open only to senior philosophy majors in the University Honors Program, the philosophy department honors-in-major program, or by special permission from the department. All senior thesis candidates must have a proposal approved in the spring of their junior year and a thesis adviser assigned by the undergraduate program director before registering for 798. Students must orally defend their theses before the department. (See department guidelines for further details.) Prerequisite for 798: PHIL 500. Prerequisite for 799: B- or above in 798. Writing intensive.

### **PHIL 799 - Senior Thesis**

**Credits:** 4.00

Two-course sequence open only to senior philosophy majors in the University Honors Program, the philosophy department honors-in-major program, or by special permission from the department. All senior thesis candidates must have a proposal approved in the spring of their junior year and a thesis adviser assigned by the undergraduate program director before registering for 798. Students must orally defend their theses before the department. (See department guidelines for further details.) Prerequisite for 798: PHIL 500. Prerequisite for 799: B- or above in 798. Writing intensive.

## Physics

### **PHYS 400 - Freshman Seminar**

**Credits:** 1.00

An informal reading and discussion course to introduce students to the general culture of physics, including career possibilities, historical and philosophical aspects of physics, current research at UNH and elsewhere, and physics in the news. Topics vary based on interests of the class. Students in their first year as physics majors (either as freshmen or transfers) are strongly encouraged to take this class. May be repeated once for a total of 2 credits. Cr/F.

### **PHYS 401 - Introduction to Physics I**

**Credits:** 4.00

Broad survey of classical and modern physics. Designed to enable students to appreciate the role of physics in today's society and technology. Emphasizes the fundamental laws of nature on which all science is based, with some examples of interest to biologists. Knowledge of high school algebra, geometry, and trigonometry essential. Lab.

### **PHYS 402 - Introduction to Physics II**

**Credits:** 4.00

Broad survey of classical and modern physics. Designed to enable students to appreciate the role of physics in today's society and technology. Emphasizes the fundamental laws of nature on which all science is based, with some examples of interest to biologists. Knowledge of high school algebra, geometry, and trigonometry essential. Prereq: PHYS 401 or the equivalent. Special fee. Lab.

### **PHYS 404 - THE Night Sky: Astronomy and the Ancients**

**Credits:** 3.00

Our view of the night sky has changed throughout the millennia. This course traces the history of how we view the sky from ancient times to the present day, covering elements of astronomy, mythology and space exploration. It also includes an observational component that will acquaint you with the basic skills of the amateur astronomer and how to develop your own view of the night sky.

### **PHYS 405 - Intro to Modern Astronomy**

**Credits:** 4.00

Starting with a survey of the night sky and the daily motions of the stars and planets, this course surveys our current understanding of the Universe. It traces the development of the tools of the modern astronomer and how those tools have led to our theories of the solar system, the life cycle of stars, the formation of elements, the formation of galaxies and the evolution of the universe. Students explore in depth an astronomical topic of their choice through a term paper. The course includes direct experience with astronomical techniques and concepts through the use of the UNH Observatory and Small Radio Telescope, and a visit to a planetarium. Recommended for liberal arts and beginning science students. Knowledge of high school algebra is assumed. Note that this is the same course as PHYS 406, except for the substitution of a term paper instead of a lab. Cannot be taken for credit if credit received for PHYS 406. Special fee.

### **PHYS 406 - Introduction to Modern Astronomy**

**Credits:** 4.00

Descriptive coverage of contemporary astronomical and astrophysical techniques with a review of current knowledge and theories concerning the solar system, galaxies, and the universe. Recommended for liberal arts and beginning science students. Knowledge of high school algebra is assumed. Note that this is the

same course as PHYS 405, except for the substitution of a lab instead of a term paper. Cannot be taken for credit if credit received for PHYS 405. Special fee. Lab.

### **PHYS 406H - Introduction to Modern Astronomy/Honors**

**Credits:** 4.00

Descriptive coverage of contemporary astronomical and astrophysical techniques with a review of current knowledge and theories concerning the solar system, galaxies, and the universe. Recommended for liberal arts and beginning science students. Knowledge of high school algebra is assumed. Note that this is the same course as PHYS 405, except for the substitution of a lab instead of a term paper. Cannot be taken for credit if credit received for PHYS 405. Special fee. Lab. Permission required.

### **PHYS 407 - General Physics I**

**Credits:** 4.00

Introductory course emphasizing motion, forces, energy, momentum, rotation, and oscillations. Recommended for the student specializing in science and engineering. Students in the Honors section must be co-enrolled in MATH 425H so that strong connections can be made between math and physics. 407H students work in groups in every class meeting. Prereq: thorough knowledge of algebra, geometry, and trigonometry; May not receive credit for both PHYS 401 and 407. Pre- or Coreq: MATH 425. Special fee. Lab.

### **PHYS 407H - Honors/General Physics I**

**Credits:** 4.00

Introductory course emphasizing motion, forces, energy, momentum, rotation, and oscillations. Recommended for the student specializing in science and engineering. Students in the Honors section must be co-enrolled in MATH 425H so that strong connections can be made between math and physics. 407H students work in groups in every class meeting. Prereq: thorough knowledge of algebra, geometry, and trigonometry; May not receive credit for both PHYS 401 and 407. Pre- or Coreq: MATH 425. Special fee. Lab.

### **PHYS 408 - General Physics II**

**Credits:** 4.00

Introductory course emphasizing waves, sound, heat, electricity and magnetism. Recommended for students specializing in science and engineering. Students in the Honors section must be co-enrolled in MATH 426H so that strong connections can be made between math and physics. 408H students work in groups in every class meeting. Prereq: PHYS 407. May not receive credit for both PHYS 402 and 408. Pre- or Coreq: MATH 426. Special fee. Lab.

### **PHYS 408H - Honors/General Physics II**

**Credits:** 4.00

Introductory course emphasizing waves, sound, heat, electricity and magnetism. Recommended for students specializing in science and engineering. Students in the Honors section must be co-enrolled in MATH 426H so that strong connections can be made between math and physics. 408H students work in groups in every class meeting. Prereq: PHYS 407. May not receive credit for both PHYS 402 and 408. Pre- or Coreq: MATH 426. Special fee. Lab.

**Co-requisites:** MATH 426H

### **PHYS 409 - Investigating Physics**

**Credits:** 4.00

Elementary physics course where students develop a conceptual understanding of topics such as the solar system, phases of the moon, seasons, electrical circuits, electromagnets, light and color, sound and simple machines. The course is based on hands-on-activities, small groups, and discussions. This course is intended for students with little or no previous experience in physics who do not intend to take any other

physics course. Cannot be taken for credit if credit received for PHYS 401, 402, 407 or 408.

**Co-requisites:**

**PHYS 444 - Myths and Misconceptions about Nuclear Science**

**Credits:** 4.00

The discoveries of nuclear physics have spawned the nuclear power plant and bomb, but also many far reaching, though less recognized applications of nuclear science in medicine, research, and our everyday lives. This course examines the underlying physics of nuclear science, the resulting technological applications and dangers, and some of the implications for public policy. In the process, we dispel many of the popular myths and misconceptions that surround nuclear science and radiation in the public's mind and the media. You may be surprised! Topics are wide ranging and inherently interdisciplinary. They include nuclear stability and radioactivity, natural sources of radioactivity, the effects of radiation on living things, particularly people, nuclear medicine, nuclear science in fields such as biology, archeology, geology and engineering, nuclear chain reactions, nuclear reactors and energy, nuclear accidents, radioactive waste, nuclear weapons and proliferation, nuclear energy in stars, and the origin of the elements. Be prepared to actively participate.

**PHYS #444A - The Big Bang**

**Credits:** 4.00

A seminar course that introduces students to some of the most exciting aspects of physics and astronomy: the nature of space and time, the Big Bang and the evolution of the universe. Writing intensive.

**PHYS 444B - Into the Final Frontier: America's Journey into Space**

**Credits:** 4.00

One of the greatest accomplishments of the twentieth century is the human advance into space. For the first time ever, travel beyond the Earth is more than just the subject of adventurous science fiction tales - it is reality. The purpose of this course is to trace the development of space flight from the late 1800's to the present time and discuss the advantages and disadvantages of maintaining a human space flight program.

**PHYS 501 - Peer-Led Team Learning in Physics**

**Credits:** 2.00

This course provides students with their initial experience as a peer instruction leader. In this course peer leaders will deepen their knowledge of introductory physics, be introduced to pedagogical theories, and meet weekly with students in introductory physics to facilitate their learning. Pedagogical topics covered include questioning techniques, learning theory, cooperative learning, student epistemologies, and the nature of science. Students in this course are asked to reflect on their work as peer leaders through the lens of the required readings. Prereq: PHYS 401/402 or PHYS 407/408. Permission required. Cr/F.

**PHYS 502 - Advanced Peer-Led Team Leadership in Physics**

**Credits:** 1.00

This course provides students with their second experience as a peer instruction leader. In this course peer leaders read more deeply about issues in teaching and learning science in general, and physics in particular. Topics include naive conceptions in physics, cooperative learning strategies, theories of cognition, and classroom assessment. Prereq: PHYS 501. Permission required. Cr/F.

**PHYS 505 - General Physics III**

**Credits:** 3.00

Electromagnetic waves, geometrical and physical optics, relativity, atomic physics, elementary quantum mechanics, molecular physics, and nuclear physics. Prereq: PHYS 408.

**PHYS 506 - General Physics III Laboratory**

**Credits:** 1.00

Structured laboratory experience in optics and modern physics. Coreq: PHYS 505. Special fee. Lab.

**Co-requisites:** PHYS 505

### **PHYS 508 - Thermodynamics and Statistical Mechanics**

**Credits:** 4.00

Classical and statistical approach to thermodynamics, kinetic theory. Prereq: PHYS 505. Coreq: MATH 526 or MATH 528.

**Co-requisites:**

### **PHYS 605 - Experimental Physics I**

**Credits:** 5.00

Circuit design with passive and active elements including transistors and operational amplifiers; electrical measurements for experimental physics; digital electronics, microprocessors, and interfacing techniques. Prereq: PHYS 408, 505; MATH 525 or 527. Lab. Special fee.

### **PHYS 615 - Classical Mechanics and Mathematical Physics I**

**Credits:** 4.00

Analytical treatment of classical mechanics covering the dynamics of particles and rigid bodies at an intermediate level. Advanced mathematical analysis (complex numbers, differential equations, Fourier series, multiple integrals) are reviewed or introduced as needed to analyze physical situations. Prereq: PHYS 407. Pre- or Coreq: MATH 527.

### **PHYS 616 - Classical Mechanics and Mathematical Physics II**

**Credits:** 4.00

Analytical treatment of classical mechanics covering the dynamics of particles and rigid bodies, at an intermediate level. Advanced mathematical analysis (complex numbers, differential equations, Fourier series, multiple integrals) are reviewed or introduced as needed to analyze physical situations. Prereq: PHYS 615.

### **PHYS 701 - Introduction to Quantum Mechanics I**

**Credits:** 4.00

Non-relativistic Schroedinger equation, the hydrogen atom, applications to atomic and nuclear structure. Prereq: PHYS 505, 615, 616.

### **PHYS 702 - Introduction to Quantum Mechanics II**

**Credits:** 4.00

Non-relativistic Schroedinger equation, the hydrogen atom, applications to atomic and nuclear structure. Prereq: PHYS 505, 615, 616.

### **PHYS 703 - Electricity and Magnetism I**

**Credits:** 4.00

Foundation of electromagnetic theory; electrostatics, dielectric theory, electromagnetism, magnetic properties of matter, alternating currents, Maxwell's field theory. Prereq: PHYS 408, 615, 616.

### **PHYS 704 - Electricity and Magnetism II**

**Credits:** 4.00

Foundation of electromagnetic theory; electrostatics, dielectric theory, electromagnetism, magnetic properties of matter, alternating currents, Maxwell's field theory. Prereq: PHYS 408, 615, 616.

### **PHYS 705 - Experimental Physics II**

**Credits:** 4.00

Modern physics experiments and special project problems assigned to individual students. Prereq: PHYS



605; senior standing in physics. Lab. Writing intensive.

### **PHYS 708 - Optics**

**Credits:** 4.00

Geometrical optics, electromagnetic theory of light, interference, diffraction, polarization, related phenomena and nonlinear optics. Prereq: PHYS 505, 615, 616. Lab.

### **PHYS 710 - Introduction to Modern Astrophysics**

**Credits:** 4.00

Reviews the sun, stars, Milky Way, external galaxies, and expansion of the universe. Recent discoveries of radio galaxies, quasi-stellar objects, cosmic black-body radiation, x rays, and gamma rays precede a discussion of Newtonian and general relativistic cosmological models, steady-state/big-bang theories, and matter-antimatter models. Prereq: PHYS 505, 615, 616.

### **PHYS 712 - Introduction to Space Plasma Physics**

**Credits:** 4.00

Introduces space plasma physics, including solar physics, heliospheric physics, magnetospheric physics, and ionospheric physics. An overview of the basic phenomena and processes (e.g., particle acceleration and transport, shock formation, magnetic structures and reconnection, wave propagation, wave-particle interactions, instabilities), theoretical techniques (e.g., single-particle orbits, kinetic and fluid descriptions), and experimental techniques. (Alternate years only.)

### **PHYS 718 - Introduction to Solid State Physics**

**Credits:** 4.00

Theory and experiment underlying the behavior of solids. Transport theory, surface studies, and the interaction of radiation and matter. Operation of semiconducting and superconducting devices and lasers. Prereq: PHYS 505, 615, 616.

**Co-requisites:** PHYS 701

### **PHYS 720 - Nuclear Physics**

**Credits:** 4.00

Nuclear phenomenology, reactions, models, radiation, interaction of radiation with matter; accelerators; properties and interactions of elementary particles; symmetries and symmetry breaking; standard model. Prereq: PHYS 702, 704.

### **PHYS 764 - General Relativity and Cosmology**

**Credits:** 4.00

Review of special relativity, and the motivation for considering gravity in terms of curvature of space time. Introduction to Riemannian geometry, general relativity and Einstein's equations. Application of general relativity in the study of black holes, gravitational waves, cosmology, as well as recent results on inflation and quantum gravity. (Alternate years only.)

### **PHYS 791 - Special Topics**

**Credits:** 4.00

Any selected topics not covered sufficiently in a general course may be studied. May be repeated to a maximum of 8 credits.

### **PHYS 795 - Independent Study**

**Credits:** 1.00 to 8.00

Individual project under direction of a faculty adviser. Prereq: department permission.

### **PHYS 799 - Thesis**

**Credits:** 4.00

Students work under the direction of a faculty sponsor to plan and carry out independent research resulting in a written thesis. Required for honors-in-major. Restricted to seniors. Prereq: permission. May be repeated to 8 credits. Writing intensive.

## Plant Biology

### **PBIO 400 - Plants and Civilization**

**Credits:** 4.00

Global experience of human interactions with plants and ways in which plants have contributed to the development and flourishing of human societies. Includes role of plants in providing sustenance, clothing and shelter, quest for spices and the historical consequences of plant explorations and exploitations, the power to heal or kill, plants in mythology and spiritual endeavors, plants that alter consciousness, plant diseases and human history, plants as energy for society, and the Green Revolution global change and feeding the world in the future. Special fee.

### **PBIO 405 - Organic and Sustainable Food Production**

**Credits:** 4.00

Introduces systems involved in organic food production with emphasis on sustainability of our food production. Scientific and biological principles relating to organic food production. Role of organic food production in our local communities. Special fee.

### **PBIO 412 - Introductory Botany**

**Credits:** 4.00

Plants in their natural environments: their structure, function, growth, reproduction, and evolutionary diversity. Special fee. Lab.

### **PBIO 421 - Introductory Horticulture**

**Credits:** 4.00

Introduces horticultural practices and principles affecting plant growth and development in garden, landscape, greenhouse, and farm settings. Special fee. Lab.

### **PBIO 421H - Honors/Introductory Horticulture**

**Credits:** 4.00

Introduces horticultural practices and principles affecting plant growth and development in garden, landscape, greenhouse, and farm settings. Special fee. Lab.

### **PBIO 501 - Basic Biochemistry**

**Credits:** 3.00

Fundamentals of general and plant biochemistry for students in majors not requiring the biology core, e.g., health sciences, agricultural sciences, environmental biology. (Will not substitute for BMCB 658-659, BMCB 751-752.) Not open to first-year students; not offered every year. Prereq: CHEM 403-404 or equivalent.

### **PBIO 503 - Introduction to Marine Biology**

**Credits:** 4.00

Emphasizes the organization of marine biological communities. Various marine environments pelagic, benthic, temperate, tropical and their characteristic communities. Major emphasis on the approaches (e.g., analysis of energy flow and predator-prey interactions) used to analyze marine communities as well as the sampling techniques employed for each approach and the characteristic habitat type. Prereq: BIOL 411-412. Special fee. (Also offered as ZOO 503.)

### **PBIO #547 - Environmental Horticulture**

**Credits:** 4.00

Effects of environmental factors such as nutrition, light, and temperature on plant growth and development. Hands-on learning of a scientific approach to plant production, with an emphasis on producing high-quality greenhouse plants. Diagnosis of plant problems related to environmental factors. Issues of environmental quality related to intensive horticultural production. Special fee. Writing intensive.

### **PBIO 565 - Turf Management**

**Credits:** 4.00

Adaptation and management of fine turf grasses for recreational, aesthetic, and functional use. Lab. Special fee.

### **PBIO 566 - Systematic Botany**

**Credits:** 4.00

Scientific basis of plant taxonomy and the identification and classification of major plant families, native trees, shrubs, and wild flowers. Field trips, plant collection. Prereq: BIOL 412 or PBIO 412. Lab. Special fee.

### **PBIO 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in setting associated with future professional employment and/or related graduate opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F.

### **PBIO 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in setting associated with future professional employment and/or related graduate opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F. Writing intensive.

### **PBIO 612 - Plant Genetics and Reproduction**

**Credits:** 4.00

Introduces plant domestication, Mendelian inheritance, plant reproduction, biochemical basis of inheritance, plant breeding, and biotechnology of crop plants. Prereq: CHEM 403; PBIO 412 or equivalent. Will not satisfy biology core requirement for genetics.

### **PBIO 615 - Tropical Coastal Plant Ecology**

**Credits:** 4.00

A field-based course taught on location in Grenada, West Indies, providing an introduction to the physical chemical and biological processes that form and sustain tropical coastal plant communities with an emphasis on mangroves and seagrasses. Plant adaptations to various environmental stresses will be examined over a range of habitats spanning a gradient of salinity from fresh to saline environments. As a dynamic ecosystem affected by both natural and anthropogenic disturbances from hurricanes to large-scale development, major environmental impacts and pressures will be examined first hand, and conservation and management actions will be discussed. A variety of on-going, community-based coastal habitat restoration and ecological monitoring sites will be visited throughout Grenada. Student participation in management actions will be encouraged through interaction with students from St. Georges University, local volunteers, and representatives from governmental environmental agencies and local non-governmental organizations. The course material is relatively specialized and is appropriate for juniors and seniors with interest/background in botany, coastal ecology and restoration, and conservation. Prereq:

BIOL 411/412.

### **PBIO 625 - Introduction to Marine Botany**

**Credits:** 4.00

Life history, classification, and ecology of micro- and macroscopic marine plants, including phytoplankton, seaweed, and salt marsh plants, and the interactions between humans and marine plant communities. Occasional Saturday morning field trips. Prereq: BIOL 412 or PBIO 412 or permission. Special fee. Lab.

### **PBIO 650 - Crop Production Technologies**

**Credits:** 3.00

Major technologies and systems for intensive production of warm season vegetable crops, including traditional and alternative tillage and fertilizer practices, irrigation systems, storage systems, and use of various plasti-culture techniques (mulches, row covers, high tunnels, and greenhouses) to extend the growing season. Prereq: PBIO 421 or equivalent or permission; PBIO 546 and 547 recommended. (Not offered every year.)

### **PBIO 651 - Plant Pathology**

**Credits:** 4.00

Nature, symptomatology, etiology, epidemiology, and control of important plant diseases. Prereq: PBIO 412, BIOL 411-412, or equivalent. Lab.

### **PBIO 652 - Culture of Vegetable Crops**

**Credits:** 3.00

Origin, distribution, adaptation and culture of major temperate and subtropical vegetable crops. Lectures emphasize information on varieties, planting systems, cultivation, pest control, harvesting, and storage for New England growing conditions. Prereq: PBIO 421 or 412 or equivalent or permission; PBIO 546 recommended. (Not offered every year.)

### **PBIO #679 - Landscape Management**

**Credits:** 3.00

Relates the principles of plant growth and development to current theory and practice in the establishment and maintenance of landscape plants. Plant selection, site assessment, planting techniques, cultural practices and diagnosis of problems are addressed with emphasis on environmental sustainability. Prereq: PBIO 421 or permission. Special fee. (Offered every other year.)

### **PBIO #689 - Greenhouse Crop Management**

**Credits:** 4.00

Production of annuals, herbaceous perennials, and flowering bulbs. Hands-on learning of production aspects including nutrition and irrigation management, and details of specific floricultural crops. Business management for greenhouse and nursery operations is covered, including use of computer spreadsheet tools. Prereq: PBIO 547. Lab. Special fee. (Offered alternate years.)

### **PBIO 701 - Plant Physiology**

**Credits:** 3.00

Structure-function relationship of plants, internal and external factors regulating plant growth and development, plant hormones, plant metabolism, water relations, and mineral nutrition. Prereq: PBIO 412 or PBIO 421 or BIOL 411-412; CHEM 403-404; PBIO 501 or equivalent.

### **PBIO #702 - Plant Physiology Laboratory**

**Credits:** 2.00

Analytical techniques for plant physiology, effects of growth regulators on plant growth and development, cell and tissue culture, enzyme kinetics, and plant water relations. Pre- or Coreq: PBIO 701. Special fee.

### **PBIO 709 - Plant Stress Physiology**

**Credits:** 3.00

Physiological and biochemical mechanisms of plant responses to abiotic stresses, including drought, salt, high and low temperature, visible and ultra-violet radiation, heavy metals, and air pollutants. Current hypotheses, agricultural and ecological implications are discussed. Prereq: plant physiology; biochemistry; or permission. (Offered alternate years.)

### **PBIO 713 - Biochemistry of Photosynthesis**

**Credits:** 4.00

Physiology and biochemistry of photosynthesis in higher plants and microorganisms: light reactions, electron transport, membrane structure and function, carbon assimilation pathways, energy conservation, and metabolic regulation. Agronomic and ecological aspects of photosynthesis are examined. Prereq: plant physiology or biochemistry (Not offered every year.)

### **PBIO 717 - Lake Ecology**

**Credits:** 4.00

Introduces the ecology of freshwater systems with emphasis on lakes. Origins of lakes and the effects of watersheds on lake chemistry and nutrient cycling are explored. Other topics include the impact of human disturbances on productivity and aquatic food webs and methods used for the management and restoration of lakes. Comparisons are made of the structure and functions of lake ecosystems found in temperate, tropical and arctic regions. Prereq: general biology. (Also offered as ZOOL 717.)

### **PBIO 719 - Field Studies in Lake Ecology**

**Credits:** 4.00

Ecology of lakes and other freshwater habitats examined through field studies. Emphasizes modern methods for studying lakes; analysis and interpretation of data; and writing of scientific papers. Seminars on research papers and student presentations of class studies. Field trips to a variety of lakes, from the coastal plain to White Mountains; investigate problems, such as eutrophication, acidification, biodiversity and biotoxins. Capstone experiences include interaction with state agencies, lake stakeholders and the submission of written manuscripts for publication. Prereq: introductory biology. (Also offered as ZOOL 719.) Special fee. Writing intensive.

### **PBIO 720 - Plant Nutrition**

**Credits:** 4.00

Mineral nutrition of higher plants, behavior of nutrients in the soil and in plants, environmental and genetic factors that influence nutrient absorption and translocation, and visual diagnosis and remediation of plant nutrient deficiencies and toxicities. Prereq: CHEM 403-404; PBIO 701 or permission. Special fee.

### **PBIO 722 - Marine Phycology**

**Credits:** 4.00

Identification, classification, ecology, and life histories of the major groups of marine algae, particularly the benthonic marine algae of New England. Periodic field trips. Prereq: BIOL 412 or PBIO 412 or 703. Lab. (Offered alternate years.) Special fee.

### **PBIO #723 - Seaweeds, Plankton, and Seagrass: The Ecology and Systematics of Marine Plants**

**Credits:** 4.00

Introduces the biology of marine plants, with an emphasis on the macroalgae common to the Gulf of Maine and found in abundance at the Isles of Shoals. Lecture topics include productivity in the world's oceans, rocky shore ecology, commercial cultivation of algae, and phytoplankton ecology, as well as molecular analysis of the evolution and biogeography of marine plants. Field and laboratory exercises include collection and identification of algae from Appledore's intertidal and subtidal habitats, experimental design

and data analysis for field study, and tide-pool community surveys. Individual field projects may involve studies of algae growth, productivity as it relates to morphology, photosynthesis, and desiccation during low tide. Daily and evening lectures, laboratories and field work. Prereq: field marine science or one year of introductory biology. (Summers only, at Shoal's Marine Lab.)

### **PBIO 725 - Marine Ecology**

**Credits:** 4.00

Marine environment and its biota, emphasizing intertidal and estuarine habitats. Includes field, laboratory, and independent research project. Prereq: general ecology; permission. Marine invertebrate zoology, oceanography, and statistics are desirable. (Also offered as ZOOL 725.) Special fee. (Offered alternate years.)

### **PBIO 727 - Algal Physiology**

**Credits:** 3.00

Survey of major topics in the physiology and biochemistry of marine and freshwater algae including: nutrition, metabolic pathways, reproductive physiology, storage and extracellular products, cell inclusions, growth and development. Prereq: plant physiology or introductory biochemistry or permission. (Not offered every year.)

**Co-requisites:**

### **PBIO 732 - Lake Management: A Multidisciplinary Approach**

**Credits:** 4.00

Lectures and seminars on interpreting lake water quality, developing a natural history inventory for lakes, the process of creating a lake management plan, and resolution of conflicting uses of lakes. Students develop lake management plans in cooperation with governmental agencies and lake associations. Guest speakers from state agencies and non-governmental organizations. Introduces use of GIS (Geographic Information Systems) methods for the analysis of lakes and watersheds. Presents lake management issues from scientific and social science points of view. Open to students from all disciplines. (Also offered as ZOOL 732.) Special fee. Lab.

### **PBIO 747 - Aquatic Plants in Restoration, Management and Conservation**

**Credits:** 4.00

A field-intensive class focusing upon freshwater and marine vascular plants with an emphasis on species commonly associated with ecological restoration, the identification and conservation of rare species, and the adaptations and management of invasive species of aquatic habitats in New England. Field trips emphasize the flora of various wetland habitats, including open water and vegetated fresh water wetlands, as well as coastal and estuarine habitats. Lectures and readings examine the current trends in research and management focusing upon specific taxa and pertinent facets of their taxonomy, physiology, and natural history. Prereq: PBIO 566 or permission.

### **PBIO 752 - Mycology**

**Credits:** 4.00

Classification, identification, culturing, life histories, and ecology of fungi, from slime molds to hallucinogenic mushrooms; the significance of fungi in human history, from their contributions to the art of bread making and alcoholic fermentation to their destructiveness as agents of deadly diseases of plants and animals. Prereq: BIOL 411-412 or PBIO 412 or equivalent. Special fee. Lab.

### **PBIO 758 - Plant Anatomy**

**Credits:** 5.00

Anatomy of vascular plants, emphasizing structure and development of basic cell and tissue types, and of the major plant organs. Prereq: BIOL 412 or PBIO 412. Lab. (Not offered every year.)

## **PBIO 760 - Insect Pest Management**

**Credits:** 4.00

Students learn the principles of integrated pest management, as they apply to insects (and some other arthropods). Additionally, they learn to recognize the major orders of insects, and some insect families that are important as natural enemies of pests. Course incorporates a significant amount of writing, plus learning to search the scientific literature. Prereq: BIOL 411 and BIOL 412 or equivalent. Writing intensive.

## **PBIO 795 - Investigations**

**Credits:** 1.00 to 6.00

Topics may include systematic botany, plant physiology, plant pathology, plant anatomy, plant ecology, mycology, cell biology, phycology, botanical teaching, morphology, cell physiology, scientific writing, micro-technique, cell and tissue culture, history of botany, genetics, plant utilization, or teaching experience. Individual projects under faculty guidance. Prereq: permission. (4 credit maximum per semester for any single section.) May be repeated.

## **PBIO 795W - Investigations**

**Credits:** 1.00 to 6.00

Topics may include systematic botany, plant physiology, plant pathology, plant anatomy, plant ecology, mycology, cell biology, phycology, botanical teaching, morphology, cell physiology, scientific writing, micro-technique, cell and tissue culture, history of botany, genetics, plant utilization, or teaching experience. Individual projects under faculty guidance. Prereq: permission. (4 credit maximum per semester for any single section.) May be repeated. Writing intensive.

## **PBIO 796 - Special Topics**

**Credits:** 1.00 to 4.00

Occasional offerings in subject matter not covered by existing courses. A) Systematic Botany, B) Physiology, C) Plant Pathology, D) Anatomy, E) Morphology, F) Ecology, G) Mycology, H) Phycology, I) Cell Biology, J) Genetics, K) Evolution, L) Plant Utilization, M) Plant Molecular Biology, N) Developmental Plant Biology, O) Cell and Tissue Culture, P) Physiological Ecology, Q) Plant Disease Control, R) Plant Hormones, S) Crop Management, T) Biotechnology, U) Plant Nutrition, V) Ecological Agriculture W) History and Philosophy. Prereq: permission. May be repeated. No more than 4cr. maximum per semester for any single section.

## **PBIO 796W - Special Topics**

**Credits:** 1.00 to 4.00

Occasional offerings in subject matter not covered by existing courses. A) Systematic Botany, B) Physiology, C) Plant Pathology, D) Anatomy, E) Morphology, F) Ecology, G) Mycology, H) Phycology, I) Cell Biology, J) Genetics, K) Evolution, L) Plant Utilization, M) Plant Molecular Biology, N) Developmental Plant Biology, O) Cell and Tissue Culture, P) Physiological Ecology, Q) Plant Disease Control, R) Plant Hormones, S) Crop Management, T) Biotechnology, U) Plant Nutrition, V) Ecological Agriculture W) History and Philosophy. Prereq: permission. May be repeated. No more than 4cr. maximum per semester for any single section. Writing intensive.

## **PBIO 797 - Senior Seminar**

**Credits:** 1.00

Professionalism course for plant biology and environmental horticulture majors. Topics focus on the importance of written and oral communications. Projects include resume preparation, oral presentations, and writing activities. Discussion of current topics in horticulture/plant sciences and job search basics. Attendance at selected seminars in related subject areas. Required of all senior majors in environmental horticulture. (Fall semesters only.) Cr/F.

## **PBIO 799 - Honors Senior Thesis**



**Credits:** 2.00 to 4.00

Students work under the direction of a faculty sponsor to plan and carry out independent research resulting in a written thesis. Two-semester sequence; IA grade (continuous course) given at end of first semester. May be repeated to a total of 6 credits. Writing intensive.

## Political Science

### **POLT 401 - Politics and Society**

**Credits:** 4.00

Introduces the nature of politics and political institutions. Emphasizes political behavior and continuing issues of modern politics, such as power, authority, legitimacy, freedom, and order.

### **POLT 401H - Honors/Politics and Society**

**Credits:** 4.00

Introduces the nature of politics and political institutions. Emphasizes political behavior and continuing issues of modern politics, such as power, authority, legitimacy, freedom, and order.

### **POLT 402 - Introduction to American Government**

**Credits:** 4.00

Power and competition in American politics focusing on voters and elections; public opinion and the media; interest groups and political institutions the President, Congress, and the Courts. Examines critical political issues from the founding of the nation to the present.

### **POLT 402H - Honors/Introduction to American Government**

**Credits:** 4.00

Power and competition in American politics focusing on voters and elections; public opinion and the media; interest groups and political institutions the President, Congress, and the Courts. Examines critical political issues from the founding of the nation to the present.

### **POLT 402W - Intro to American Government**

**Credits:** 4.00

Power and competition in American politics focusing on voters and elections; public opinion and the media; interest groups and political institutions the President, Congress, and the Courts. Examines critical political issues from the founding of the nation to the present. Writing intensive.

### **POLT 403 - United States in World Affairs**

**Credits:** 4.00

Introduction to United States foreign policy since the end of World War II examining the foundations of American policy, the origins and conduct of the Cold War and the dilemmas of the post Cold War era. Explores contemporary problems facing United States foreign policy such as international economy and transnational global issues.

### **POLT 403H - Honors/United States in World Affairs**

**Credits:** 4.00

Introduction to United States foreign policy since the end of World War II examining the foundations of American policy, the origins and conduct of the Cold War and the dilemmas of the post Cold War era. Explores contemporary problems facing United States foreign policy such as international economy and transnational global issues. Writing intensive.

### **POLT 403W - United States in World Affairs**

**Credits:** 4.00

Introduction to United States foreign policy since the end of World War II examining the foundations of American policy, the origins and conduct of the Cold War and the dilemmas of the post Cold War era. Explores contemporary problems facing United States foreign policy such as international economy and

transnational global issues. Writing intensive.

### **POLT 407 - Law and Society**

**Credits:** 4.00

Introduces the ways in which law operates in modern society: its forms, functions, underlying values, and the consequences of its application in particular regimes. Topics include the psychological bases for legal obligation, the evolution of particular legal doctrines, the philosophical underpinnings of legal responsibility, the relationship of law to social structures, the relationship of law to morality, the nature of legal reasoning, and critiques of law.

### **POLT 407H - Honors/Law and Society**

**Credits:** 4.00

Introduces the ways in which law operates in modern society: its forms, functions, underlying values, and the consequences of its application in particular regimes. Topics include the psychological bases for legal obligation, the evolution of particular legal doctrines, the philosophical underpinnings of legal responsibility, the relationship of law to social structures, the relationship of law to morality, the nature of legal reasoning, and critiques of law.

### **POLT #444 - Politics and Policy in a Warming World**

**Credits:** 4.00

Uses the issue of climate change to explore the relationships between scientific and technical research and debate, policymaking at the international and domestic (U.S.) levels and public understanding and interpretation of complex technical issues. The course is interdisciplinary. Writing intensive.

### **POLT 444A - Democracy: Its Character and Its Characters**

**Credits:** 4.00

An examination of the spirit of a modern democracy and its influence on the thoughts and actions of those who live within it. Includes selections from Tocqueville's Democracy In America and an examination of characters in the works of Weems, Twain, and Salinger. Writing intensive.

### **POLT 500 - American Public Policy**

**Credits:** 4.00

Political and economic factors that mold the processes by which American policy makers deal with such domestic issues as crime and violence, poverty and inequality, inflation and unemployment, urban blight and renewal, and energy and the environment. Writing intensive.

### **POLT 502 - State and Local Government**

**Credits:** 4.00

Powers, politics, political cultures, and constitutional settings of American state and local governments. State legislatures, governorships, court systems, political parties, electoral systems, and interest groups. Structures and functions of local governments, including towns, cities, counties, and special districts. Writing intensive.

### **POLT 504 - American Presidency**

**Credits:** 4.00

The President as administrator, policy maker, and political leader. The relationship between the President and the public, the media, and other governmental institutions. Historical and constitutional background of the Presidency, role and powers of the President in domestic and foreign affairs.

### **POLT 505 - American Congress**

**Credits:** 4.00

Role and powers of Congress as national lawmaker and check on the executive branch: committee

structure, concepts of representation, legislative oversight and party cleavage, federal budget control, and foreign policy involvement.

### **POLT 506 - Parties, Interest Groups, and Voters**

**Credits:** 4.00

Role of political parties as organizers and managers of social conflict. Role of voters in controlling parties and government. Influence of interest groups in the electoral process and in governmental decision making.

### **POLT 507 - Politics of Crime and Justice**

**Credits:** 4.00

Criminal justice in theory and practice; contemporary role of police, prosecutors, judges, juries, counsel, and interest groups in the administration of criminal justice. Writing intensive.

### **POLT 508 - Supreme Court and the Constitution**

**Credits:** 4.00

Supreme Court treated as a political institution whose historic mission is to decide all controversies arising under the Constitution between the nation and the states, the President and Congress; the role of the judiciary in defining its own powers, rights, and duties. Writing intensive.

### **POLT #509 - Bureaucracy in America**

**Credits:** 4.00

Growth and development of the bureaucratic state. Roles and powers of administrative officials, decision making in bureaucratic settings, citizen participation, and the influence of interest groups on bureaucratic policy making.

### **POLT 510 - Mass Media in American Politics**

**Credits:** 4.00

Contemporary review of media in politics; major roles of media today in providing news, setting public agenda, influencing public opinion; government regulations vs. media responsibility; future developments and consequences for American democracy. Writing intensive.

### **POLT 512 - Public Opinion in American Politics**

**Credits:** 4.00

Relationship of mass and elite opinion within the context of American political culture. Impact of public opinion on American governmental policies, especially with respect to major issues facing the President and Congress. Appraisal of responsiveness to influence and responsibility to lead. Writing intensive.

### **POLT 513 - Civil Rights and Liberties**

**Credits:** 4.00

Analysis of four major areas of constitutional rights and liberties political freedom, equal protection of the laws, and due process with particular attention to their impact on such problems as political protest, discrimination, school segregation, students rights and the relationship between government and religion. Writing intensive.

### **POLT 520 - Justice and the Political Community**

**Credits:** 4.00

Origin of the idea of justice; relationship between politics, justice, and morality; selections from Plato, Aristotle, Roman, Islamic, and Christian political philosophers.

### **POLT 521 - Rights and the Political Community**

**Credits:** 4.00

Human rights and the quality of communities as expressed in Hobbes, Locke, Mandeville, Rousseau, and others.

### **POLT 522 - Dissent and the Political Community**

**Credits:** 4.00

Current political ideologies and controversies in America and abroad; liberal democracy and its critics since the 19th century.

### **POLT 523 - American Political Thought**

**Credits:** 4.00

Introduces the student to the key questions about politics and government asked and answered by American thinkers and actors, as well as the ways in which those "answers" have shaped our institutions and political processes. Emphasizes the idea of property. Writing intensive.

### **POLT 524 - Politics and Literature**

**Credits:** 4.00

Classical and contemporary works of literature to illustrate perennial issues in political philosophy; among authors studied are Aristophanes, Sophocles, Shakespeare, Melville, Tolstoy, and Sartre.

### **POLT 524W - Politics and Literature**

**Credits:** 4.00

Classical and contemporary works of literature to illustrate perennial issues in political philosophy; among authors studied are Aristophanes, Sophocles, Shakespeare, Melville, Tolstoy, and Sartre. Writing intensive.

### **POLT 525 - Multicultural Theory**

**Credits:** 4.00

Issues of concern generated from an attention to and appreciation of our diverse cultural identities. As a theory course in political framework, we approach multiculturalism as a new attempt to respond to the challenges that difference poses in democratic theory.

### **POLT 543 - The Politics of Costa Rica**

**Credits:** 4.00

While the rest of the Central American region has struggled to overcome authoritarian legacies, Costa Rica has been a trailblazer on the path to democracy. The successful establishment of democratic political institutions and political culture have been coupled with other innovations including the abolition of the military, investments in human capital, and eco-friendly economic development. This course is designed to explore the many facets of Costa Rican exceptionalism onsite in Costa Rica during the J term. Special fee.

### **POLT 544 - Pathways to Democracy**

**Credits:** 4.00

Parting from analysis of the Third Wave of worldwide democratization in the 1980s and 1990s, focuses on understanding how and why these regime changes came about, the ongoing trials of democratic consolidation faced by many of these nations, and movement toward democracy by some of the world's remaining authoritarian regimes. Writing intensive.

### **POLT 545 - People and Politics in Asia**

**Credits:** 4.00

Surveys the contemporary politics of nations and peoples of East Asia within the framework of their modern histories and societies. Emphasizes China and Japan, and introduces the evolving political systems of Taiwan, North and South Korea, Hong Kong/Macao. Companion course to POLT 546, but either may be taken separately. Writing intensive.

### **POLT #546 - Wealth and Politics in Asia**

**Credits:** 4.00

Different paths to modernization, industrialization, and development in nations of the Asia-Pacific Rim. In-depth examinations of the challenges faced by Japan, China, Hong Kong/Macao, Taiwan and the Koreans in their search for the correct path to economic growth and prosperity, with special emphasis on each nation's distinct society and history. Companion course to POLT 545, but either may be taken separately. Writing intensive.

### **POLT 549 - Development and Environment in the Middle East**

**Credits:** 4.00

The class explores selected topics in the politics of economic development and environmental sustainability through a field-based experience based in a selected country in the Middle East. We spend January term learning about the political, economic, and social factors that shape how issues of environment and development are framed, what kinds of policies are pursued, and with what consequences. We will visit local and international organizations employing diverse approaches to problems of poverty, pollution, the provision of water and sanitation, and other key challenges for citizens and cities in the region. We will combine experiential learning, including field trips and lectures by activists, scientists, and NGO leaders, with readings and papers that provide a broader theoretical and comparative context.

### **POLT 550 - Comparative Government and Society**

**Credits:** 4.00

Concepts for comparing modern political systems, such as ideologies, institutions, social movements, and various forms of states, from democracies to authoritarian regimes. Illustrates concepts with examples from Western-style democracies, former communist regimes, and the developing world. Writing intensive.

### **POLT 552 - Contemporary European Politics**

**Credits:** 4.00

Politics and governments in Western Europe, with attention to both basic characteristics of political life in different countries and current issues of politics. Writing intensive.

### **POLT 553 - Politics in the Developing World**

**Credits:** 4.00

Considers patterns of political and economic development in the context of globalization. Part one addresses why much of the world has not kept pace with the industrialized democracies; part two addresses nation-building and development efforts, with case studies from Central Asia, Latin America, the Middle East, and Sub-Saharan Africa.

### **POLT 554 - Latin American Politics**

**Credits:** 4.00

Examines region-wide transitions from state-led to neo-liberal economic strategies in the 1980s and 1990s and from authoritarian to democratic political systems. Considers the results of these ongoing political and economic changes in several case study nations and the broader impacts of increased globalization and economic integration of the Americas. Writing intensive.

### **POLT 555 - Politics in Russia**

**Credits:** 4.00

Develops an understanding of politics in the Russian Federation. Surveys the political history of Russia from 1900 until the collapse of the Communist Party and the dissolution of the USSR. Focuses on the development of the Federation's institutions, with emphasis on the Presidency and the Parliament, federalism, the role of the people, transformation toward a market economy, and the Federation's status as a democracy.

### **POLT 555W - Politics in Russia**

**Credits:** 4.00

Develops an understanding of politics in the Russian Federation. Surveys the political history of Russia from 1900 until the collapse of the Communist Party and the dissolution of the USSR. Focuses on the development of the Federation's institutions, with emphasis on the Presidency and the Parliament, federalism, the role of the people, transformation toward a market economy, and the Federation's status as a democracy. Writing intensive.

### **POLT 556 - Politics in China**

**Credits:** 4.00

Dynamics of China's domestic political and economic policy processes—from massive starvation of the Great Leap Forward and the ideological upheavals of the Great Proletarian Cultural Revolution to the "Opening of China to the Outside World." Writing intensive.

### **POLT 557 - Politics in Italy**

**Credits:** 4.00

Develops an understanding of the politics and political development of Italy, with an emphasis on the political system which emerged after WWII and the transformation of the 1990's.

### **POLT 558 - Government and Politics of Canada**

**Credits:** 4.00

Cultural background of party competition, role of ideology, structure of government, and contemporary issues in Canadian political system. Special fee. Writing intensive

### **POLT 559 - Comparative Politics of the Middle East**

**Credits:** 4.00

Examines the dynamics of political and economic change in states and societies of the Middle East. Covers state formation, nationalism and colonialism, authoritarianism and opposition movements, and the origins of the Israeli-Palestinian conflict.

### **POLT 560 - World Politics**

**Credits:** 4.00

Examines the structures, processes and issues that shape contemporary international relations. Topics include: the rise and fall of the nation-state system and its current prospects, national and international security in the post Cold War era, problems of the international political economy, international conflict resolution, human rights, and global environmental politics. Writing intensive.

### **POLT 561 - Introduction to International Political Economy**

**Credits:** 4.00

Designed for students with little or no knowledge of economics; the course develops the relationships between political and economic policy and behavior in international affairs. A major focus is on the conflict between the primary values of the international economic system (efficiency and growth) and other societal and political values. Among the topics are: international trade and finance, economic and non-economic globalization, growth and human development, illicit trade, and economic governance.

### **POLT 562 - Strategy and National Security Policy**

**Credits:** 4.00

Provides an overview of U.S. national security. Examines the nature of security, evolution of strategy, and the history of the United States's approach to its national security. Focuses on the policy and decision-making processes, the use of force in international affairs, and the capabilities of the U.S. military. Concludes with treatment of specific issues, including the current American security environment state and

non-state threats, contemporary military strategy, weapons of mass destruction, terrorism, peacekeeping, coercive diplomacy, alliances, and conflict management and resolution. Writing intensive.

### **POLT 565 - United States/Latin American Relations**

**Credits:** 4.00

Contemporary political, economic, and social relations between the U.S. and Latin America. Topics include the pattern of U.S. response to political change in Latin America, regional cooperation, debt, trade investment, the drug trade, immigration, rising interdependence, and prospects for economic integration.

### **POLT 567 - Politics of Global Resources**

**Credits:** 4.00

International politics from the perspective of the exhaustibility of global resources and the expansion of global demand. Concentrates on issues including population, food, energy, the environment, security, and human rights. Global interdependence and the appearance of new institutional frameworks of global public policy making. Writing intensive.

### **POLT 568 - Introduction to Intelligence**

**Credits:** 4.00

The purpose and practice of intelligence in the national security process. Concentration on the role of intelligence in the United States involving the C.I.A., military intelligence agencies, and the practice of intelligence in other countries.

### **POLT 568W - Introduction to Intelligence**

**Credits:** 4.00

The purpose and practice of intelligence in the national security process. Concentration on the role of intelligence in the United States involving the C.I.A., military intelligence agencies, and the practice of intelligence in other countries. Writing intensive.

### **POLT 569 - Chinese Foreign Policy**

**Credits:** 4.00

Analysis of China's struggle for political and economic power in Asia and the world. Examines the legacy of China's historical encounters with the outside world, interactions with the international system since 1949, domestic determinants of foreign political and economic policies, and theories of decision making. Writing intensive

### **POLT 580 - Selected Topics Am Politics**

**Credits:** 4.00

Special topics such as politics and public affairs in New Hampshire, women in politics, and civil liberties. Not offered every semester. See departmental listings for semester offerings. Writing intensive. 4 cr.

### **POLT 584 - Selected Topics in Political Thought**

**Credits:** 4.00

Special Issues in political theory, such as liberalism and conservatism, radical political thought, the American character, and others. Not offered every semester. See departmental listings for semester offerings. Writing intensive. 4 cr.

### **POLT 588 - Selected Topics in Comparative Politics**

**Credits:** 4.00

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### **POLT 592 - Selected Topics Intl Politics**

**Credits:** 4.00



Examines specialized issues in international politics. Topics may include ethnic conflict, non-proliferations and global security, economic and political globalization, etc. Not offered every semester. See department listings for semester offerings. Writing Intensive. 4 crs.

### **POLT 602A - Internship**

**Credits:** 4.00

Field experience in a governmental or nongovernmental organization at the local, state, national, or international level. Arrangements must be made through the political science department. Open to juniors and seniors with at least a 3.2 G.P.A. Permission of the undergraduate curriculum committee of the department is required prior to the internship.

### **POLT 602B - Washington Center Internship**

**Credits:** 4.00

A four-credit independent study designed to work in conjunction with the University's Washington Center Internship program. Requirements: major in Political Science. Junior or senior research component to be discussed with faculty sponsor. For details on the Washington Center Internship, please contact Paula DiNardo, Coordinator National Student Exchange and Washington Center Internships, 114 Hood House, 603-862-3485 (V/TTY 862-2607), email: paula.dinardo@unh.edu. Prereq: POLT 402.

### **POLT 602C - Concord Internship Program**

**Credits:** 12.00

Provides students with field experience in state government in Concord (State Senate, House of Representatives, Office of the Governor, etc.). Students will spend three days weekly in Concord and attend a weekly practicum in Durham. Open to junior and seniors with a 3.2 or better G.P.A. Applications accepted in the fall semester and can be found on department's website. Permission required. Students may sign up for 602A or any four (4) credit course along with 602C for a total of 16 credits. Cr/F.

### **POLT 602D - Internship**

**Credits:** 2.00 to 12.00

Field experience in governmental or nongovernmental organization at the local, state, national, or international level. Arrangements must be made through the political science department. Open to juniors and seniors with at least 3.2 G.P.A. Permission from the undergraduate curriculum committee of the department is required. From 2 to 12 credits maybe taken. Cr/F.

### **POLT 695 - Independent Study**

**Credits:** 2.00 to 4.00

Designed to meet special interests of students and instructors in exploring issues in political science. Upon satisfying eligibility requirements set forth by departmental guidelines (in departmental office and on the Web), students must have the approval of a faculty sponsor. Students submit the form and all supporting evidence by mid-semester prior to the planned semester of independent study for departmental approval. Does not meet the major's four field-course requirement; maximum of eight (8) credits can be counted toward the non-field major requirements. Prereq: at least one upper-level course in field of independent study.

### **POLT 696 - Independent Study**

**Credits:** 2.00 to 4.00

See description for POLT 695.

### **POLT 701 - Courts and Public Policy**

**Credits:** 4.00

Impact of judicial decisions on public policy and influences on judicial decision making at the federal, state, and local levels. Writing intensive.

### **POLT 706 - State and Local Government**

**Credits:** 4.00

Advanced study of powers, politics, political cultures, and constitutional settings of American state and local government. Writing intensive.

### **POLT 708 - Administrative Law**

**Credits:** 4.00

Examines the legal rules governing regulatory agencies, in the U.S. Topics include regulatory adjudication and rulemaking, legislative and executive control over administrative agencies, judicial review and public participation. Examines federal and state levels of government.

### **POLT 711 - Public Opinion and Survey Research**

**Credits:** 4.00

Examines the role of public opinion in democracy. Research, design, implementation and analysis of a public opinion survey.

### **POLT 721 - Feminist Political Theory**

**Credits:** 4.00

Explores various strands of feminist political theory; taking a specifically political view of the challenges of feminist activism and philosophy. Addresses issues of the public space, power, social transformation, and democracy.

### **POLT 725 - Politics and Literature**

**Credits:** 4.00

Seminar: Advanced work in exploring classical and contemporary works of literature to illustrate perennial issues in political philosophy.

### **POLT 740 - States and Societies in the Middle East**

**Credits:** 4.00

Exploration of changing relationships between states and societies in the Middle East and North Africa from WWI to the present. Analyzes the creation of states and markets, the origins of authoritarian and democratic rule, the politics of environment and development, and the evolution of Islamist movements. Country and case studies vary. Previous coursework in comparative politics (POLT 540-559) or history strongly recommended. Writing intensive.

### **POLT 750 - Politics of Poverty**

**Credits:** 4.00

Examines economic development to understand causes of international inequality in the distribution of wealth.

### **POLT 751 - Comparative Environmental Politics and Policy**

**Credits:** 4.00

Environmental politics and policy across national boundaries and at different levels of governance. Comparison of the U.S. and European Union environmental policies to build a foundation for comparisons across national boundaries and sub-national authorities. Students improve their understanding of how and why comparative methods are used to gain insight into politics and policymaking. Central concepts and debates addressed include the roles of expertise, sustainability, precautionary principle, the use of market mechanisms in policy, environmental justice, policy devolution and flexibility, environmental performance assessment, NGO roles, activism, and social movements. A range of theoretical approaches and historical and contemporary events and case studies, evaluating the claims and explanatory power of various concepts and theories. Includes ethical issues emerging from the theory and practice of environmental

politics. Writing intensive.

### **POLT 760 - Theories of International Relations**

**Credits:** 4.00

Theoretical approaches of international politics, international organization and international political economy with particular emphasis on systems theories, domestic determinants of foreign policy and theories of decision making. Writing intensive.

### **POLT #762 - International Political Economy**

**Credits:** 4.00

The evolution of international economic regimes (monetary, trade, development). Particular emphasis on theoretical approaches to explain current economic problems: systematic theories (interdependence, hegemonic stability); domestic determinants (bureaucratic, interest group); and decision-making theories (rational choice). Writing intensive.

### **POLT 778 - International Organization**

**Credits:** 4.00

Various forms of cooperation among nations on security, economic, environmental and social issues through international organizations such as the United Nations, NATO, the World Trade Organization, and other global and regional bodies. Examines the role and influence of non-governmental international organizations. Writing intensive.

### **POLT 780 - International Environmental Politics, Policy and Law**

**Credits:** 4.00

Explores international/global environmental politics and policymaking, multilateral negotiations, the role of science and technology in policymaking, state capacity, the making of international law, implementation, and compliance. Other issues include climate change, marine pollution, long-range air pollution, United States leadership in the global political arena, North-South divisions in global politics, environmental justice, sustainable development, and the role of the United Nations and other international organizations. Writing intensive.

### **POLT 795 - Advanced Study**

**Credits:** 4.00

Senior POLT majors, with a cumulative average of 3.20 or greater, may undertake advanced study (political science), in an area of their choice, in consultation with member(s) of the faculty. Normally, the result of the project is a significant written product of a quality comparable to that done at the 700 course level. Student must initiate the project discussion and obtain approval of the undergraduate curriculum committee of the department before undertaking the project. Writing intensive.

### **POLT 796 - Advanced Study**

**Credits:** 4.00

Senior POLT majors, with a cumulative average of 3.20 or greater, may undertake advanced study (political science), in an area of their choice, in consultation with member(s) of the faculty. Normally, the result of the project is a significant written product of a quality comparable to that done at the 700 course level. Student must initiate the project discussion and obtain approval of the undergraduate curriculum committee of the department before undertaking the project. Writing intensive.

### **POLT 797B - Seminar in American Politics**

**Credits:** 4.00

Advanced analysis and individual research. Prereq: senior standing. Writing intensive.

### **POLT 797C - Seminar in Comparative Politics**

**Credits: 4.00**

Advanced analysis focusing on government and politics in foreign nations or regions. Areas of interest may include: constitutional structures, political parties and interest groups, legislatures, bureaucracy and public policy. Topics address such concerns as religion and politics, patterns of economic development, ethnic strife, political leadership. Prereq: senior standing. Writing intensive.

**POLT 797E - Seminar in International Politics****Credits: 4.00**

Advanced analysis focusing on problems of theory and contemporary issues in international politics. Areas of interest may include: democratic norms in international relations, NATO expansion and European security, the peace process in the Middle East, etc. See department listings for semester offerings. Prereq: senior standing. Writing intensive.

**POLT 797F - Seminar in Public Administration****Credits: 4.00**

Advanced analysis and individual research, including opportunities for direct observation of governmental administration. Prereq: senior standing. Writing intensive.

**POLT 797I - Seminar in Political Thought****Credits: 4.00**

Advanced treatment and individual research. Prereq: senior or graduate standing. Writing intensive.

**POLT 798B - Seminar in American Politics****Credits: 4.00**

Advanced analysis and individual research. Prereq: senior standing. Writing intensive.

**POLT 798C - Seminar in Comparative Politics****Credits: 4.00**

Advanced analysis focusing on government and politics in foreign nations or regions. Areas of interest may include constitutional structures, political parties and interest groups, legislatures, bureaucracy and public policy. Topics address such concerns as religion and politics, patterns of economic development, ethnic strife, political leadership. Prereq: senior standing. Writing intensive.

**POLT 798E - Seminar in International Politics****Credits: 4.00**

Advanced analysis focusing on problems of theory and contemporary issues in international politics. Areas of interest may include democratic norms in international relations; NATO and European security; the peace process in the Middle East; etc. See department listings for semester offerings. Prereq: senior standing. Writing intensive.

**POLT 798F - Seminar in Public Administration****Credits: 4.00**

Advanced analysis and individual research, including opportunities for direct observation of governmental administration. Prereq: senior standing. Writing intensive.

**POLT 798I - Seminar in Political Thought****Credits: 4.00**

Advanced treatment and individual research. Prereq: senior or graduate standing. Writing intensive.

**POLT 799 - Honors Thesis****Credits: 4.00**

Senior POLT honors-in-major students (see department for honors-in-major requirements), with a

cumulative average of 3.20 or greater, may undertake a special honors project in an area of their choice. The results of this special project is a significant written product constituting an honors thesis, under the supervision of a faculty sponsor. Students must initiate the project discussion and obtain approval of the undergraduate curriculum committee before undertaking the project. The honors thesis constitutes the tenth course in the major. Writing intensive.

## **Politics and Society**

### **PS 407 - Politics, Law and Contemporary Society**

**Credits:** 4.00

This course examines the foundation and structure of the American legal system and the complex relationship between law, politics, and contemporary social structures, including the philosophical and historical origins of law and the concept of sovereignty. Using case studies and United States Supreme Court decisions, the course considers the philosophical, historical, economic, environmental, and sociological underpinnings of contemporary legal and politics issues.

### **PS 501 - Social and Political-Economic Theory**

**Credits:** 4.00

Classics of sociological and political economic theory, as well as contemporary thinking in conservative, classical liberal, modern liberal, and radical political economy. Emphasis on the historical context in which these ideas emerge, and the links among them. Readings and discussions include such thinkers as Comte, Spencer, Weber, Durkheim, Locke, Marx, Smith, Riccardo, J.S. Mill, Shumpeter, Keynes, Hayek.

### **PS 502 - Political Psychology**

**Credits:** 4.00

Political opinion, identity, and belief-formation and reinforcement. The roles of cognition and emotion in how political identities, opinions and beliefs form, change and resist change. The implications of idea-framing in the acceptance and rejection of political concepts and ideologies. The role of social contexts and the media in creating conceptual boundaries in contemporary politics. Writing intensive.

### **PS 503 - Political Theory and Historical and Social Context**

**Credits:** 4.00

Course analyzes and evaluates the roles of political philosophy and historical circumstances in politics through the readings of selected works by political philosophers and political leaders whose writings combine political philosophy with historical analysis. Special attention given to the nature of argument, choice, and leadership in political behavior. Authors studied include Machiavelli, Madison, Marx, and Lincoln. Writing intensive.

### **PS 504 - Empire, Democracy and War**

**Credits:** 4.00

The United States, the worlds oldest and most prominent constitutional democracy, is frequently characterized as an American empire, and empire maintained not only by its political ideals and its economic strength, but also by war. Through the reading of selected ancient and modern works by major political philosophers, historians, and political leaders, this course examines empire, democracy, and war as recurrent political concerns and as the actual experience of different regimes throughout history, including the United States. Works by, among others, Aristotle, Thucydides, Machiavelli, Hobbes, Kant, Clausewitz, and Lincoln are supplemented by selected historical studies and by analyses of American policy since World War II.

### **PS 505 - Political Violence and Terrorism**

**Credits:** 4.00

This course provides an interdisciplinary approach to the study of political violence and terrorism. It covers the psychological and sociological roots of terrorism, the organizational patterns of cells, groups and networks, and the role of ideology and identity in shaping goals, targets, and tactics. No credit for students who have previously taken PS 651 Special Topics: Political Violence and Terrorism.

### **PS 506 - Civil Society and Public Policy**

**Credits:** 4.00

Explores how grassroots advocacy organizations and social movements mobilize human and material resources in order to shape public policy and what tactics and organizational and communication strategies lead to success. Provides students with hand-on learning through service learning project at a local organization. Policy areas may include immigration, environmental conservation, women's issues and more. Instructor permission required.

### **PS 507 - Justice Law and Politics**

**Credits:** 4.00

This course examines the relationships among law, politics, and social structures and how much relationships shape our conceptions of justice. We explore philosophical and historical origins of US law and such concepts as due process and sovereignty. We examine the foundations and economic, environmental, and sociological underpinnings of contemporary legal and political issues.

### **PS 508 - Supreme Court in US Society**

**Credits:** 4.00

This course examines Supreme Court legal holdings from the creation of the American Republic to the present, with attention to the social and historical contexts in which holdings have been made. We examine Constitutional issues, the process by which the Court examines such issues, the ways in which political and social context has framed and influenced Court decisions, as well as how the Court has influenced politics and the broader society.

### **PS 509 - Political and Social Change in Developing Countries**

**Credits:** 4.00

Overview of the pressing social, political, and economic issues in the developing world. Analysis includes: political development, including different forms of authoritarianism and democracy; international political economy and models of macro-economic development; international and national aid programs aimed at reducing poverty. Case studies include China, India, Iraq and more.

### **PS 510 - Politics of Food**

**Credits:** 4.00

This course examines the politics of how food is produced, marketed and distributed in the United States, with attention to how the American food system has changed since World War II. The ethics and nutritional and public health implications of current agricultural policies and practices are looked at carefully, as are the environmental impacts of current practices. The impact on international food prices and markets and world hunger are also examined.

### **PS 651 - Selected Topics Politics and Society**

**Credits:** 4.00

Interdisciplinary treatment of selected topics in politics and society. Topics may include democracy, empire and war, gender roles in electoral process, the sociology and psychology of terrorism, the political economy of hunger and poverty, the social origins of dictatorship and democracy, and others. May repeated for a maximum of 8 credits. Topic: Empire, Democracy, and War is Writing intensive.

### **PS 651W - Selected Topics Politics and Society**

**Credits:** 4.00

Interdisciplinary treatment of selected topics in politics and society. Topics may include democracy, empire and war, gender roles in electoral process, the sociology and psychology of terrorism, the political economy of hunger and poverty, the social origins of dictatorship and democracy, and others. May repeated for a maximum of 8 credits. Topic: Empire, Democracy, and War is Writing intensive. Writing intensive.

**PS 695 - Politics and Society Independent Study****Credits:** 1.00 to 4.00

Independent study on specific topics in Politics and Society. Project must be approved by the project supervisor Politics and Society Program.

**PS 701 - Senior Project and Interdisciplinary Seminar in Politics and Society****Credits:** 4.00

Students undertake internships or other approved field projects with organizations such as political campaigns, media organizations, government offices, business or community groups. The seminar component enables students to share and analyze these experiences, employing readings, discussions, collective behavior games, and speakers. Permission required. Writing intensive.

**PS 702 - International Relations: Interdisciplinary Approach****Credits:** 4.00

This course explores International Relations Theory as developed by political scientists, subjected to critical insights from other disciplines, including psychology, anthropology, political economy and history. Course first surveys the historical development of International Relations Theory, beginning with Thucydides and Macchiavelli, and proceeding through 20th and 21st century realist, liberal, Marxist and constructivist theories. These theories are then examined critically in the light of insights from psychology, anthropology and political economy. Pre or Coreq: PS 501 or PS 401 or permission of instructor. Special fee.



## Portuguese

### **PORT 401 - Elementary Portuguese I**

**Credits:** 4.00

Conducted in Portuguese. For students without previous knowledge of Portuguese. Aural-oral practice; fundamental speech patterns; reading and writing to achieve a firm basis for an active command of the language. Labs. No credit toward a major. (No credit for students who have had two or more years of Portuguese in secondary school; however, any such students whose studies of Portuguese have been interrupted for a significant period of time should consult the chairperson about possibly receiving credit.) Special fee.

### **PORT 402 - Elementary Portuguese II**

**Credits:** 4.00

Conducted in Portuguese. Aural-oral practice; fundamental speech patterns; reading and writing to achieve a firm basis for an active command of the language. Labs. No credit toward a major. (No credit for students who have had two or more years of Portuguese in secondary school; however, any such students whose studies of Portuguese have been interrupted for a significant period of time should consult the chairperson about possibly receiving credit.) Special fee. Prereq: PORT 401. (PORT 401 and 402 together satisfies the foreign language requirement.)

### **PORT 500 - Selected Topics in World Literature**

**Credits:** 4.00

Topics are chosen that introduce students to major themes and genres. (Also offered as CLAS 500, FREN 500, GERM 500, ITAL 500, RUSS 500, SPAN 500.) May be repeated for credit. Cr/F. Writing intensive.

### **PORT 595 - Portuguese Practicum**

**Credits:** 2.00

Practical use of Portuguese language or cultural skills outside the classroom through special projects. Prereq: PORT 401-402 and permission. May be repeated up to 4 credits

## Psychology

### **PSYC 401 - Introduction to Psychology**

**Credits:** 4.00

Psychology as a behavioral science; its theoretical and applied aspects. Includes research methods, behavioral neuroscience, sensation and perception, cognition, learning, development, personality, psychopathology, and social psychology. To experience actively the nature of psychological research students have an opportunity to participate in a variety of studies as part of a laboratory experience.

### **PSYC 401H - Honors/Introduction to Psychology**

**Credits:** 4.00

Psychology as a behavioral science; its theoretical and applied aspects. Includes research methods, behavioral neuroscience, sensation and perception, cognition, learning, development, personality, psychopathology, and social psychology. To experience actively the nature of psychological research students have an opportunity to participate in a variety of studies as part of a laboratory experience.

### **PSYC 402 - Statistics in Psychology**

**Credits:** 4.00

Design, statistical analysis, and decision making in psychological research. Probability, hypothesis-testing, and confidence intervals. Conceptualization, computation, interpretation, and typical applications for exploratory data analysis (including measures of central tendency, variability), t-tests, correlations, bivariate regression, one-way analysis of variance, and chi square. Introduction to computer methods of computation. No credit for students who have completed ADM 430; BIOL 528; ADMN 420; EREC 525; HHS 540; MATH 439; MATH 539; MATH 644; SOC 502. Special fee.

### **PSYC 402H - Honors/Statistics in Psychology**

**Credits:** 4.00

Design, statistical analysis, and decision making in psychological research. Probability, hypothesis-testing, and confidence intervals. Conceptualization, computation, interpretation, and typical applications for exploratory data analysis (including measures of central tendency, variability), t-tests, correlations, bivariate regression, one-way analysis of variance, and chi square. Introduction to computer methods of computation. No credit for students who have completed ADM 430; BIOL 528; ADMN 420; EREC 525; HHS 540; MATH 439; MATH 539; MATH 644; SOC 502. Special fee.

### **PSYC #444A - Think Globally, Act Locally: The Individual in Community Context**

**Credits:** 4.00

Introduces students to the field of community psychology through both classroom work and service learning. Broadly, the course aims to help students consider questions such as: What is community? How is individual development influenced by larger community variables? What makes a strong community and what is our role in promoting changes to help our communities become more effective? Students will explore these questions through consideration of current community problems (for example, interpersonal violence, poverty) and through 20 hours of service learning during the semester. Writing intensive.

### **PSYC 502 - Research Methods in Psychology**

**Credits:** 4.00

Research design, including experimental and correlation design; internal versus external validity; measurement; writing a research report; graphic and statistical methods for summarizing data; sampling; and special problems such as experimenter effects, reactivity of measurement, and others. The use of hypothesis testing and data analysis in research. Prereq: PSYC 401 and 402. Special fee. Writing

intensive.

### **PSYC 511 - Sensation and Perception**

**Credits:** 4.00

The study of how humans (and some other animals) sense and perceive their environment. Topics include seeing (vision), hearing (audition), tasting (gustation), smelling (olfaction), feeling (somatosensation), and the variety of state-of-the-art methods used by psychologists to study these senses. Illusions and other sensory and perceptual phenomena are treated. Prereq: PSYC 401.

### **PSYC 512 - Psychology of Primates**

**Credits:** 4.00

A comparative analysis of primate cognitive, linguistic, and social processes. The origins of human behavior are explored from the perspectives of history, evolution, and contemporary work in neuropsychology, linguistic, sociobiology, and related fields. Prereq: PSYC 401.

### **PSYC 513 - Cognitive Psychology**

**Credits:** 4.00

The study of human cognition, its basic concepts, methods, and major findings. Human knowledge acquisition and use. Attention, perception, memory, imagery, language, reading, problem solving, and decision making. Prereq: PSYC 401.

### **PSYC 521 - Behavior Analysis**

**Credits:** 4.00

Principles derived from the experimental study of human and animal learning and their theoretical integration. Respondent and operant conditioning. Reinforcement and punishment, stimulus control, choice and preference, conditioned reinforcement. Prereq: PSYC 401.

### **PSYC 522 - Behaviorism**

**Credits:** 4.00

Introduction to behaviorism as a philosophy of science. Some historical background, but concentration on modern behaviorism as exemplified in the works of B. F. Skinner. No credit for students who have completed PSYC 722. Offered only in Manchester. Prereq: PSYC 401.

### **PSYC 531 - Psychobiology**

**Credits:** 4.00

Introduces the behavioral neurosciences. Surveys research conducted by psychologists to learn about the biological basis of behavior: development, sensation, perception, movement, sleep, feeding, drinking, hormones, reproduction, stress, emotions, emotional disorders, learning, and memory. Prereq: PSYC 401.

### **PSYC 552 - Social Psychology**

**Credits:** 4.00

Behavior of individuals as affected by other individuals, groups, and society. Topics include attitude change and social influence, conformity, social interaction, interpersonal attraction, impression formation, research. Prereq: PSYC 401.

### **PSYC 553 - Personality**

**Credits:** 4.00

Major theories, methods of assessment, and research. Prereq: PSYC 401.

### **PSYC 561 - Abnormal Behavior**

**Credits:** 4.00

Causes, diagnosis, and treatment of abnormal behavior. Implications of varying theoretical viewpoints.

Prereq: PSYC 401.

### **PSYC 571 - Pioneers of Psychology**

**Credits:** 4.00

An introduction to the development and evolution of psychology as an academic discipline and applied science. The lives and works of innovators in psychology are placed in socio-political context.

### **PSYC 571H - Honors/Pioneers of Psychology**

**Credits:** 4.00

An introduction to the development and evolution of psychology as an academic discipline and applied science. The lives and works of innovators in psychology are placed in socio-political context.

### **PSYC 581 - Child Development**

**Credits:** 4.00

The developing child in the context of his/her society. Current problems in, and influences on, development of the child. Personality and cognitive development; exceptional children. Prereq: PSYC 401.

### **PSYC 582 - Adult Development and Aging**

**Credits:** 4.00

A life-span developmental framework for the study of growth, decline, and stability on adult development. Developmental methods in adult development research; biological basis for aging; patterns of change and stability in diverse domains of psychological functioning, e.g., perception, cognition, intellectual performance, and personality organization. Prereq: PSYC 401. (Offered only in Manchester.)

### **PSYC 591 - Special Topics**

**Credits:** 4.00

New or specialized courses are presented under this listing. Staff present material not normally covered in regular course offerings. May repeat but not duplicate content. Prereq: PSYC 401.

### **PSYC 595 - Applications of Psychology**

**Credits:** 1.00 to 4.00

Arranged by the student or offered by psychology faculty for supervised field, academic, or research experience related to psychology. A) Field experience: supervised internship at a business or human services setting, B) Academic experience: specialized classroom experience or supervised teaching assistance, C) Research experience: supervised research experience or laboratory work. Psychology instructors sponsor academic credit for appropriate experience combined with a relevant academic component. Requires a signed learning agreement prior to registration. Prereq: permission. May be taken for 1-4 credits in a semester and repeated to a maximum of 8 credits total. Cr/F.

### **PSYC 702 - Advanced Statistics and Research Methodology**

**Credits:** 4.00

A review of basic statistics from Psychology 402 and 502 . Covers partial correlation, factorial ANOVA, and other analyses that include multiple predictor variables. Appropriate for students who plan to apply to research-oriented graduate programs, those who use statistics in honors thesis research, and those who plan to work in areas such as marketing or survey research. Topics covered are appropriate for use in psychology, sociology, education, medicine, and other research areas. Prereq: PSYC 402; 502; or permission. (Not offered every year.) Writing intensive.

### **PSYC 705 - Tests and Measurement**

**Credits:** 4.00

Testing intelligence, creativity, achievement, interests, and personality. Test construction; evaluation; relation to psychological theory, research, and practice. Prereq: PSYC 402; 502;/or permission.

## **PSYC 705H - Honors/Tests and Measurements**

**Credits:** 4.00

Testing intelligence, creativity, achievement, interests, and personality. Test construction; evaluation; relation to psychological theory, research, and practice. Prereq: PSYC 402; 502;/or permission.

## **PSYC 710 - Visual Perception**

**Credits:** 4.00

The study of how humans (and some other animals) see. Topics include color vision, depth perception, form and pattern vision, visual learning and development, eye movements, diseases of the visual system, illusions, and other visual phenomena. Prereq: PSYC 402, 502, 511, or 531; or permission. Special fee. Writing intensive.

## **PSYC 712 - Psychology of Language**

**Credits:** 4.00

Theories of language structure, functions of human language, meaning, relationship of language to other mental processes, language acquisition, indices of language development, speech perception, reading. Prereq: PSYC 402; 502; 512; or 513; or permission. Special fee. Writing intensive.

## **PSYC 713 - Psychology of Consciousness**

**Credits:** 4.00

Explores questions of consciousness What is it? How does it develop? Are infants and animals conscious? Why did consciousness evolve? Includes a review of historical background, including the ideas of Jaynes, Piaget, James, Freud, and others. Contemporary topics may include the role of language and other representational systems, blindsight, subliminal perception, priming and other implicit cognitive phenomena, hypnosis, confabulation and attribution, dreaming, multiple personality and conceptions of self and free will, from simultaneous perspectives of phenomenology, behavior, and neuroscience. Specific topics governed by class interests. Prereq: PSYC 402; 502; 512; or 513; or permission. Writing intensive.

## **PSYC 720 - Animal Cognition**

**Credits:** 4.00

Do animals use language or have a culture? Can birds count? Do animals use tools and understand how they function? How do ants navigate their environment to find food and then return to their nest? How animals perceive, attend to, process, store, and represent information from their environment. Research on animal learning and behavior as a framework for investigating cognitive processes in animal learning. Quantitative versus qualitative nature of differences between people and non-human animals. Multidisciplinary approach including the fields of anthropology, physiology, philosophy and biology. Prereq: PSYC 401; 402; 502; 513 or 521; or permission. Writing intensive.

## **PSYC 722 - Behaviorism, Culture, and Contemporary Society**

**Credits:** 4.00

Introduces behaviorism as a philosophy of science. Concentration on modern behaviorism as exemplified in the works of B.F. Skinner. Implications of behaviorism for the development and evolution of cultures. Consideration of societal issues (for example pollution, overpopulation, conflict, drug abuse) from a behavioral framework. Prereq: PSYC 402; 502; 521;/or permission. No credit for students who have completed PSYC 522. Writing intensive.

## **PSYC 731 - Brain and Behavior**

**Credits:** 4.00

Neuropsychology, the study of brain/behavior relationships including clinical topics related to the analysis of neurological diseases in humans and more basic experimental topics related to integrative functions of the brain. The main focus is on cerebral cortex and functions related to perception, movement, attention,

memory, and language. Prereq: PSYC 402; 502; 531;/or permission. Special fee. Writing intensive.

### **PSYC 733 - Drugs and Behavior**

**Credits:** 4.00

Introduces the principles of psychopharmacology and the effects of psychoactive substances on behavior. Focuses on the therapeutic and recreational use of drugs and the mechanisms of drug action, that is how the drugs affect the brain. Neuropsychiatric function and dysfunction are discussed as they relate to the use or abuse of particular drugs. Prereq: PSYC 402; 502; 531;/or permission. Writing intensive.

### **PSYC 735 - Neurobiology of Mood Disorders**

**Credits:** 4.00

Neurobiological and neurochemical substrates underlying various psychopathologies, using both animal models and human data. Study of disorders from the field of biological psychiatry including aggression, anxiety, panic disorder, obsessive-compulsive disorder, unipolar depression, bipolar affective disorder, schizophrenia, and post-traumatic stress disorder. The effectiveness of current behavioral and pharmacological therapy. Prereq: PSYC 402; 502; 531; or permission. Writing intensive.

### **PSYC 736 - Attention Disorders**

**Credits:** 4.00

Attention encompasses several cognitive functions including, but not limited to, the ability to select relevant from irrelevant stimuli, to maintain goal-directed behavior over time, and to process multiple streams of information at once. This course explores how the normal brain "attends", and the consequences of dysfunction in neurochemical systems hypothesized to mediate these abilities including dementia, attention-deficit hyperactivity disorder (ADHD) and schizophrenia. Prereq: PSYC 402; 502; 531;/or permission.

### **PSYC 737 - Behavioral Medicine**

**Credits:** 4.00

Behavioral, physiological, and neurochemical alterations, associated with health-promoting behaviors (low-fat diet, exercise) as well as health-impairing behaviors (eating disorders, smoking, excessive alcohol consumption). Topics include stress, coping, type-A behavior, hypertension, and the interface of brain, behavior, and immunity (psychoimmunology, cancer, AIDS). Treatment/therapy are discussed from behavioral and pharmacological perspectives. Prereq: PSYC 402; 502; 531;/or permission. Writing intensive

### **PSYC 741 - Advanced Topics**

**Credits:** 4.00

Advanced material in which instructor has specialized knowledge through research and study. May be repeated for different offerings. Topics under this listing may be used to fulfill a major requirement in category CI. A) Psychology as a Natural Science, B) Cognition, C) Behavior Analysis, D) Biological/Sensory. Prereq: PSYC 402; 502; plus other prerequisites when offered; or permission. Writing intensive.

### **PSYC 755 - Psychology and Law**

**Credits:** 4.00

Applications of psychology to the study of the law, including theories of legal and moral judgment, participants in the legal system (judges, police, victims, witnesses), the trial process, and plea bargaining. Special focus on the death penalty, the insanity plea, and child witnesses. Prereq: PSYC 402; 502;/or permission. Writing intensive.

### **PSYC 756 - Psychology of Crime and Justice**

**Credits:** 4.00

Examines the psychological aspects of crime and justice, including the following origins and causes of

crime: developmental, biological, biopsychological, learning, and mental disorder. Focuses on issues related to homicide, profiling, and serial killers. Examines aggression and violence as well as causes and consequences of criminal homicides. Discussion of the future of crime. Prereq: PSYC 402; 502; or permission. Writing intensive.

### **PSYC 758 - Health Psychology**

**Credits:** 4.00

Survey of current topics in health psychology, including social stress and the etiology of disease, Type A and other personality factors related to health, modification of risk factors, the practitioner-patient relationship, chronic pain, and the emotional impact of life-threatening illness. Prereq: PSYC 402; 502; or permission. Writing intensive.

### **PSYC 762 - Counseling**

**Credits:** 4.00

Theories of counseling, ethical considerations, professional and paraprofessional activities in a variety of work settings. Prereq: PSYC 402; 502; 553; or 561; or permission. Writing intensive.

### **PSYC 763 - Community Psychology**

**Credits:** 4.00

Examines the sub-field of community psychology, which grew out of clinical psychology but is different from it. Theoretical and research perspectives on prevention, diversity, empowerment, resilience, community intervention, and ecological understandings of behavior. Causes of and interventions in social issues such as interpersonal and community violence and homelessness. Prereq: PSYC 401; 402; 502; 552, 553, or 561;/or permission. Writing intensive.

### **PSYC 765 - Dysfunctional Families and Therapy**

**Credits:** 4.00

Family structure and function. Problem cycles of functioning (dysfunction) and their impact on family members. The multigenerational nature of dysfunction. Role differentiation; physical, sexual abuse; addictive patterns; issues of power/control; problems with intimacy development; clinical methods of intervention. Prereq: PSYC 402, 502, 561, 762, or permission. Writing intensive.

### **PSYC 771 - Psychology in 20th Century Thought and Society**

**Credits:** 4.00

Reassesses, extends, and integrates knowledge of 20th century psychology within the historical perspective. Major figures, schools, systems, theories. Social, institutional, and international developments since the 19th century. Review of major fields of psychology. Prereq: PSYC 402; 502; or 571; or permission. Writing intensive.

### **PSYC 775 - Madness in America**

**Credits:** 4.00

Examines how popular and professional concepts of mental illness are shaped by historical events as well as scientific and medical research. Writings of former psychiatric patients, therapists, researchers, social critics, and historians of psychology and psychiatry. Cultural values, public attitudes, and popular views of mental health and illness as expressed through motion pictures, documentaries, novels, autobiographies, and biographies. The impact of WWI and WWII on how people thought about madness and how it was treated. The 1973 removal of homosexuality from the diagnostic manual of the American Psychological Association; the rise and fall of the lobotomy; feminist criticisms of psychiatry and psychology. Prereq: PSYC 402; 502; 561;/or permission.

### **PSYC 780 - Prenatal Development and Infancy**

**Credits:** 4.00

Psychological development of infants from conception through second year of life. Factors and potential influences on reproductive health and prenatal physical and behavioral development. Transition to parenthood, infant temperament and parent-infant relationships. Developmental patterns of specific capabilities. Prereq: PSYC 402; 502; 581 or FS 525; or permission. Writing intensive.

### **PSYC 783 - Cognitive Development**

**Credits:** 4.00

Theories of cognitive development. Comparison among major theorists on how knowledge, thought, and development are defined and studied. Current research, including cognitive development; memory; perceptual processes; language. Prereq: PSYC 402; 502; 581; or permission. Writing intensive

### **PSYC 785 - Social Development**

**Credits:** 4.00

Examines development of social interactions. Emphasizes important social relationships for the child (e.g., attachment to parents and friendships with peers). Considers other topics of relevance to social developmentalists, such as temperament, aggression, social cognition, and sex roles. Prereq: PSYC 402; 502; 581; or permission. Writing intensive.

### **PSYC 791 - Advanced Topics**

**Credits:** 4.00

Advanced material in which instructor has specialized knowledge through research and study. May be repeated for different offerings. Topics under this listing may be used to fulfill a major requirement in category CII. A) Psychology as a Social Science, B) Social Psychology, C) Personality, D) Abnormal/Counseling, E) History of Psychology, F) Child Development, G) Adult Development. Prereq: PSYC 402; 502; plus other prerequisites when offered, or permission. Special fee with some topics. Writing intensive.

### **PSYC 793 - Internship**

**Credits:** 4.00 to 8.00

Supervised practicum in one of several cooperating New Hampshire mental health/rehabilitation facilities. Coursework knowledge applied to meaningful work and team experience. Commitment includes a negotiated number of weekly work hours and weekly seminars. Supervision by institution personnel and the instructor. A maximum of 4 credits may be applied to the Psychology major. Course applications accepted beginning in March for fall term and October for spring term. Prereq: permission; PSYC major; PSYC 402; 502; 561 Pre- or coreq: PSYC 762.

### **PSYC 794 - Advanced Internship**

**Credits:** 1.00 to 8.00

Supervised advanced practicum experience in co-operating New Hampshire mental health/rehabilitation facilities. Expands and builds on experiences and skills acquired in PSYC 793. Commitment includes a negotiated number of hours of work per week and participation in weekly seminars. Supervision done by institution personnel and instructor. Prereq: PSYC 793; permission. 1 to 8 credits.

### **PSYC 795 - Independent Study**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.



### **PSYC 795B - Independent Study in Perception**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795C - Independent Study in History and Theory**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795E - Independent Study in Social Psychology**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795F - Independent Study in Cognition**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795H - Honors/Independent Study**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795I - Independent Study in Personality**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment

by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795J - Independent Study in Developmental Psychology**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795K - Independent Study in Counseling**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 795L - Independent Study in Psychotherapy**

**Credits:** 1.00 to 4.00

A) Physiological, B) Perception;, C) History and Theory, D) Behavioral Analysis, E) Social, F) Cognition, G) Statistics and Methods, H) Experimental, I) Personality, J) Developmental, K) Counseling, L) Psychotherapy, M) Research Apprenticeship, N) Teaching of Psychology, O) Advanced Externship (content area to be determined). Arranged by the student with a psychology faculty sponsor. Learner/sponsor contract required. Minimum time commitment: three hours per credit per week. Enrollment by permission only. Prereq: PSYC 402; 502; or permission.

### **PSYC 797 - Senior Honors Tutorial**

**Credits:** 4.00

For senior psychology honors students. Students propose honors theses under the supervision of psychology faculty. Theses proposed and begun in this course are completed in PSYC 799. Prereq: admission to psychology honors program. (Typically offered in fall.)

### **PSYC 799 - Senior Honors Thesis**

**Credits:** 4.00

Under supervision of psychology department faculty members, students complete the honors projects proposed and begun in PSYC 797. The honors project, which should be empirical in nature, culminates in an oral presentation at the end of the semester. Prereq: admission to psychology honors program; PSYC 797. Special fee. (Typically offered in spring.)

## **Race,Culture,&Power**

### **RCP 795 - Independent Study in Race, Culture and Power**

**Credits:** 1.00 to 8.00

Open to qualified sophomores, juniors, and seniors. May include research project or fieldwork. To be elected only with permission of the coordinator and with qualified supervision.

### **RCP XXX - Special message place holder**

**Credits:**

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## Recreation Management & Policy

### **RMP 444 - Building a Culture of Peace**

**Credits:** 4.00

Peace is more than just the absence of war. A culture of peace incorporates respect and dignity for all persons, stewardship of natural resources, a striving toward justice and equality, the non-violent resolution of conflicts, non-hierarchical decision-making and participatory community life. Students in this course explore the origins and concepts of peace culture. Students experience the elements of a culture of peace as they are empowered to create a peace culture within the classroom and as they share peace culture with a broader community through service learning projects.

### **RMP 444A - Taking the "Dis" out of Disability**

**Credits:** 4.00

In contrast to the traditional view of disability as a defect, students learn how disability provides a unique vantage point on our world and can be perceived as an ordinary part of the twists and turns of life. Examines the history of social responses to disability, with an emphasis on the present day concepts of inclusion and self-determination. Students explore expressions of the disability experience through print and visual media. Writing intensive.

### **RMP 490 - Recreation and Leisure in Society**

**Credits:** 4.00

Examines the historical and philosophical foundation of recreation and leisure. Emphasizes concepts, theories, and the interrelationships between factors (social, economic, political, and environmental), which influence people's leisure attitudes and behavior. Explores implications of leisure for holistic and balanced living.

### **RMP 501 - Recreation Services for Individuals with Disabilities**

**Credits:** 4.00

Presents and discusses issues that concern the delivery of quality leisure services to individuals with disabilities in community settings. Lab requirements as well as classroom activities provide opportunities for practical experience. Prereq: permission. Lab.

### **RMP 502 - Foundations of Therapeutic Recreation**

**Credits:** 4.00

History and professional concepts of therapeutic recreation and the roles and functions of the therapeutic recreation specialist.

### **RMP 503 - Therapeutic Recreation Rehabilitation Principles & Interventions**

**Credits:** 4.00

Introduces the rehabilitation principles and recreational therapy interventions used by therapeutic recreation specialists to improve functioning for people with physical and cognitive impairments. Students learn and apply fundamental processes of clinical reasoning and treatment program planning to improve quality of life. A lab provides students with the opportunity to use a variety of assistive techniques, adaptive devices, and equipment to support individuals and achieve maximum independence and promote a healthy leisure lifestyle. Prereq: RMP 490, 501, 502. Special fee.

### **RMP 504 - Therapeutic Recreation Mental Health Principles and Interventions**

**Credits:** 4.00

Introduces mental health principles and recreational therapy interventions to improve functioning for people

with emotional, social, and behavioral impairments. Students will learn and apply fundamental processes of clinical reasoning and treatment program planning to improve quality of life for persons with emotional, social, and behavioral impairments. Prereq: RMP 490, 501, 502.

### **RMP 511 - Issues of Wilderness and Nature in American Society**

**Credits:** 4.00

Provides students with an overview of the evolving relationship between wilderness/nature and American society. Examines the philosophy, ethics, and societal values in American society and its relationship to our natural wilderness. Recent issues are used as case studies in order for students to articulate, defend, and critique the ethical issues presented. Students are responsible for understanding and applying philosophical approaches developed by philosophers, writers, and activists associated with the wilderness, sustainability, biodiversity, hunting, suburban sprawl, environmental activism, endangered species, organic foods, and genetic engineering.

### **RMP 557 - Recreation Services Program Design**

**Credits:** 4.00

Introduces the student to a systems approach to program design. Includes needs assessment techniques, goal setting and objectives writing, process of group planning, public relations, program evaluation, and leisure education. Applied projects are required. Prereq: RMP 490 or permission. Lab.

### **RMP 558 - Program Supervision and Leadership**

**Credits:** 4.00

Emphasizes specific knowledge of leisure activity categories with related organization and leadership techniques. Other topics include facilitation of activity throughout the lifespan and planning for instruction, safety, and crisis confrontation. Applied projects are required. Prereq: RMP 557 or permission.

### **RMP 560 - Recreational Sport Management**

**Credits:** 4.00

Explores and examines the theoretical foundations and basic skill methods, and techniques necessary for the effective and efficient delivery of recreational sport programs within a variety of collegiate, public, quasi-public, and private settings, agencies and/or organizations.

### **RMP 563 - Recreation Management and Policy Practicum**

**Credits:** 2.00

Designed to provide first and second year RMP majors the opportunity to observe and practice leadership skills in clinical and community-based settings. Students complete a 40-45 hour practicum at an approved site. Successful completion of a practicum is prerequisite to the professional internship, RMP 664. Students are responsible for transportation and housing. Prereq: RMP 490, 501. Permission required. May be repeated for a total of 4 credits. Cr/F.

### **RMP 565 - Introduction to Child Life**

**Credits:** 4.00

When facing acute, chronic or life-threatening illness and traumatic injuries, children and families have unique needs within the medical system. The purpose of this course is to provide an introduction to the theory and practice of the child life profession and family centered care. Topics include children's emotional reactions to hospitalization, use of play, preparation, and family support, designing healing environments, and specializations within the field. Permission required. (Also listed as FS 565).

### **RMP 593 - Special Topics**

**Credits:** 2.00 to 4.00

A) Camping and Outdoor Education for Individuals with Disabilities, B) State Parks: Their Management and Role, C) Therapeutic Recreation in the School Setting, D) Social Psychology of Leisure, E) New

Hampshire's Recreation/Ski Industry, F) Child Life Internship, G-Z) Interdisciplinary. Specialized courses covering information not presented in regular course offerings. Description of topics available in department office during preregistration. Prereq: RMP majors or permission. May be repeated but not in duplicate areas. Special fee for RMP 593G.

### **RMP 593W - Special Topics**

**Credits:** 2.00 to 4.00

A) Camping and Outdoor Education for Individuals with Disabilities, B) State Parks: Their Management and Role, C) Therapeutic Recreation in the School Setting, D) Social Psychology of Leisure, E) New Hampshire's Recreation/Ski Industry, F) Child Life Internship, G-Z) Interdisciplinary. Specialized courses covering information not presented in regular course offerings. Description of topics available in department office during preregistration. Prereq: RMP majors or permission. May be repeated but not in duplicate areas. Special fee for RMP 593G. Writing intensive.

### **RMP 600 - Multicultural Perspectives and Leisure**

**Credits:** 4.00

Explores the multicultural issues within a pluralistic society both generally and as they are specifically evident through leisure, recreation, and play behaviors, values, and possibilities. Course topics and assignments applied to the exploration of three questions: (1) How does leisure expression honor, value, and preserve unique cultural and ethnic heritages? (2) Does and/or can leisure expression create meaningful bridges across interpersonal and societal differences? (3) What are the moral and ethical responsibilities and opportunities for leisure services providers within a pluralistic society? Writing intensive.

### **RMP 602 - Clinical Treatment Lab I**

**Credits:** 2.00

A clinical lab that provides students with the opportunity to apply principles central to the effective delivery of therapeutic recreation individualized treatment planning, client assessment, documentation, and activity analysis with members of one of two community sites located in the Seacoast region. Students are required to participate in weekly sessions (five to six hours per week) for a total of 15 weeks. Prereq: RMP 490, RMP 501, RMP 502. Permission required. Cr/F.

**Co-requisites:** RMP 603

### **RMP 603 - Assessment and Treatment Planning in Therapeutic Recreation**

**Credits:** 4.00

Addresses the principles of activity analysis, client assessment, documentation, individualized program planning, selection of interventions, and collaboration with a treatment team. Prereq: RMP 490; 502.

### **RMP 604 - Therapeutic Communication and Facilitation in Therapeutic Recreation**

**Credits:** 4.00

Addresses specific clinical knowledge and skills essential to therapeutic recreation service delivery including clinical interviewing, group process, leisure education, treatment approaches, and intervention techniques. Prereq: RMP 490; 502; 603.

### **RMP 605 - Clinical Treatment Lab II**

**Credits:** 2.00

A clinical treatment lab that emphasizes the concepts and intervention techniques used in the clinical application of therapeutic recreation services, which relate to practice. Students provide therapeutic recreation services to members of one of two community sites located in the Seacoast region. Students are required to participate in weekly sessions (five to six hours per week) for a total of 15 weeks. Prereq: RMP 603 and RMP 602. Permission required. Cr/F.

**Co-requisites:** RMP 604

### **RMP 612 - Therapeutic Communication and Facilitation Techniques in Therapeutic Recreation**

**Credits:** 4.00

Addresses specific clinical knowledge and skills essential to therapeutic recreation service delivery including clinical interviewing, group process, leisure education, treatment approaches, and intervention techniques. Prereq: RMP 490. Permission required.

**Co-requisites:** RMP 613

### **RMP 613 - Interventions and Documentation in Therapeutic Recreation**

**Credits:** 3.00

This course emphasizes theory and concepts in clinical intervention within therapeutic recreation settings. Students learn to identify and select appropriate facilitation techniques for a variety of client needs. Students also learn to write and interpret practice-based documentation. Students are afforded the opportunity to practice and apply concepts learned. Prereq: RMP 490. Permission required.

**Co-requisites:** RMP 612

### **RMP 614 - Assessment and Treatment Planning in Therapeutic Recreation**

**Credits:** 4.00

Addresses the principles of activity analysis, client assessment, documentation, individualized program planning, selection of interventions, and collaboration with a treatment team. Prereq: RMP 612/613. Permission required.

**Co-requisites:** RMP 615

### **RMP 615 - Clinical Lab in Therapeutic Recreation**

**Credits:** 2.00

A clinical lab that provides students with the opportunity to apply principles central to the effective delivery of therapeutic recreation individualized treatment planning, client assessment, documentation, and activity analysis with members of one of two community sites located in the Seacoast region. Students are required to participate in weekly sessions (five to six hours per week) for a total of 15 weeks. Prereq: RMP 612/613. Permission required. Cr/F.

**Co-requisites:** RMP 614

### **RMP 654 - Professional Development and Ethics**

**Credits:** 2.00

Focuses on preparing students for the internship experience through the identification of career goals and the selection of an approved internship site. A portfolio emphasizing process skills in resume construction, interviewing techniques, establishing internship goals and objectives, and self-assessment is developed. Majors only. Prereq: permission. Letter Grade/IA (continuous grading).

### **RMP 663 - Management and Policy in Leisure Services**

**Credits:** 4.00

Comparative analysis of administrative processes within various organizations as well as the political and policy-making roles of the managers in the private and public sectors. Emphasizes organizational development, fiscal management, and budgeting as tools used in formulating and implementing policy. Prereq: RMP 557 or permission.

### **RMP 664 - Internship**

**Credits:** 14.00 to 16.00

A full-time 14-16 week internship in Therapeutic Recreation or Program Administration. Supervised work experience in an approved profession-related agency. An IA (continuous grading) grade (yearlong course) may be assigned at the end of the semester or summer session. Prereq: majors only; permission. Special fee. Cr/F.

### **RMP 665 - Applied Marketing and Communications in Recreation Services**

**Credits:** 4.00

Prepares students to respond effectively to an information-based society. Course topics are applied to the leisure service delivery systems and include microcomputer systems and applications, standardized information systems, networking, and dissemination of information through audio-visual, print, and mass media. Prereq: RMP 557 or permission.

### **RMP 668 - Youth Culture and Programs**

**Credits:** 4.00

Emphasizes the identification of community and personal issues youth face in growing up as well as institutional and programmatic support available to assist youth. The course also examines the leadership, administrative, financial, and marketing tools necessary to develop successful youth programs and services. Prereq: RMP 490 or permission for non-majors. Writing intensive.

### **RMP 680 - Festival and Event Planning**

**Credits:** 4.00

Introduces the planning, marketing, management, and evaluation of festivals and special events. Explores the theories and practices relevant to successful event planning for host community residents and visitors.

### **RMP 700H - Senior Honors Project**

**Credits:** 4.00 to 6.00

Under the direction of an RMP faculty member, students complete either a supervised research or applied field study project that builds on their honors coursework. Students submit a written proposal for approval and present the results at the completion of their project. Applied studies address a specific need or problem of a local agency or organization. Prereq: permission required.

### **RMP 705 - Management and Policy in Therapeutic Recreation**

**Credits:** 4.00

Addresses National Council for Therapeutic Recreation Certification knowledge areas concerning management competency. Students acquire knowledge of current principles and procedures for assuming an administrative role in the therapeutic recreation profession. Issues and practices related to budgeting, reimbursement, quality improvement programs, and comprehensive program planning. Prereq: RMP 502; 603; 604.

### **RMP 711 - Recreation Resource Management**

**Credits:** 4.00

Examines the supply and demand of natural resources for outdoor recreation uses, with emphasis on relationships between public and private roles and responsibilities. Social, environmental, and economic impacts of outdoor recreation use are discussed. Current principles and techniques of recreation resource planning and management are outlined. Prereq: seniors or permission.

### **RMP 724 - Grantsmanship, Evaluation, and Research**

**Credits:** 4.00

Emphasizes understanding and application of grantsmanship, research techniques, and research writing. Addresses the process of program planning and grant proposal development. Examines research methodologies and the evaluation processes as applied to recreation and allied health settings. Critical assessment of uses and limitations of research for recreation. Prereq: RMP 557, 663 and senior RMP major or permission. Writing intensive.

### **RMP 730 - Camp Administration and Leadership**

**Credits:** 4.00

Provides students with an understanding of administrative and organizational practices in structured camp



settings. Students are exposed to the theory, practice, and challenges of program planning for youth and adult development within the recreation context of camping. Explores current sociological, environmental, economical, and legislative trends influencing contemporary camp management. Permission required.

### **RMP #760 - Community Sport Organizations: Administration and Development**

**Credits:** 4.00

The administration and development of participant-based community sport organizations and resources. Emphasizes the organizational, administrative, and programming competencies necessary to effectively manage these resources. Focuses on problems and research-oriented solutions related to the management of community sport organizations. Prereq: RMP 560 or permission of the instructor.

### **RMP 770 - Management and Design of Recreation and Park Facilities**

**Credits:** 4.00

Provides students with an orientation to the theories, design, operation, and functions of recreational facilities. Topics include facility development, operational considerations, and auxiliary functions that impact the manager's role. Students gain insight into key areas of facility management through visitations to actual facilities. Prereq: RMP 705; permission. Special fee.

### **RMP 772 - Law and Public Policy in Leisure Services**

**Credits:** 4.00

Topics including the law of torts, contracts, property, civil rights, risk management, and legal research are addressed in the context of leisure services and recreation resources. Public policy and professional advocacy implications are examined in relation to legislative and judicial systems. Prereq: RMP 557, 663, and senior RMP major or permission. Writing intensive.

### **RMP #775 - Entrepreneurial and Commercial Recreation**

**Credits:** 4.00

Principles of business planning and development as applied to the private sector leisure services industry. Emphasizes knowledge of key commercial leisure services profiles and their intersection with allied professions such as hospitality and tourism. Course topics include entrepreneurship, business planning, needs assessment, product development, selling, financing, legal designations, and business operations leading to the development of a business plan for a new entrepreneurial recreation enterprise. Prereq: RMP 663.

### **RMP 793 - Advanced Topics**

**Credits:** 2.00 to 4.00

A) Area and Site Planning, B) Concepts and Trends in Therapeutic Recreation, and C) Conference Planning. Topics presented by instructors with specialized knowledge gained through professional practice, research, and study. Descriptions of topics available in department office during preregistration. May be repeated but not in duplicate areas. 2 to

### **RMP 796 - Independent Study**

**Credits:** 1.00 to 4.00

Individual study and/or research relating to leisure-oriented topics. Prereq: permission.

## Religious Studies

### **RS 483 - History of World Religions**

**Credits:** 4.00

Introduces the religions of the world in terms of historical development, relationship to society, belief system, central texts, and ritual practices. (Also offered as HIST 483.)

### **RS 483W - History of World Religions**

**Credits:** 4.00

Introduces the religions of the world in terms of historical development, relationship to society, belief system, central texts, and ritual practices. (Also offered as HIST 483.) Writing intensive.

### **RS 576 - Hebrew Bible in Historical Context**

**Credits:** 4.00

An introductory study of the Hebrew Bible, or Old Testament, examining the development of biblical literature in the context of ancient Near Eastern cultures and history. Includes the interpretation of creation stories and the patriarchal narratives using literary and folklore methods, the transformation of Israelite religion from Moses to David to Ezra, the role of prophets and nature of ancient prophecy, the concept of the messiah, "wisdom" literature and the biblical interpretations of misfortune, the formation of a biblical canon, and the critical analysis of sacred texts. (Also offered as HIST 576.) Writing intensive.

### **RS 584 - Patterns in World Religions**

**Credits:** 4.00

Introductory course on the comparison of religions and religious patterns. Examining cross-cultural themes such as sacred places, sacred books, and sainthood, students become acquainted with the concepts and methods used in the historical study of religions. Primary and secondary readings encompass a wide variety of religious practices and ideas. (Also offered as HIST 484.) Writing intensive.

### **RS 600 - Special Topics**

**Credits:** 4.00

Studies of particular religious traditions, or periods within those traditions, or special topics and issues of concern within religious studies such as mythology, ritual, mysticism, etc. May be repeated up to a maximum of 12 credits.

### **RS 601 - Seminar in Religious Texts**

**Credits:** 4.00

Close study of sacred text(s) from a particular religious tradition (Islam, Christianity, Buddhism, Judaism, etc.) or a thematic selection of texts across religions. (Also offered as HIST 601.)

### **RS 682 - Cults and Charisma**

**Credits:** 4.00

Examines religious sects and charismatic leaders using case studies from history and the contemporary world, as well as analytical principles from religious studies and anthropology. Explores various approaches to the question, What makes a person powerful over others? in connection with the formation of messianic sects, the genesis of the "cult," the traditional authority of priests and kings, sainthood, the events at Jonestown and Waco, and the popular image of the "cult." Students learn to employ a variety of tools and models to understand historical situations of charismatic leadership. (Also offered as HIST 682.)

### **RS 699 - Seminar in Religious Studies**

**Credits: 4.00**

Advanced discussion of a particular theme in religious studies, meant both to give students a solid foundation in classic theories of religion and to explore new authors and ideas. Past topics have included ritual, possession, magic, and apocalypticism. Classes are in seminar format and culminate in a final research paper. (Priority to minors in Religious Studies.) Prereq: permission.

**RS #770 - Anthropology of the Sinister****Credits: 4.00**

Examines narratives of the sinister stories about witches, demons, vampires, and extraterrestrials that are told as if true. Investigates the cultural, political, and economic contexts of their production. Variants of the sinister are compared cross-culturally and trans-historically. Links between a recent worldwide upsurge in narratives of the sinister and the processes of globalization and modernity are emphasized. Seminar format; open only to juniors and seniors. (Also listed as ANTH 770).

**RS 795 - Independent Study****Credits: 2.00 or 4.00**

Independent study of traditions, topics, or figures within the scope of religious studies. Before registration, student must formulate a project and secure consent of a cooperating program/faculty member who will supervise the independent study.

**RS 796 - Independent Study****Credits: 2.00 or 4.00**

Independent study of traditions, topics, or figures within the scope of Religious Studies. Before registration, student must formulate a project and secure consent of a cooperating program/faculty member who will supervise the independent study.

**RS XXX - Special message place holder****Credits:**

## Russian

### **RUSS 401 - Elementary Russian I**

**Credits:** 4.00

For students without previous training in Russian. An introduction to contemporary standard Russian. Includes a cultural component. Topics include those which enable students to function in Russian in everyday situations (i.e. food, leisure activities, literature, transportation, music, sports, daily life.) Special fee.

### **RUSS 402 - Elementary Russian II**

**Credits:** 4.00

See description for RUSS 401.

### **RUSS 425 - Introduction to Russia: Contemporary Society and Culture**

**Credits:** 4.00

Introduction to contemporary Russian society and culture in English. Examines the "Russian mind" (as it was before 1917), the "Soviet mind," and how the two have clashed. A closer examination of how the Russians are adapting to the changes that have taken place in their country since the collapse of communism. Readings, films, realia. Themes to be discussed include leadership; authority and power; the Russian soul; family, women, youth, education, holidays and celebrations; and the new Russians. Special fee.

### **RUSS 500 - Selected Topics in World Literature**

**Credits:** 4.00

Topics are chosen that introduce students to major themes and genres. (Also offered as CLAS 500, FREN 500, GERM 500, ITAL 500, PORT 500, SPAN 500.) May be repeated for credit. Special fee.

### **RUSS 500W - Topics in World Literature**

**Credits:** 4.00

Topics are chosen that introduce students to major themes and genres. (Also offered as CLAS 500, FREN 500, GERM 500, ITAL 500, PORT 500, SPAN 500.) May be repeated for credit. Special fee. Writing intensive.

### **RUSS 503 - Intermediate Russian I**

**Credits:** 4.00

Continued work in grammar, and writing with cultural components. A review of the fundamentals of grammar and syntax. Readings and cultural material included. Topics include: university life, travel, cultural activities, cooking, politics. Special fee.

### **RUSS 504 - Intermediate Russian II**

**Credits:** 4.00

Continued work in grammar, and writing with cultural components. A review of the fundamentals of grammar and syntax. Readings and cultural material included. Topics include: university life, travel, cultural activities, cooking, politics. Special fee.

### **RUSS 521 - Devils, Deities, and Madness in Russian Literature**

**Credits:** 4.00

Introduces Russian literature from a variety of perspectives. Selected works by famous and lesser known Russian writers on the themes of devils, deities, and madness. Literary texts, as well as film versions of

literary texts, are considered in their historical and cultural contexts. Lectures, readings, and discussions in English. Open to all students, including freshmen. No prerequisites. Special fee.

### **RUSS 521W - Devils, Deities, and Madness in Russian Literature**

**Credits:** 4.00

Introduces Russian literature from a variety of perspectives. Selected works by famous and lesser known Russian writers on the themes of devils, deities, and madness. Literary texts, as well as film versions of literary texts, are considered in their historical and cultural contexts. Lectures, readings, and discussions in English. Open to all students, including freshmen. No prerequisites. Special fee. Writing intensive.

### **RUSS 522 - Morality, Sex and Revolution in Russian Literature**

**Credits:** 4.00

Introduces Russian literature from a variety of perspectives. Selected works by famous and lesser known Russian writers on themes of morality, sex, and revolution. Literary texts, as well as film versions of literary texts, are considered in their historical and cultural contexts. Lectures, readings, and discussions in English. Open to all students, including freshmen. No prerequisites. Special fee.

### **RUSS 522W - Morality, Sex and Revolution in Russian Literature**

**Credits:** 4.00

Introduces Russian literature from a variety of perspectives. Selected works by famous and lesser known Russian writers on themes of morality, sex, and revolution. Literary texts, as well as film versions of literary texts, are considered in their historical and cultural contexts. Lectures, readings, and discussions in English. Open to all students, including freshmen. No prerequisites. Special fee. Writing intensive.

### **RUSS 525 - Russia: Mythology and Propaganda**

**Credits:** 4.00

Exploration of the relationship between mythology and culture as a part of the cultural identity of the Russian people, before the 1917 Revolution, during the Communist period, and since the fall of the Soviet Union. Focus on pre 1917 Slavic pagan, Christian, and folk mythology vis-a-vis Western mythology, on 20C propaganda and control of the "public mind" designed to reshape national identity and on the current deconstruction, reform, and rebirth of the old mythology. Special fee.

### **RUSS 525M - Russia: Mythology and Propaganda in Moscow**

**Credits:** 4.00

Exploration of the relationship between mythology and culture as a part of the cultural identity of the Russian people, before the 1917 Revolution, during the Communist period, and since the fall of the Soviet Union. Focus on pre 1917 Slavic pagan, Christian, and folk mythology vis-a-vis Western mythology, on 20C propaganda and control of the "public mind" designed to reshape national identity and on the current deconstruction, reform, and rebirth of the old mythology. Course conducted on location in Russia and on line. Special fee.

### **RUSS #533 - History of Slavic Languages and Culture**

**Credits:** 4.00

A survey of the history of the Russian language in a historical and cultural context. Overview of the changes in sounds, structure and vocabulary from Proto-Indo-European through Old Church Slavic, Old Russian to contemporary Russian. Readings and discussions of historical events, culture and civilization parallel the chronology of the studied linguistic period. Special fee.

### **RUSS 586 - Introduction to Russia and Russian: Study Abroad in the Russian Federation**

**Credits:** 4.00

This is an introductory and intermediate Russian language course with a significant culture and civilization component. It is not intended to be used as a substitute for the study abroad component of the Russian

major, nor as a substitute of any major requirements. The course is designed as an introduction to Russia and Russian for those who have had no such, or minimal instruction of for intermediate students who need the on site exposure to the target language to increase language proficiency. No previous knowledge of Russian required. Open to all students with no Russian and with credit for 401 or 402.

### **RUSS 593 - Myths, Visions and Issues in Russian Literature and Society**

**Credits:** 4.00

Discussion and analysis of topics and authors in Russian literature, film, and culture. A variety of different topics or authors is covered each semester: (A) the Giants of Russian Literature: Dostoevsky and Tolstoy, (B) Dostoevsky, (C) Tolstoy, (D) Jewish Voices in the Russian Empire, (E) The Devil in Russian Literature, (F) the Myth of St. Petersburg, (G) Death and Revolution, (H) Russian Fairy Tales, (I) Drama, (J) Women's Voices, etc. Lectures, readings, and films with English subtitles, and discussions in English. Open to all students. Special fee.

### **RUSS 593W - Myths, Visions and Issues in Russian Literature and Society**

**Credits:** 4.00

Discussion and analysis of topics and authors in Russian literature, film, and culture. A variety of different topics or authors is covered each semester: (A) the Giants of Russian Literature: Dostoevsky and Tolstoy, (B) Dostoevsky, (C) Tolstoy, (D) Jewish Voices in the Russian Empire, (E) The Devil in Russian Literature, (F) the Myth of St. Petersburg, (G) Death and Revolution, (H) Russian Fairy Tales, (I) Drama, (J) Women's Voices, etc. Lectures, readings, and films with English subtitles, and discussions in English. Open to all students. Special fee. Writing intensive.

### **RUSS 595 - Russian Practicum**

**Credits:** 2.00

Participants earn credit for approved, uncompensated, pre-professional activities and special projects, including K-12 outreach, assisting in undergraduate courses, work with professional organizations, businesses, social services, non-profits, NGOs or educational organizations in a Russian context and with on-site supervision. Writing assignments are required and vary depending upon the project. Enrollment limited to sophomores, juniors and seniors who are Russian majors and have a B or above average in Russian language courses. Cr/F.

### **RUSS 601 - Russian Conversation and Phonetics**

**Credits:** 4.00

Practical application of fundamental phonetic theory of spoken Russian. Designed to increase fluency and accuracy in conversation. Prereq: RUSS 504 with a grade of C or better; permission. Special fee.

### **RUSS 631 - Advanced Russian Conversation and Composition**

**Credits:** 4.00

Advanced spoken and written Russian designed to include all four language skills (speaking, reading, writing, listening.) Readings on contemporary cultural topics and vocabulary building. Composition and conversation based on Russian-language media and literature. Special fee.

### **RUSS 632 - Advanced Russian Conversation and Composition**

**Credits:** 4.00

Advanced spoken and written Russian designed to include all four language skills (speaking, reading, writing, listening.) Readings on contemporary cultural topics and vocabulary building. Composition and conversation based on Russian-language media and literature. Special fee.

### **RUSS 685 - Study Abroad**

**Credits:** 16.00

Studies at a Russian institution of higher learning. Interested students should consult with a Russian

advisor. Prereq: primarily for juniors and seniors who have completed RUSS 632 or equivalent with a grade of B (3.00) or better. Special fee. Cr/F. (IA grade will be assigned until official transcript is received from the foreign institution.)

### **RUSS 686 - Study Abroad**

**Credits:** 16.00

Studies at a Russian institution of higher learning. Interested students should consult with a Russian advisor. Prereq: primarily for juniors and seniors who have completed RUSS 632 or equivalent with a grade of B (3.00) or better. Special fee. Cr/F. (IA grade will be assigned until official transcript is received from the foreign institution.)

### **RUSS 691 - Readings in Russian Literature**

**Credits:** 4.00

Linguistic and stylistic characteristics of works of important authors of the 19th and 20th centuries. Readings, lectures, and papers entirely in Russian. Special fee. Writing intensive.

### **RUSS 693 - Myths, Visions and Issues in Russian Literature and Society**

**Credits:** 4.00

Same as RUSS 593, except that in addition majors are required to do selected readings in Russian and/or conduct research assignments in English on a specified topic. Final project required. Writing intensive option. Special fee.

### **RUSS 693W - Myths, Visions and Issues in Russian Literature and Society**

**Credits:** 4.00

Same as RUSS 593, except that in addition majors are required to do selected readings in Russian and/or conduct research assignments in English on a specified topic. Final project required. Writing intensive option. Special fee. Writing intensive.

### **RUSS 721 - Topics in Contemporary Russian Literature: From Chekhov to Post-Modernism**

**Credits:** 4.00

Reading, discussion, and close analysis of works of prose fiction and/or poetry from post-19th-century Russian literature within various contexts (literary-historical, socio-political, cultural, artistic, etc.) of the given period. All readings, written assignments, and class discussion in Russian. Prereq: RUSS 691 or equivalent or by permission. Special fee. Writing intensive.

### **RUSS 725 - Topics in Russian Culture and Society**

**Credits:** 4.00

Historical, geographical, social, political, intellectual and artistic developments in Russia that have influenced contemporary Russian society and culture. Readings, class discussions, and films. Conducted entirely in Russian. Special fee. Writing intensive.

### **RUSS #733 - History of Slavic Languages and Culture**

**Credits:** 4.00

A survey of the history of the Russian language in a historical and cultural context. Overview of the changes in sounds, structure and vocabulary from Proto-Indo-European through Old Church Slavic, Old Russian to contemporary Russian. Readings and discussions of historical events, culture and civilization parallel the chronology of the studied linguistic period. Special fee.

### **RUSS 790 - Advanced Language and Style**

**Credits:** 4.00

For students who have a strong, active control of grammar. The most difficult problems of Russian grammar and syntax in poetry and prose. Develops confidence in expression both in everyday situations

and in abstract concepts (emphasis on the latter). Prereq: grade of C or better in last Russian language course taken. Special fee. Barring duplication of material, may be repeated for a maximum of 8 credits. Writing intensive.

### **RUSS 795 - Independent Study**

**Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with permission of the Russian program coordinator and the supervising faculty member or members. Barring duplication of subject, may be repeated for credit. Special fee.

### **RUSS 796 - Independent Study**

**Credits:** 1.00 to 4.00

Open to highly qualified juniors and seniors. To be elected only with permission of the Russian program coordinator and the supervising faculty member or members. Barring duplication of subject, may be repeated for credit. Special fee.

### **RUSS 797 - Special Studies in Russian Language, Literature, and Culture**

**Credits:** 2.00 or 4.00

Selected topics in language, literature, and culture. Barring duplication of subject, may be repeated for credit. Special fee.

### **RUSS 798 - Special Studies in Russian Language, Literature, and Culture**

**Credits:** 2.00 or 4.00

Selected topics in language, literature, and culture. Barring duplication of subject, may be repeated for credit. Special fee.



## Sign Language Interpreting

### **INTR 430 - Introduction to Interpretation**

**Credits:** 4.00

A survey of traditional and contemporary perspectives on interpretation and interpreters; introduces the cognitive processes involved in interpretation and factors that influence those processes. Several models of interpretation explored. Particular attention given to interpretation as an intercultural, as well as interlingual, process. Students engage in a research project related to course content.

### **INTR 438 - A Socio-cultural Perspective on the Deaf Community**

**Credits:** 4.00

Introduction to the deaf community and deaf culture. Discussion of similarities to, and differences from, mainstream hearing culture. Supplemental videotapes focus on aspects of culture including deaf education, autobiographical sketches, deaf norms and values, and deaf literature and folklore. Theoretical issues of culture and linguistics applied to deaf culture, American Sign Language, and the variety of cultural perspectives of the deaf community. Students engage in a research project related to course content. Pre- or Coreq: ENGL 401. Writing intensive.

### **INTR 439 - Ethics and Professional Standards for Interpreters**

**Credits:** 4.00

Seminar course using readings, theory, and discussion of hypothetical situations and role plays to explore ethical standards and dilemmas in ASL-English interpretation. Covers personal and professional values, ethics, and morality; professional principles; power, responsibility, and group dynamics; the interpreter's role; cross-cultural issues; and the decision-making process. Students engage in a research project related to course content. Prereq: INTR 430. Writing intensive.

### **INTR 539 - Comparative Linguistic Analysis for Interpreters**

**Credits:** 4.00

Examines the basic similarities and differences between the linguistic structure of American Sign Language and spoken English; focuses on each language's communication functions and how they serve these functions. Students engage in a research project related to course content. Prereq: ENGL 505; Pre-or Coreq: ASL 532.

### **INTR 540 - Principles and Practices of Translation**

**Credits:** 4.00

Introduction to theory and practice of translation. Students analyze pre-prepared interpretations and translations to discover how expert interpreters produce target language messages which are pragmatically equivalent to the source language messages. Particular attention paid to the form/meaning distinction. Students prepare translations from texts of their choosing. Pre- or Coreq: ASL 532.

### **INTR 599 - Special Topics**

**Credits:** 1.00 to 4.00

Occasional offerings dependent on availability and interest of faculty. Barring duplication of subject, may be repeated up to a maximum of 8 credits.

### **INTR 630 - Principles and Practices of Consecutive Interpretation**

**Credits:** 4.00

Introduction to the theory and practice of consecutive interpretation. Analyzes and integrates specific subtasks of the interpreting process culminating in the performance of prepared and spontaneous

consecutive interpretations. Students work with a variety of texts, language models, and settings with the goal of producing a grammatically correct target language text which is equivalent to the source language text. Prereq: INTR 540.

### **INTR 636 - Principles of Simultaneous Interpretation**

**Credits:** 4.00

Introduces the theory and practice of simultaneous interpretation. Particular attention is given to processes involved in translation from consecutive to simultaneous interpreting. The advantages and limitations of both types of interpreting are compared. Students apply theoretical information to the process of simultaneous interpreting. Students engage in a research project related to course content. Prereq: INTR 630.

### **INTR 732 - Simultaneous Interpretation of Discussions, Speeches, and Reports**

**Credits:** 4.00

Focuses on simultaneous interpretation of group discussions, speeches, and reports. Students apply theory learned in INTR 636 to a variety of texts, language models, and settings. Students engage in a research project related to course content. Prereq: INTR 636. Writing intensive.

### **INTR 734 - Field Experience and Seminar I**

**Credits:** 4.00

Gives students the opportunity to observe professional working interpreters, with some direct interpreting experience as deemed appropriate. Students integrate knowledge, theoretical understanding, and skills acquired in the interpreting program by working closely with on-site supervisors (interpreters) in addition to attending a bi-weekly seminar with the UNHM field experience coordinator. Pre- or Coreq: INTR 732.

### **INTR 735 - Field Experience and Seminar II**

**Credits:** 4.00

Gives students the opportunity to gain supervised interpreting experience. Students engage in actual interpreting assignments and receive support and mentorship from a professional interpreter, enabling them to integrate knowledge, theoretical understanding, and skills acquired in the interpreting program. Students work closely with on-site supervisors (interpreters) in addition to attending a biweekly seminar with the UNHM field coordinator. Prereq: INTR 734.

### **INTR 798 - Special Topics**

**Credits:** 4.00

Selected topics that vary by semester. Possible course topics are interpreting in educational settings, working with specific populations, or other topics of importance to interpretation. Descriptions available in departmental office during preregistration. Students engage in a research project related to course credit. Prereq: INTR 636; permission. May be repeated for credit if topics differ

## Social Science

### **SCSC 681 - Internships**

**Credits:** 16.00

Fieldwork in a state or local government department, agency, or institution, or in an approved private agency. Work is under supervision of agency. Department chairperson or representative is responsible for arranging the program. Offered through departments of history, political science, psychology, sociology, and anthropology. Prereq: senior standing. Special fee.

### **SCSC 682 - Washington Internship**

**Credits:** 12.00

Internship placements in Washington, D.C., through the Washington Center. Individual internships arranged with legislative and judicial offices, law firms, public interest organizations; in the arts, the media, labor, international affairs, business, consumer affairs. Supervision by agency personnel and faculty sponsor. Students should have above-average academic records before applying. Open to all majors. Applications available in the National Student Exchange Office, Hood House. Prereq: junior or senior. Student must also register for a graded, 4-credit independent study in the student's major. credit variable to 12 credits. Special fee. Cr/F.

## Social Work

### **SW 424 - Introduction to Social Work**

**Credits:** 4.00

Introduces the learner to the field of social work with emphasis on the "person-in-environment" and attention to a range of practice approaches to understanding and assisting of the human condition. An overview of the history, values, and ethics of the profession. Includes various fields of practice in which social workers are employed. Special fee.

### **SW 444 - You've Got Your Troubles, I've Got Mine**

**Credits:** 4.00

A seminar for traditional first- or second-year students. Examines the many personal losses typical for students leaving home for the first time. Guest speakers from various disciplines (e.g., social work, therapeutic recreation, nursing, family studies). The various ways one may find and give informal support to others dealing with loss are explored. In addition, the personal responses allowing one to better cope with adversity and ways of expressing grief are explored. Group work brings the class together as an informal support network. Students exchange ideas in techniques used to deal with personal loss and develop an informal support network to use after the course has ended.

### **SW 525 - Social Welfare Policy: History of Social and Economic Justice**

**Credits:** 4.00

An overview of the history and current status of social welfare policy in the United States. Considers the origins, development, and analysis of significant policies, values, attitudes and other issues related to the social welfare system and the delivery of service. Focuses on policy analysis from a social and economic justice perspective.

### **SW 550 - Human Behavior and Social Environment I**

**Credits:** 4.00

Introduces human behavior and development as it influences and is influenced by multiple factors in the social environment, including individual genetic and biological composition, race, gender, age, socioeconomic status, ethnicity, geographic location, physical appearance, and ability. How these factors operate throughout the life cycle. Provides a knowledge base and perspective to understand a client's behavior, attitude, and values in relation to the attitudes and values of the social work professional and the larger society.

### **SW 551 - Human Behavior and Social Environment II**

**Credits:** 4.00

Agents of socialization that most significantly affect family, group, and organizational development and behavior within an ecosystems framework. Particular attention is paid to the influence of class, gender, race, ethnicity, religion, age, sexual orientation and other aspects of diversity on development and behavior of larger systems.

### **SW 601 - Research Methods in Social Work**

**Credits:** 4.00

Introduces students to practitioner-researcher role in social work. Critical evaluation of, and introduction to research including project design, survey and evaluative methodologies. Introduction to statistics used in research process. Each student completes an individual research project. Cannot be taken for credit after SOC 601 or PSYC 502. Prereq: SW 424 and junior or senior standing or permission. Writing intensive.

### **SW 622 - Social Work Practice: Interventions with Individuals and Families**

**Credits:** 4.00

Introduces methods and practice. Basic principles, values, and ethics, interviewing skills, problem assessment, and contracting of social work practice with individuals and families are studied. Skills training in lab sessions. Prereq: SW 424 or permission of instructor. Must have junior or senior status. Writing intensive.

### **SW 623 - Social Work Practice: Interventions with Groups, Organizations and Communities**

**Credits:** 4.00

Continuation of SW 622. Delineation and study of intervention and change strategies differentiated with individuals, groups, and communities. Prereq: SW 622. Special fee. Writing intensive.

### **SW 625 - Social Welfare Policy in a Global Context**

**Credits:** 4.00

Builds on the curricular content covered in Introduction to Social Welfare Policy (SW 525). Both courses view social welfare policy as the framework from which social work services are developed and delivered. This course examines the macroeconomic context for policy analysis and advocacy and integrates policy and practice through student research and analysis of specific social problems. Policymaking is analyzed in legislative, community, organizational, and global environments emphasizing advocacy in the pursuit of social and economic justice. Prereq: SW 424, SW 525. Special fee.

### **SW 640 - Social Work Field Experience I**

**Credits:** 5.00

Majors are placed in a social welfare setting for a minimum of 225 hours; individual arrangements with faculty coordinator. Prereq; SW 622 and permission. Coreq; SW 640A. Special fee. (No credit toward a minor.) Cr/F.

**Co-requisites:** SW 640A

### **SW 640A - Social Work Field Experience I: Seminar**

**Credits:** 3.00

This weekly seminar, held concurrently with Social Welfare Experience I, integrates the field experience with social work theory and concepts learned throughout the curriculum by class discussion, exercises, readings and written assignments. Seminar I provides an opportunity for orientation to field, an overview of field requirements, review of the Code of Ethics, and use of small group discussion for problem solving. Students learn to use supervision effectively, to participate in the helping process, and to manage their own stress. Students learn to assess the impact of policy on the client system, agency and worker and to use research to inform practice. Prereq: SW 622 and permission.

**Co-requisites:** SW 640

### **SW 641 - Social Work Field Experience II**

**Credits:** 5.00

A continuation of SW 640 with a minimum of 225 hours. Prereq: SW 640 and permission. Coreq: SW 641A. (No credit toward a minor.) Cr/F.

**Co-requisites:** SW 641A

### **SW 641A - Social Work Field Experience II: Seminar**

**Credits:** 3.00

This is a continuation of Social Welfare Field Experience I: SW 640A and builds upon the concepts presented in the student's first field practice seminar. This seminar meets weekly for one and a half hours and is held concurrently with the field placement. It is designed to integrate the field experience with social work concepts through class discussion, reading and written assignments. Topics include but are not limited to, understanding and using agency structure to enhance client interactions, preparing client

assessment and other documents, enhancing the client-worker therapeutic interaction, effective use of supervision, effective use of self in practice, prevention of burn-out, termination with clients and with agency staff, and values and ethics. Prereq: SW 640/640A and permission.

**Co-requisites:** SW 641

### **SW 697 - Special Topics in Social Welfare**

**Credits:** 4.00

Seminar for advanced majors. Topics may include: A) Alcohol and Alcoholism, B) Drugs and Chemical Dependency, C) Income Maintenance, D) Health Care, E) Child Welfare, F) Aging, G) Mental Health, or H) Developmental Disabilities. May be repeated for different topics. Prereq: permission. Special fee for course trip.

### **SW 701 - Women and Aging**

**Credits:** 4.00

Analysis of the major theories about social conditioning of aging women and its effects in contemporary society. Human service response. psychosocial, biological, legal, and economic implications. Prereq: junior, senior status or permission.

### **SW 705 - Child and Adolescent Risks and Resiliency: Program, Policy and Practice**

**Credits:** 4.00

Examination of the major policy and program questions of child welfare with a focus on child care and protection, adoption and foster care, juvenile delinquency, service delivery, and concepts of treatment in public and private programs. Prereq: junior, senior status or permission.

### **SW 711 - Understanding Mental Illness**

**Credits:** 4.00

An overview of the public mental health system focusing on people affected by severe and persistent mental illness. Reviews the current service system and its history; major mental illness, psychosocial rehabilitation, and treatment; and community support systems. Prereq: junior, senior status or permission.

### **SW 712 - Understanding Developmental Disabilities**

**Credits:** 4.00

Analysis of the complex social contexts of people with developmental disabilities. Explores and questions traditional approaches and the current system. Examines family and community services and resources. Prereq: junior, senior status or permission. Special fee.

### **SW 714 - Alcohol: Use, Misuse, and Addiction**

**Credits:** 4.00

This course examines a) historical, cultural, social aspects of alcohol, b) impact of alcohol on body and behavior, c) progression of drinking and the treatment and prevention of alcoholism, d) impact of addiction on families. Prereq: junior, senior status or permission.

### **SW 715 - Practice with Gay, Lesbian, Bisexual, and Transgender People**

**Credits:** 4.00

Sexual minorities constitute the minority group social workers most consistently encounter wherever they work. Addresses practice with gay, lesbian, and bisexual people on both professional and personal levels for the social worker. The readings include theoretical, experimental, clinical, counseling, and personal perspectives, as well as providing an introduction to the gay/lesbian/bisexual subculture. A unit on gender minorities is included. Students are also required to explore and examine their own attitudes and assumptions about gays, lesbians, bisexuals, and gender minorities. Prereq: junior, senior status or permission. (Also offered as SW 815.)

**SW 785 - Study Abroad: Comparative Social Welfare Systems****Credits:** 4.00

Students examine the historical development of social welfare in another country including an analysis of the underlying values and attitudes that dictate practice and policy decisions. Includes agency site visits, lectures, themed readings, and visits to important cultural sites. Prereq: SW 424 and SW 525; junior, senior status or permission. Special fee.

**SW 795 - Independent Study in Social Service****Credits:** 1.00 to 6.00

Independent work under department faculty guidance. Enrollment by permission only through arrangement with specific faculty. May be repeated with a different focus to maximum of 8 credits. Prereq: 12 hours social service coursework; permission. Cr/F. Special fee.

**SW 796 - Independent Study: Teaching Assistantship****Credits:** 1.00 to 6.00

Participating students provide leadership and supervision for small groups of social work majors in social work practice simulations. Student teaching assistants work closely with, and under the direction of, department faculty. May be repeated to a maximum of 8 credits. Prereq: senior status; 16 hours in social work; and permission. Cr/F

**SW 797H - Honors Thesis****Credits:** 2.00 to 4.00

Working with an assigned faculty adviser, students propose and develop a thesis project for both oral and written presentation before the end of the semester. Prereq for 797H: admission to the SW honors program; senior status, 16 hours in social work and permission.

**SW 798H - Honors Thesis****Credits:** 2.00 to 4.00

Working with an assigned faculty adviser, students propose and develop a thesis project for both oral and written presentation before the end of the semester. Prereq: satisfactory completion of 797H; senior status, 16 hours in social work and permission. 6 credit maximum for both semesters.

## Sociology

### **SOC 400 - Introductory Sociology**

**Credits:** 4.00

Overview of sociology as the scientific study of human social and cultural relationships. Social theory, methods and techniques of research, and current research findings on a wide range of social issues.

### **SOC 400H - Honors/Introductory Sociology**

**Credits:** 4.00

Overview of sociology as the scientific study of human social and cultural relationships. Social theory, methods and techniques of research, and current research findings on a wide range of social issues. Writing intensive.

### **SOC 400W - Introductory Sociology**

**Credits:** 4.00

Overview of sociology as the scientific study of human social and cultural relationships. Social theory, methods and techniques of research, and current research findings on a wide range of social issues. Writing intensive.

### **SOC #444 - Social Mobility and Social Change**

**Credits:** 4.00

Uses a multidisciplinary perspective to examine the major social and economic trends that have affected American mobility patterns since the 1950s. The primary goal of the course is to help students ask and answer questions about the processes of social mobility and social change. Students learn how social scientists formulate research questions, how they collect and analyze data to answer those questions, and how their findings shape scholarly debates and public policy. Writing intensive.

### **SOC 444A - Society in the Arctic**

**Credits:** 4.00

Introduction to societies of the far North today, from Alaska and Canada through Greenland, Iceland, northern Scandinavia and Russia. Reviews interconnected issues of social change, environment, sustainable development, local control, and modernization vs. traditions. Arctic dilemmas highlight some basic questions facing all societies in the 21st century. Writing intensive.

### **SOC 502 - Statistics**

**Credits:** 4.00

Elementary applied statistical techniques; tables, graphs, cross-classifications; central tendency and dispersion; correlation and linear regression; confidence intervals and hypothesis testing. No credit for students who have completed ADM 430, BIOL 528, ADMN 420, EREC 525, HHS 540, MATH 439, MATH 539, MATH 644, PSYC 402, but petitions for acceptance of such courses to fulfill the sociology major requirement in statistics will be entertained.

### **SOC 502H - Honors/Statistics**

**Credits:** 4.00

Elementary applied statistical techniques; tables, graphs, cross-classifications; central tendency and dispersion; correlation and linear regression; confidence intervals and hypothesis testing. No credit for students who have completed ADM 430, BIOL 528, ADMN 420, EREC 525, HHS 540, MATH 439, MATH 539, MATH 644, PSYC 402, but petitions for acceptance of such courses to fulfill the sociology major requirement in statistics will be entertained.



### **SOC 515 - Introductory Criminology**

**Credits:** 4.00

Introduces the scientific study of crime. Reviews the different forms of criminal behavior, theories of crime, and strategies of crime control.

### **SOC 520 - Family**

**Credits:** 4.00

Sociological study of marriage and the family in American society. Following a life-cycle approach, topics include gender roles, communication and conflict, dating and mate selection, work and family economics, the transition to parenthood, middle- and late-life family, divorce, and remarriage.

### **SOC 520H - Honors/Family**

**Credits:** 4.00

Sociological study of marriage and the family in American society. Following a life-cycle approach, topics include gender roles, communication and conflict, dating and mate selection, work and family economics, the transition to parenthood, middle- and late-life family, divorce, and remarriage.

### **SOC 525 - Juvenile Crime and Delinquency**

**Credits:** 4.00

Crime, violence, and the criminal justice system as it affects children and youth in the role of both perpetrators and victims.

### **SOC #530 - Race and Ethnic Relations**

**Credits:** 4.00

Majority-minority group relations; special attention to nature and results of black-white and ethnic group relations in the United States.

### **SOC #530W - Race and Ethnic Relations**

**Credits:** 4.00

Majority-minority group relations; special attention to nature and results of black-white and ethnic group relations in the United States. Writing intensive.

### **SOC 535 - Homicide**

**Credits:** 4.00

Introduces to theory and research in homicide studies, including a review of the origins of and social responses to homicide.

### **SOC 540 - Private Troubles, Public Issues: Contemporary Social Problems**

**Credits:** 4.00

This course introduces students to the study of major social problems in contemporary society, including poverty, discrimination, inequality, crime, violence, and environmental degradation. Explores how and why people come to view certain social conditions as problematic. Also explores the consequences of and possible solutions to contemporary social problems. This course fulfills the requirement in the Social Science category of UNH's Discovery Program.

### **SOC 540W - Social Problems**

**Credits:** 4.00

This course introduces students to the study of major social problems in contemporary society, including poverty, discrimination, inequality, crime, violence, and environmental degradation. Explores how and why people come to view certain social conditions as problematic. Also explores the consequences of and possible solutions to contemporary social problems. This course fulfills the requirement in the Social Science category of UNH's Discovery Program. Writing intensive.

**SOC 565 - Environment and Society****Credits:** 4.00

Environmental and Society focuses on the complex interactions between human communities and the natural world. The course considers the interconnected ways that social systems, the built environment, and related technologies produce environmental changes, and in turn how shifts in resources, air, water quality, climate, biodiversity, and ecosystems force societies to adapt.

**SOC 570 - Sexual Behavior****Credits:** 4.00

A comparative approach to questions of the universality and variability of human sexual behavior. Topics include the changing expression of sexuality at various stages of the life cycle, patterns of arousal and response for each sex, the social control of sexuality, and sexual dysfunctions.

**SOC 595 - Independent Reading and Research****Credits:** 2.00 to 8.00

Independent study of advanced or specialized topics in sociology requiring extensive reading and writing. Before registering, students must develop a project in consultation with a faculty supervisor and submit a proposal to the undergraduate committee. Prereq: 12 sociology credits and permission.

**SOC 597 - Special Topics****Credits:** 4.00

Occasional or experimental offerings. May be repeated for different topics.

**SOC 599 - Sociological Analysis****Credits:** 4.00

Basic skills essential to sociological study, including: development of critical reading skills; evaluation of theory construction and evidence; analysis of classic and contemporary works, research, writing, and use of library resources. To be taken by sociology majors no later than the junior year. Writing intensive.

**SOC 601 - Methods of Social Research****Credits:** 4.00

Overview of major research methods: survey analysis, personal interview, participant observation, content analysis, and experimental design. Each student designs and completes a research project. Prereq: SOC 502 or equivalent and SOC 599; juniors and seniors only. Writing intensive.

**SOC 611 - Sociological Theory****Credits:** 4.00

Analysis of the origins and development of sociological theory. Includes the classical works of Marx, Weber, and Durkheim and their connections to the major strands of present day research. Writing intensive.

**SOC 612 - Topics in Sociological Theory****Credits:** 4.00

Major schools, concepts, and issues in present-day sociological theory. Functionalism, conflict theory, feminist theory, social constructionism, systems theory, critical theory, and hermeneutics are among the possible topics. Prereq: SOC 611. Writing intensive.

**SOC 620 - Drugs and Society****Credits:** 4.00

Provides students with an overview of drug using behavior as viewed from a sociological perspective. Highlights historical and current drug use trends, examines the social correlates of drug use, considers

societal responses to drug use including treatment, prevention, and policy, and engages students in key controversial debates confronting U.S. citizens and policymakers. Provides a foundation for understanding of drugs and society.

### **SOC 630 - Sociology of Gender**

**Credits:** 4.00

Gender examined as (1) socially constructed differences between the sexes, and (2) a system of social relations, which are part of the fabric of our social institutions. Topics include gender socialization, gender and education, gender and employment, and work-family intersections. Attention paid to the issue of gender inequalities and to the intersection of class, culture, race-ethnicity, age, and sexual orientation with gendered experience and gendered institutions. Focuses primarily on the contemporary United States.

### **SOC 635 - Medical Sociology**

**Credits:** 4.00

Interrelationship of health, medicine, and society; the social construction of wellness, illness, and healing; age, sex, class, and ethnicity in medical care; institutional networks and the social control functions of medicine; roles and relations of physicians, patients, nurses, and other health workers; medicine in a cross-national context. Writing intensive.

### **SOC 645 - Class, Status and Power**

**Credits:** 4.00

Focuses on the major dimensions of inequality, including class, gender, and race, by exploring the distribution of economic, political, and social resources within contemporary societies.

### **SOC 645W - Class, Status and Power**

**Credits:** 4.00

Focuses on the major dimensions of inequality, including class, gender, and race, by exploring the distribution of economic, political, and social resources within contemporary societies. Writing Intensive.

### **SOC 655 - Sociology of Law and Justice**

**Credits:** 4.00

Systematic study of how social factors, such as inequality, differentiation, culture, and organization, influence the justice process. Historical and cross-cultural focus on the behavior of the police, courts, and other legal institutions. Prereq: SOC 515 or permission; juniors and seniors only.

### **SOC 656 - Terrorism**

**Credits:** 4.00

This course provides a global assessment of the definition and nature of terrorism, trends in terrorism over the course of the past several decades, perspectives concerning the degree to which cultural, economic, and political conflict contribute to terrorism, and alternative means for dealing with terrorism in the age of globalization.

### **SOC 660 - Urban Sociology**

**Credits:** 4.00

Focuses on urban communities, urbanization, and urban social issues. Covers the historical development of cities; the differences between urban, suburban, and rural communities; urban life styles; and the significance of poverty and race for understanding contemporary American cities. Emphasizes American cities, with some consideration to world patterns of urbanization and the growth, development, and role of global cities. Writing intensive.

### **SOC 665 - Environmental Sociology**

**Credits:** 4.00

Interactions between society and the physical environment, including environmental constraints, population and economic growth, social impacts of resource development, large-scale environmental change, and the social bases of environmental attitudes, behavior, and politics. Writing intensive.

### **SOC 670 - Sociology and Non-Fiction Film**

**Credits:** 4.00

Examines nonfiction films as both a method of exploring social life and a cultural product that reflects its social environment. Among the topics to be addressed are the use of photographic images in social science research, the historical development of documentary film, and the critical analysis of visual images.

### **SOC 675 - Sociology of AIDS**

**Credits:** 4.00

Seminar class addresses social, political, emotional, and bioethical dimensions of HIV infection and AIDS. Specific topics include the social epidemiology and etiology of AIDS, stigmatization and the social construction of disease, community action, AIDS prevention, and ethical issues in the health care of people with AIDS.

### **SOC 680 - Sociology of the Holocaust**

**Credits:** 4.00

Examines the origins, realities, and consequences of the Holocaust as an all-embracing European phenomenon. Topics include the genocidal policies and procedures of the Nazis and Soviets with respect to indigenous populations as well as the role of collaborators. This course is normally offered only at UNH-Manchester.

### **SOC 680W - Sociology of the Holocaust**

**Credits:** 4.00

Examines the origins, realities, and consequences of the Holocaust as an all-embracing European phenomenon. Topics include the genocidal policies and procedures of the Nazis and Soviets with respect to indigenous populations as well as the role of collaborators. This course is normally offered only at UNH-Manchester. Writing intensive.

### **SOC 695 - Research on Family Violence in World Perspective**

**Credits:** 4.00

The nature, frequency, causes, and consequences of family violence, including physical, verbal, material, and sexual abuse of children; of partners in dating, cohabitating, and marital relationships; and of the elderly; and also neglect of children and the elderly. Includes data analysis projects to provide experience with cross-national comparative research to test theories about social causes of family violence and the effects of family violence on society as a whole. Prereq: SOC 502 (or equivalent), SOC 601

### **SOC 697 - Special Topics**

**Credits:** 4.00

Occasional or experimental offerings. May be repeated for different topics. Writing intensive.

### **SOC 699 - Senior Thesis**

**Credits:** 4.00 or 8.00

Independent work in the library or field culminating in a written senior thesis. Recommended for, but not confined to, majors intending to pursue graduate studies. Students must arrange for supervision from two faculty members and submit a proposal to the Undergraduate Committee before registering. May be completed in one or two successive semesters during the senior year. Permission required. May be repeated up to a maximum of 8 credits.

### **SOC 699H - Senior Honors Thesis**

**Credits:** 4.00 or 8.00

Independent work in the library or field culminating in a written senior honors thesis and a formal research presentation. Recommended for, but not confined to, majors intending to pursue graduate studies. Required for students participating in the departmental honors program as part of their 16 honors credits. Students must arrange for supervision from two faculty members and submit a proposal to the Undergraduate Committee before registering. May be completed in one or two successive semesters during the senior year. Permission required. May be repeated up to a maximum of 8 credits.

### **SOC 715 - Criminological Theory**

**Credits:** 4.00

Introduces graduate students and advanced undergraduates to the major theoretical literature in crime and delinquency. Covers both classical and contemporary theory, with empirical assessments of theories, including macro- and micro-level control, strain, and learning theories, as well as recent developments in biosocial, deterrence, labeling, and critical/feminist theories. Permission required.

### **SOC 720 - Sociology of Drug Use**

**Credits:** 4.00

Examines licit and illicit drug use from a sociological perspective. Draws primarily from the sociology of mental health and criminology to explore a variety of drug-related topics including historical and current U.S. drug trends, dominant theoretical approaches about the initiation into, and continued use of drugs, drug-related crime, therapeutic use of drugs, prevention and treatment of drug problems, and drug-related policies. Permission required.

### **SOC 725 - Social Demography**

**Credits:** 4.00

Social demography examines the linkages between changes in the size, composition and distribution of the population and changes in social, environmental, economic and political factors. The course examines demographic methods and the materials and the analytical techniques used by demographers to analyze population redistribution, fertility, work, marriage, migration and mortality. The policy implications of demographic change will be examined with attention to the U.S. as well as the developed and developing world. Permission required.

### **SOC 730 - Communities and the Environment**

**Credits:** 4.00

People and the natural environments in which they live fundamentally structure communities around the globe. Economic change, expanding development, and human migration are transforming social and environmental conditions in both rural and urban settings, altering the identities of many communities as well as their relationships with the natural world. The importance of these emerging social and environmental issues has made them a focus for social science inquiry. This course exposes students to a range of sociological concepts, theories, and research approaches related to the study of communities and environmental issues. Some of the substantive themes that are covered include: population dynamics and environmental change; social capital and social networks; political economy and community development; collective action and social movements; science, technology, and environmental risks; and environmental racism and justice. The principal assignment for the course will be a research project where students investigate a community or environmental issue of their own interest. Permission required.

### **SOC 735 - Sociology of Community**

**Credits:** 4.00

This course analyzes "community" from a sociological perspective. Community is one of the fundamental concepts in the sociological literature; this course covers those aspects of the concept that are concerned with geographic communities: neighborhoods, communities, cities, etc. It considers how American communities have changed over time and what the current characteristics are, and how these

characteristics are related to the "quality of life" in the communities. Students study theoretical and empirical approaches to studying communities, particularly but not exclusively American communities. Among specific areas of community research covered are: spatial inequality and concentrated poverty; what housing research shows about the importance of community to outcomes for families and children; the impact of community on health; and community development as a strategy for community change. Permission required.

### **SOC 740 - Sociology of Mental Health**

**Credits:** 4.00

Introduces students to different sociological approaches for studying and understanding mental health and illness. Students examine the social distribution of mental illness in the United States and the social-structural factors that help to explain mental health variations. Also addresses issues surrounding mental health treatment, systems, and policies for the mentally ill. Permission required.

### **SOC 742 - Sociology and Social Policy**

**Credits:** 4.00

Social policy and public policy defined: description of the policy making process. The political sociology of the policy-making process; who makes policy and who influences policy, under what conditions and with what effect. Definition of social policy research and the various roles social scientists can adopt for policy-relevant work. Students are responsible for critiquing the readings and for preparing a substantial research paper. Permission required.

### **SOC 745 - Race, Ethnicity, and Inequality**

**Credits:** 4.00

Sociological perspectives on race and ethnic relations for graduate and advanced undergraduate students. Topics include the creation of racial and ethnic identities, the nature and extent of segregation, education, employment, and wealth inequalities, and the effects of state policy. The course emphasizes both theoretical and empirical assessments. Permission required.

### **SOC 754 - Sociology of Religion**

**Credits:** 4.00

Topics covered included religion's role in constructing social identities, feminism, sexuality, and the negotiation of traditional religious doctrine, religion and social capital, religious violence, and political and cultural conflict. The course will give particular attention to questions pertaining to religious authority and meaning, how religious traditions are contested and reinvigorated and how new religious/spiritual practices emerge. Permission required.

### **SOC 773 - Sociology of Childhood**

**Credits:** 4.00

Exposes students to a variety of sociological perspectives about childhood in American society. Stimulates analysis about how social institutions, like the modern family, school, economic system, justice system and communications media affect children. Assumes prior understanding of important sociological concepts, critical thinking skills and social science writing ability. Permission required. Writing intensive.

### **SOC 776 - Family Violence Research Seminar**

**Credits:** 4.00

Analysis of abusive relationships within the family, especially physical and sexual abuse of children and spouses. Each student designs and conducts an empirical study to test a theory purporting to explain intra-family violence, the consequences of violence for families and society, or a study of what might prevent family violence. Permission required.

### **SOC 780 - Social Conflict**

**Credits: 4.00**

Analysis of the social conditions associated with the major forms of conflict management in human societies: discipline, rebellion, vengeance, negotiation, mediation, law, therapy, supernaturalism, and avoidance. Permission required. Writing intensive.

**SOC 793 - Internship**

**Credits: 4.00**

Provides upper level sociology majors with an opportunity to apply what they have learned in the classroom to the real world. Students meet weekly to discuss assigned readings, internship progress and semester project. Project ideas are developed with faculty and internship site supervisor. Permission required.

**SOC 794 - Evaluation of Social Programs**

**Credits: 4.00**

Evaluation research defined: purposes of evaluation, design of evaluation studies, setting of programs, utilization of evaluation results. Examination of case studies of evaluations of social programs. Students are responsible for designing an evaluation study in their chosen substantive area. Permission required.

**SOC 797 - Special Topics**

**Credits: 4.00**

Occasional or experimental offerings. May be repeated for different topics. Permission required. Writing intensive.

## Spanish

### **SPAN 401 - Elementary Spanish I**

**Credits:** 4.00

Conducted in Spanish. For students without previous knowledge of Spanish. Aural-oral practice, fundamental speech patterns, reading and writing to achieve a firm basis for an active command of Spanish. Lab. No credit toward a major. (No credit for students who have had two or more years of Spanish in secondary school; however, any such students whose studies of Spanish have been interrupted for 5 years or more should consult the coordinator of elementary Spanish. 401-402 taken together satisfies the foreign language requirement. Special fee.

### **SPAN 402 - Elementary Spanish II**

**Credits:** 4.00

Conducted in Spanish. Aural-oral practice, fundamental speech patterns, reading and writing to achieve a firm basis for an active command of Spanish. No credit toward a major. 401-402 taken together satisfies the foreign language requirement. Special fee. SPAN 401 is a prerequisite for this course. Cannot be taken separately without permission of instructor.

### **SPAN 403 - Review of Spanish**

**Credits:** 4.00

Conducted in Spanish. Emphasizes aural/oral practice, reviews basic structure, reading and writing to develop active command of language. Preparation for Spanish 503. Designed for those who have had only two years of high school Spanish. Special fee. Does not satisfy the foreign language requirement. A grade of C or higher is required in the course to advance to SPAN 503.

### **SPAN 410 - Communicative Spanish for the Professions**

**Credits:** 2.00

A skill-based course for students at the advanced beginner/low intermediate level who wish to focus on the Spanish language for use in relation to the health fields, business, law, tourism, and social services. Helps students develop a practical understanding of the Hispanic world through communicative activities in specific fields.

### **SPAN 500 - Selected Topics in World Literature**

**Credits:** 4.00

Topics chosen that introduce students to major themes and genres. (Also offered as CLAS 500, FREN 500, GERM 500, ITAL 500, PORT 500, RUSS 500.) May be repeated for credit. Writing intensive.

### **SPAN 503 - Intermediate Spanish I**

**Credits:** 4.00

Conducted in Spanish. Emphasizes the development of reading, writing, speaking, and listening skills. Review of grammar. Discussion and short papers in Spanish based on cultural and literary readings. Films. No credit toward the major. Special fee. Lab. Satisfies the foreign language requirement.

### **SPAN 503H - Honors/Intermediate Spanish I**

**Credits:** 4.00

Conducted in Spanish. Emphasizes the development of reading, writing, speaking, and listening skills. Review of grammar. Discussion and short papers in Spanish based on cultural and literary readings. Films. No credit toward the major. Special fee. Lab. Satisfies the foreign language requirement.



### **SPAN 504 - Intermediate Spanish II**

**Credits:** 4.00

Conducted in Spanish. Emphasizes the development of reading, writing, speaking, and listening skills. Review of grammar. Discussion and short papers in Spanish based on cultural and literary readings. Films. No credit toward the major. Special fee. Lab. Satisfies the foreign language requirement.

### **SPAN 504H - Honors/Intermediate Spanish II**

**Credits:** 4.00

Conducted in Spanish. Emphasizes the development of reading, writing, speaking, and listening skills. Review of grammar. Discussion and short papers in Spanish based on cultural and literary readings. Films. No credit toward the major. Special fee. Satisfies the foreign language requirement.

### **SPAN 525 - Spanish Civilization and Culture**

**Credits:** 4.00

Historical, geographical, and artistic expressions of Spanish civilization that have formed the character of contemporary Spanish culture. Conducted in English. Majors must take either 525 or 526, but both may not be counted for major credit. Special fee.

### **SPAN 526 - Latin American Civilization and Culture**

**Credits:** 4.00

Significant historical, geographical, and artistic expressions of pre-Colombian and Latin American civilization. Conducted in English. Majors must take either 525 or 526, but both may not be counted for major credit. Special fee.

### **SPAN 526H - Honors/Latin American Civilization and Culture**

**Credits:** 4.00

Significant historical, geographical, and artistic expressions of pre-Colombian and Latin American civilization. Readings, slides, films, tapes, records. Conducted in English. Majors must take either 525 or 526, but both may not be counted for major credit. Special fee.

### **SPAN 595 - Practicum**

**Credits:** 2.00

Practical use of Spanish language or cultural skills outside the classroom through special projects. Prereq: SPAN 504. May be repeated up to a maximum of 4 credits.

### **SPAN 631 - Advanced Conversation and Composition I**

**Credits:** 4.00

Emphasis on written and spoken Spanish through in-class and online discussions and frequent writing assignments based on cultural and literary readings and films. Prereq: SPAN 504 or equivalent. Special fee. Writing intensive. Satisfies the foreign language requirement.

### **SPAN 631H - Honors/Advanced Conversation and Composition I**

**Credits:** 4.00

Emphasis on written and spoken Spanish through in-class and online discussions and frequent writing assignments based on cultural and literary readings and films. Prereq: SPAN 504 or equivalent. Special fee. Writing intensive. Satisfies the foreign language requirement. Writing Intensive.

### **SPAN 632 - Advanced Conversation and Composition II**

**Credits:** 4.00

Emphasis on written and spoken Spanish through in-class and online discussions and frequent writing assignments based on cultural and literary readings and films. Prereq: SPAN 631 or equivalent. Special fee. Writing intensive. Satisfies the foreign language requirement.

## **SPAN 632H - Honors/Advanced Conversation and Composition II**

**Credits:** 4.00

Emphasis on written and spoken Spanish through in-class and online discussions and frequent writing assignments based on cultural and literary readings and films. Prereq: SPAN 631 or equivalent. Special fee. Writing intensive. Satisfies the foreign language requirement.

## **SPAN 641 - Spanish Phonetics**

**Credits:** 4.00

Practical application of fundamental phonetic theory to spoken Spanish. Special fee. Prereq: SPAN 632 (or equivalent) or consent of instructor.

## **SPAN 645 - Intro to Spanish Linguistics**

**Credits:** 4.00

Establishes the basis for future application of linguistic principles. Explores different areas of linguistics including morphology, word formation and verbal inflection. Issues in syntax and semantics are analyzed both in isolation and in terms of their relationship to each other. Students will be equipped with the skills necessary to apply these linguistic concepts to actual Spanish language data and to achieve a better understanding of the structures governing the language they are studying. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee.

## **SPAN 647 - Hispanic Cultural Studies**

**Credits:** 4.00

Contemporary approaches to the study of the cultures of Hispanic populations that examine the intersections of politics, art, religion and the forces of globalization. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee.

## **SPAN 648 - Readings in Current Periodicals**

**Credits:** 4.00

Advanced practice in reading, speaking, and writing, based on current events in contemporary periodicals of the Spanish-speaking world. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee.

## **SPAN 650 - Introduction to Critical Analysis**

**Credits:** 4.00

Methods and practice of literary criticism. Critical analysis of representative essays, fiction, poetry, and drama from Spain and Latin America. Frequent short papers. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee. Writing intensive.

## **SPAN 651 - Introduction to Spanish Literature and Thought**

**Credits:** 4.00

Reading and analysis of major works within the historical, cultural, and social background of the Iberian peninsula. Emphasis on works from medieval to Golden Age Spain. Papers, discussion, and examinations in Spanish. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee. Writing intensive.

## **SPAN 652 - Introduction to Spanish Literature and Thought**

**Credits:** 4.00

Reading and analysis of major works in the historical, cultural, and social background of the Iberian peninsula. Emphasis on works from 19th and 20th century Spain. Papers, discussion, and examinations in Spanish. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee. Writing intensive.

## **SPAN 653 - Introduction to Latin American Literature and Thought**

**Credits:** 4.00

Reading and analysis of major works within the historical, cultural, and social background of the New

World. Emphasis on works from Colonial period and 19th century. Papers, discussion, and examinations in Spanish. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee. Writing intensive.

### **SPAN 654 - Introduction to Latin American Literature and Thought**

**Credits:** 4.00

Reading and analysis of major works within the historical, cultural, and social background of Latin America. Emphasis on works from the 20th century. Papers, discussion, and examinations in Spanish. Prereq: SPAN 632 (or equivalent) or consent of instructor. Special fee. Writing intensive.

### **SPAN 683 - Summer Study in Costa Rica**

**Credits:** 8.00

Studies in San Joaquin de Flores, Costa Rica. Six week summer immersion program for undergraduate students. Prereq: a minimum of 32 credit hours with an overall GPA of 2.5. Interested students should contact the program director. Special fee. Cr/F.

### **SPAN 686 - Study Abroad/Granada**

**Credits:** 20.00

Studies in Granada, Spain. Prereq: primarily for juniors and seniors who have passed SPAN 503-504 or equivalent with a grade of B (3.00) or better. Noncredit orientation meetings required during semester prior to departure. Interested students should consult with the program directors. Special fee. Cr/F. (An IA [continuous grading] grade will be assigned until official transcript is received from the foreign institution.)

### **SPAN 790 - Topics in Second Language Acquisition/Pedagogy/Methodology**

**Credits:** 4.00

A) Introduction to Second Language Acquisition, B) Internet Technologies and Second Language Learning. Prereq: permission of instructor. Special fee. May be taken more than once if no duplication of content.

### **SPAN 795 - Independent Study**

**Credits:** 1.00 to 4.00

Guided individual study with training in bibliography and organization of materials. Topics selected by instructor and student in conference. Barring duplication of content, may be repeated for credit. Prereq: permission of instructor.

### **SPAN 797 - Topics in Hispanic Literary and Cultural Studies**

**Credits:** 4.00

A) Medieval Spanish Literature, B) Spanish Literature of the Renaissance and the Golden Age, C) Spanish Literature of the 18th and 19th Centuries, D) Spanish Literature of the 20th Century (Poetry/Theater/Prose), E) Contemporary Spanish Literature, F) Spanish Cultural Studies, G) Latin American Literature of the 16th and 17th Centuries, H) Latin American Literature of the 18th and 19th Centuries, I) 20th Century Latin American Literature (Poetry/Theater/Prose), J) Contemporary Latin American Literature, K) Cyberliterature and Cyberculture, L) Transatlantic Studies, M) Spanish and Latin American Philosophy and Essay, N) Indigenous Cultural Expression of the Americas, O) Hispanic Film Studies, P) U.S. Hispanic Cultural Studies, Q) Latin American Cultural Studies, R) Senior Seminar, S) Other. Prereq: permission of instructor. Special fee. May be taken more than once for credit if no duplication of content. Writing intensive.

### **SPAN 798 - Topics in Hispanic Linguistics and Cultural Studies**

**Credits:** 4.00

A) History of the Spanish Language, B) Study of Spanish Mood and Aspect, C) Sociolinguistics of Spanish, D) Discourse Analysis, E) Politeness and Pragmatics, F) Bilingualism and Spanish in the U.S., G) Spanish Pronouns, Agreement and Modifiers, H) Regional and Social Variation in Spanish Phonetics, I) Other. Prereq: permission of instructor. Special fee. May be taken more than once for credit if no duplication of

content.

**SPAN 799 - Senior Honors**

**Credits:** 4.00

For senior Spanish majors with a minimum cumulative grade-point average of 3.40 and the same or better average in the major who want to undertake a special honors project in an area of Spanish language or literature of their choice. Prereq: permission of advisor. Special fee.

## Sustainable Ag & Food Systems

### **SAFS 502 - Agroecology**

**Credits:** 4.00

This course introduces students to the discipline and practice of agroecology, with an emphasis on relevant ecological theory within the context of production agriculture. Students are exposed to key ecological principles from population, community, and ecosystem ecology and agronomy. Students learn about the history and consequences of modern industrial agricultural systems and the need for more sustainable management practices that consider ecological interactions.

### **SAFS 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic knowledge in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Permission required. Cr/F.

### **SAFS 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic knowledge in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty adviser selected by the student. May be repeated to a maximum of 8 credit hours. Permission required. Writing intensive. Cr/F.

### **SAFS 642 - Team Experience in Agroecosystems Management (TEAM - Organic)**

**Credits:** 4.00

TEAM - Organic is a 2-semester experiential course where students are actively engaged in the operation of the COLSA/NHAES Organic Dairy Research Farm. Building on principles of agro-ecology and sustainable agriculture, students explore and practice the environmental, economic, social and production strategies needed for organic food production. Organic dairy farming methods and best practices are presented and applied. The organic food chain is addressed along with marketing and value-added strategies for organic dairy products. Instruction permission. Two semesters of SAFS 642 are required.

### **SAFS 795 - Investigations**

**Credits:** 1.00 to 4.00

With faculty guidance students work on individual projects related to sustainable agriculture and food systems. Permission required. May be repeated to a maximum of 8 credit hours.

### **SAFS 795W - Investigations**

**Credits:** 1.00 to 4.00

With faculty guidance students work on individual projects related to sustainable agriculture and food systems. Permission required. May be repeated to a maximum of 8 credit hours. Writing intensive.

### **SAFS 799 - Honors Senior Thesis**

**Credits:** 2.00

Independent research requiring a written proposal, thesis, and presentation of research results to an audience of faculty and/or students. Intended for students completing SAFS Honors-in-Major requirements. Contact SAFS Program coordinator prior to senior year to arrange supervision and obtain permission. Two-semester sequence; students register for 2 credits each semester. IA grade (continuous course) given at

end of first semester. Writing intensive.

## Technology

### **TECH 400 - Introduction to CEPS Programs**

**Credits:** 1.00

An overview of programs offered by the College of Engineering and Physical Sciences with an emphasis on skills needed to be successful academically, career opportunities and professional development.

Required course of all undeclared majors in CEPS. Cr/F.

### **TECH 564 - Fundamentals of CAD**

**Credits:** 3.00

Fundamentals of CAD and computer-based graphics, including using CAD as a design tool to create engineering drawings. AutoCAD and Softdesk Civil software used to cover the following topics: drawing file storage and retrieval, display functions, basic drawing and editing commands, symbol libraries, plotting drawings on paper, and using parametric design features in the CAD system. Basic DOS familiarity is assumed. Prereq: civil engineering majors only. Special fee. Lab.

### **TECH 583 - Technology: Cultural Aspects**

**Credits:** 4.00

Study of the requirements, limitations, benefits, and hazards that are constraints on the development of technological systems. Prereq: prior courses in physics or chemistry at high school level; sophomore or higher standing at UNH; not open to CHE, CIE, EE, or ME majors; permission.

### **TECH 583H - Honors/Technology: Cultural Aspects**

**Credits:** 4.00

Study of the requirements, limitations, benefits, and hazards that are constraints on the development of technological systems. Prereq: prior courses in physics or chemistry at high school level; sophomore or higher standing at UNH; not open to CHE, CIE, EE, or ME majors; permission.

### **TECH 601 - Fundamentals Examination Review Course**

**Credits:** 1.00

A ten-week review course for those interested in taking the fundamentals examination to be certified as an engineering-in-training (EIT). Cr/F.

### **TECH 685 - Budapest Program**

**Credits:** 20.00

Enables students to pursue a semester of study at the Technical University of Budapest. For information, contact the Dean's Office, College of Engineering and Physical Sciences. Prereq: CEPS students only. Special fee. Cr/F.

### **TECH 696 - Independent Study**

**Credits:** 1.00 to 4.00

Open to all qualified students pursuing studies that do not fall within existing departmental areas. Special fee when the topic is chemistry for engineers.

### **TECH 697 - CEPS Industrial Internship**

**Credits:** 1.00

Students in the CEPS Industrial Internship Minor must register for TECH 697 during each semester (fall and spring) in which they are participating in their industry internship. Students in the minor must get permission for the minor advisor in order to register for this course. Special fee.

## **TECH 797 - Undergraduate Ocean Research Project**

**Credits:** 2.00

Students work as members of interdisciplinary project teams on contemporary ocean-related problems under the guidance of a faculty adviser. Student team defines problem, prepares a budget, conducts literature surveys, engages in dialogue with experts in the community, deals with vendors, designs, and builds a working engineering model, gathers analyzes scientific data or conducts a comprehensive study, makes interim reports, and defends the results before a jury of experts. Prereq: normally senior standing and permission of the program director. A yearlong effort: 2 credits each semester, 4 credits total, an IA (continuous course) grade given at the end of the first semester. Writing intensive.



## Theatre & Dance

### **THDA 435 - Introduction to Theatre**

**Credits:** 4.00

Introduces all aspects of theatrical production: play writing, acting, directing, design, technical theatre and construction, and theatre management. Cultural and social context of theatre in our time and through the ages. Introduces major classical and modern types of theatre. Selected plays are read and discussed, and attendance at theatrical production is required. Special fee.

### **THDA 436 - History of Theatre I**

**Credits:** 4.00

The history of theatre and its drama is introduced through close study of the world's greatest plays from the Greeks through the end of the 17th century -- How these plays were performed then, how they are performed now, their political, social, and cultural urgencies.

### **THDA 436H - Honors/History of Theatre I**

**Credits:** 4.00

The history of theatre and its drama is introduced through close study of the world's greatest plays from the Greeks through the end of the 17th century -- How these plays were performed then, how they are performed now, their political, social, and cultural urgencies. Writing intensive

### **THDA 438 - History of Theatre II**

**Credits:** 4.00

The history of theatre and its drama is introduced through close study of the world's greatest plays of the 19th, 20th, and 21st centuries -- How these plays were performed then, how they are performed now, their political, social and cultural urgencies.

### **THDA 438H - Honors/History of Theatre II**

**Credits:** 4.00

The history of theatre and its drama is introduced through close study of the world's greatest plays of the 19th, 20th, and 21st centuries -- How these plays were performed then, how they are performed now, their political, social and cultural urgencies. Writing intensive.

### **THDA 439 - Introduction to Shakespeare in the Theatre**

**Credits:** 4.00

Introduces the imaginative process by which actors and directors bring Shakespeare's plays to life on the stage. Detailed study of eight plays.

### **THDA 440 - Exploring Musical Theatre**

**Credits:** 4.00

This is an introductory course designed to enhance the student's enjoyment and understanding of musical theatre. Course content and internet exploration as well as play attendance are designed to acquaint students with and nurture an appreciation for musical theatre. This course is intended for introductory students of all majors who are interested in studying musical theatre elements, styles, and significance.

### **THDA 442 - Introduction to the Art of Acting**

**Credits:** 4.00

Designed for non-THDA major students interested in the art of acting. Students broaden and deepen their own creativity, gain a deeper understanding of human behavior and interaction, and strengthen analytical

skills through class work and projects. Focuses on the basic skills of acting: the ability to effectively communicate, to gain access to the full spectrum of human emotions, and increase spontaneity. Important innovators and theorists in the field of theatre and acting are covered, such as Sanford Meisner, Constantine Stanislavski, Bertolt Brecht, Jerzy Grotowsky, Augusto Boal, and Jacques Lacoq. Additional topics include contemporary plays and playwrights, an historical perspective of the art of acting, and the current state of live theatrical performance.

### **THDA #444 - Dramatic Impact: Theatre and Socio-political Change**

**Credits:** 4.00

This course that will examine to what degree dramatic literature and theatre art has effected socio-political change in the past, and in the present, through an in-depth exploration of texts, artistic methods and theatrical techniques. Students will create theatrical art related to various sociopolitical issues. Absolutely no experience in theatre is necessary, as this course is built around the premise that we all have the ability to create art and affect politics and society. Special fee.

### **THDA 444A - What's Old Becomes New: Threading Theatrical Themes into Societal Truths**

**Credits:** 4.00

To what degree does updating theatrical themes contribute to societal norms and relevant commentary? This course will examine how enduring dramatic ideas evolve by comparing plays that are written in reaction to or as an extension of a provocative piece, both carrying on similar themes but told in updated ways. Students also will investigate the role these adaptations play in theatre history, why they are done and whether they are justified as quality art.

### **THDA 450 - History of Musical Theatre in America**

**Credits:** 4.00

Study of the development of the musical and its relationship to American social history.

### **THDA 458 - Costume Construction**

**Credits:** 4.00

Study and development of costuming techniques, including hand and machine sewing, pattern drafting, alterations, and fabric manipulation. Emphasis on demonstrated understanding. Special fee.

### **THDA 459 - Stagecraft**

**Credits:** 4.00

Elements of play production: basic building components, tools, and materials for producing the scenery; equipment and shop layouts supporting all of the areas of the set, lighting, and costume designs; and consideration of various stage spaces and theatrical venues. Practical application on University theatre productions. Special fee. Lab.

### **THDA 460 - Elements of Design**

**Credits:** 4.00

Course is designed for students who are interested in theatrical design elements including scenery, costume, lighting and sound. Class encompasses lecture, discussion, presentation and studio (work in class) formats. Critique and discussion are essential to the creative thinking that a designer needs to have. Throughout the course, each student is expected to complete projects that incorporate the design elements they have studied.

### **THDA 462 - Ballet I**

**Credits:** 4.00

Introductory course: technique, historical development of ballet. Students who have had several years of ballet are expected to register for THDA 562 or 662. Instructor determines appropriate level. Not open to seniors.

### **THDA 463 - Theatre Dance I**

**Credits:** 4.00

Introductory course: techniques; improvisation; lectures on jazz, ethnic, and other theatrical dance forms. Students with prior experience are expected to register for THDA 563 or 663. Instructor determines appropriate level. Not open to seniors. Special fee.

### **THDA 470 - Movement and Vocal Production**

**Credits:** 4.00

Expansion of the student's vocal and physical/kinesthetic awareness, utilizing basic theories and lessons of Lessac, Laban, and Alexander. Text exploration is supplemented with exercises from Berry. Permission required. Special fee.

### **THDA 475 - Stage Makeup**

**Credits:** 2.00

Fundamentals of juvenile, old age, character, and special stage makeup techniques. Special fee.

### **THDA 487 - Dance**

**Credits:** 4.00

Historical and philosophical consideration of dance trends. Not a performance course.

### **THDA 500 - Musical Theatre Voice I**

**Credits:** 1.00

A one-on-one studio voice class designed to provide students with a foundation in healthy, relaxed, and dynamic singing of primarily musical theatre repertoire. In addition to expanding the student's knowledge of and ability to sing various styles of musical theatre repertoire, this course provides a venue to explore and develop analytical skills relating to character and script. This course is repeatable for up to three credits.

### **THDA 520 - Creative Drama**

**Credits:** 4.00

Drama techniques leading to the design and execution of drama sessions with children. Includes role-playing, improvisation, and story dramatization. Lab.

### **THDA 532 - The London Experience**

**Credits:** 2.00

Exploration of the culture and history of London while enhancing study of live theatre prior to active study in the country. May be repeated to a maximum of 4 credits. IA (continuous grading). Special fee.

### **THDA 540 - Playwriting**

**Credits:** 4.00

To illuminate and guide each student through the art and craft of writing for performance. This course explores the fundamental principles needed to build a realistic play that is intended to be produced upon the stage. Though the course is built around the construction of plays, the principles, writing exercises, readings, and other assignments serve as a solid base for any form of dialogue driven writing.

### **THDA 540W - Playwriting**

**Credits:** 4.00

To illuminate and guide each student through the art and craft of writing for performance. This course explores the fundamental principles needed to build a realistic play that is intended to be produced upon the stage. Though the course is built around the construction of plays, the principles, writing exercises, readings, and other assignments serve as a solid base for any form of dialogue driven writing. Writing intensive.

### **THDA 541 - Art and Theatre Administration**

**Credits:** 4.00

Administration practices applied to arts, music, and theatre management. Fund raising, public relations, business and box office management, audience development and long range planning.

### **THDA 546 - Costume Design for the Theatre**

**Credits:** 4.00

How to design costumes for the theatre, not figure drawing, although drawing techniques are taught. Script analysis and research and presentational techniques for costume design explored and implemented.

Special fee. Prereq: THDA 460 or permission of instructor.

### **THDA 547 - Stage Properties**

**Credits:** 4.00

Research and manufacture of period and modern stage, trim, and hand properties. Prereq: THDA 459. Special fee.

### **THDA 548 - Stage Lighting Design and Execution**

**Credits:** 4.00

Script analysis, the light plot, and instrument schedule, including cue-writing, color, instrumentation, and the mechanics of developing a functional design. Special fee.

### **THDA 550 - Actor's Voice Through Text**

**Credits:** 4.00

Continuing development of the actor's techniques for creating increased vocal expressiveness. Addresses the methods of varying vocal style and presentation through in-depth analysis and interpretation of the text. Prereq: THDA 470.

### **THDA 551 - Acting I**

**Credits:** 4.00

Development of fundamental vocal and physical stage techniques for actors and directors through exercises, improvisation and theatre games. Special fee.

### **THDA 552 - Acting II**

**Credits:** 4.00

Focuses on strengthening the actor's ability to achieve a higher level of truth, presence, and spontaneity on stage. Building on the approach devised by Sanford Meisner, this highly intensive class creates a bridge to connect these developing skills to various forms of text. Prereq: THDA 551. Special fee.

### **THDA 555 - Musical Theatre I**

**Credits:** 4.00

Foundations of solo musical theatre performance, including the development of the speaking and singing voice, stage movement, and character analysis explored through exercises, improvisation, theatre games, in-class performance, and written assignments. Lab. Special fee.

### **THDA 562 - Ballet II**

**Credits:** 2.00

Extension of ballet I syllabus; emphasis is on technique, with additional step vocabulary. May be repeated once for credit. Prereq: THDA 462 or permission.

### **THDA 563 - Theatre Dance II**

**Credits:** 2.00

Technique; African-Cuban, modern, and East Indian dance; body movement through exercise and

combinations involving stretch, strength, and flexibility. May be repeated for a maximum 16 credits. Prereq; THDA 463 or permission. Special fee.

### **THDA 576 - Pointe**

**Credits:** 2.00

Intermediate course in the art of dancing on pointe. Focus on technique involved in gaining strength and on methodology for understanding the art of the ballerina.

### **THDA 583 - Introduction to Puppetry**

**Credits:** 4.00

Introduces the art of puppetry for general appreciation, entertainment, application in the classroom, and as a therapeutic tool. Emphasis on constructing a variety of puppets (e.g., hand, rod, shadow, and scarf) and adapting literary sources for scripts and performance. (Not open to seniors.) Special fee.

### **THDA 589 - Practicum**

**Credits:** 1.00

The practicum ensures a breadth of experience in the major. Students should register for a different topic each semester during the sophomore and junior years. A) technical, B) costumes, C) performance, D) promotion and marketing. May be repeated for up to 8 credits. Cr/F.

### **THDA 592A - Special Topics**

**Credits:** 1.00 to 4.00

Special topics, projects in theatre and dance. Content varies according to needs and interests of students and faculty. Course descriptions are available in department office. May be repeated for credit.

### **THDA 597 - Dance Theatre Performance**

**Credits:** 2.00

Designed for students participating in UNH Dance Theatre Company. Skill development through rehearsal and actual performance experience. May be repeated for a maximum of 16 credits.

### **THDA 600 - Musical Theatre Voice II**

**Credits:** 1.00

This course is a continuation of THDA 500: Musical Theatre Voice I. Students build on the groundwork in vocal technique, analysis, and performance established in Musical Theatre Voice I and continue to explore and develop these skills. This course is repeatable for up to 3 credits.

### **THDA 622 - Storytelling, Story Theatre, and Involvement Dramatics**

**Credits:** 4.00

Students actively develop storytelling techniques based on individual needs. Includes an examination of story theatre and involvement styles and the development of the ensemble. Special fee.

### **THDA 624 - Theatre for Young Audiences**

**Credits:** 4.00

Introduces coaching and directing techniques for classical and contemporary acting styles in theatre for young audiences. Historical contents leads into practical exploration of actor training and coaching , production and design, choreography, and business management for theatre and for youth programs. Students develop teaching strategies for young performers and participate in a culminating project. Prereq: THDA 551 and THDA 436 or THDA 438. Special fee.

### **THDA 632 - Interpretation of Shakespeare in Theatre**

**Credits:** 4.00

Increases understanding of Shakespeare's language and action, and improves ability to speak his verse

and prose with clarity and verve. Students achieve insights into Shakespeare's plays through the medium of performance. Weekly oral and written assignments. Prereq: THDA 551 and THDA 552; or permission of instructor.

### **THDA 633 - Dance Composition**

**Credits:** 4.00

Practical, developmental approach to process of creating dances. Prereq: THDA 561; 562; 563;/or permission. Special fee.

### **THDA 638 - American Theatre: 1920-1970**

**Credits:** 4.00

A survey of American plays from O'Neill onward. Students read and analyze two plays a week. Oral, written, and theatrical assignments. Prereq: (one of the following) THDA 436, THDA 438, THDA 450 or permission of the instructor.

### **THDA 641 - Stage Management**

**Credits:** 2.00

Introduces to the concepts and skills needed for stage management. Stage managers perform a central role in the theatrical production, coordinating artistic and technical elements. They need a thorough understanding of the script, strong management skills, and a solid background in all aspects of the theatre. Prepares students to function as a stage manager in productions at any theatre. Prereq: (one of the following) THDA 459; 551; 597; 655; or 741. Special fee.

### **THDA 650 - Scene Painting for the Theatre**

**Credits:** 2.00

Scene painting analyzed. Techniques and media to create a larger-than-life approach to scale, equipment for conversion, and appropriate stylistic techniques for enlargement reviewed. Employs basic painting techniques and methods of paint application, but scale conversion technique extend the training of easel painters. Prereq: THDA 459.

### **THDA 651 - Rendering for the Theatre**

**Credits:** 2.00

Theatrical rendering is a presentational arrangement of given items in perspective appropriate to a set or in a costume at a frozen moment during the production, indicating appropriate mood, atmosphere, and depth. For the theatre, this is generally done in watercolor, but many other media are possible and are explored. Special fee.

### **THDA 652 - Scene Design**

**Credits:** 4.00

Scene design from script to finished design. Both aesthetic and practical viewpoints considered. Emphasis on presentational techniques: study of perspective and finished rendering. Prereq: THDA 460 or permission of instructor.

### **THDA 653A - Performance Project**

**Credits:** 2.00

Application of prior coursework to a formal theatre production or to an individual performance or teaching project. Substantial written work is factored into the final grade. May be repeated for up to 8 credits. Writing intensive.

### **THDA 653B - Performance Project/Musical Theatre**

**Credits:** 2.00

Application of prior coursework to a formal theatre production or to an individual performance or teaching

project related to Musical Theatre. Substantial written work is factored into the final grade. May be repeated. Special fee. Writing intensive.

### **THDA 654 - Scenic Arts Project**

**Credits:** 2.00

Application of prior coursework to a formal theatre production or to an individual performance or teaching project. Substantial written work is factored into the final grade. May be repeated up to a maximum of 8 credits. Writing intensive.

### **THDA 655 - Musical Theatre Scene Study**

**Credits:** 4.00

Builds on and expands the techniques learned in Acting I and Musical Theatre Voice I, with a special emphasis on partner work and scene study. Prereq: THDA 551 or permission of instructor. Special fee.

### **THDA 657 - Play Reading**

**Credits:** 4.00

A high-volume reading course that introduces a breadth of dramatic literature from ancient times to the present. Reading lists vary according to interests and needs of students. Students read and analyze three plays/week.

### **THDA 662 - Ballet III**

**Credits:** 2.00

Advanced-level course in technique; pointe work included. May be repeated for a maximum of 16 credits. Prereq: THDA 562 or permission.

### **THDA 663 - Theatre Dance III**

**Credits:** 2.00

Extension of Theatre Dance I and II; brings students to a more advanced technical level. May be repeated for a maximum of 16 credits. Prereq: Theatre Dance II. Special fee

### **THDA 665 - Aerial Dance**

**Credits:** 2.00

The study of aerial arts including two and one point trapeze and fabric. May be repeated for a maximum of 16 credits. Prereq: THDA 662 or 663. Permission required.

### **THDA 670 - Dialects**

**Credits:** 4.00

Study and practice in basic dialect acquisition for performers. Prereq: THDA 470, 551. Permission required. Special fee.

### **THDA 683 - Advanced Puppetry**

**Credits:** 4.00

In-depth study of the theory and practice of puppetry for the advanced student. Students develop skills in manipulation and construction of selected puppet forms and apply these skills in performance. Examines historical perspectives and the application of puppetry in the classroom and as a therapeutic tool. Prereq: THDA 583 or permission. Special fee.

### **THDA 684 - Special Topics**

**Credits:** 2.00 to 4.00

Exploration of topics agreed upon by students and instructor. Topics vary. May be repeated.

### **THDA 691 - Internship**

**Credits:** 2.00 to 8.00

Fieldwork with a regional or touring theatre. This advanced level internship allows the student to experience a professional theatre setting prior to graduation. Normally supervised by a qualified theatre professional, with frequent consultation with a faculty sponsor. A written report is required. May be part- or full-time with credits assigned accordingly. Permission required. Student must also register for a graded 4-credit independent study. May be repeated up to a maximum of 12 credits. Cr/F.

### **THDA 700 - Musical Theatre Voice III**

**Credits:** 1.00

This course is a continuation of THDA 600: Musical Theatre Voice II. Students continue to develop their skills of vocal technique, analysis, and performance established in Musical Theatre Voice II, while focusing these skills towards their application in auditioning for, and performing in, professional theatre. This course is repeatable for up to 3 credits.

### **THDA 721 - Arts Integration**

**Credits:** 4.00

An advanced course that is paired with Methods of Teaching Theatre. Provides in-depth study and practice of integrated arts lessons in K-12 school curricula. Prereq: THDA 520. Special fee. Writing intensive.

### **THDA 727 - Methods of Teaching Theatre**

**Credits:** 2.00 to 4.00

The capstone of the theatre education major's studies. Designed for students who are preparing to enter student teaching. Provides practical information, skills, and lesson plans that theatre teachers use as source material for the secondary classroom. Covers a wide range of teaching models. Students define and articulate a personal teaching philosophy, write comprehensive semester curricula and course syllabi, and create an extracurricular program plan and philosophy. Prereq: THDA 520. Special fee. Writing intensive.

### **THDA 729 - Community Oriented Drama Programs**

**Credits:** 1.00 to 4.00

Advanced practicum in designing, developing, and producing drama programs for the school and community. Includes audience analysis and marketing skills as well as adapting spaces, soliciting volunteers, and working with a limited budget. May be repeated to a maximum of 12 credits.

### **THDA 732 - Choreography**

**Credits:** 4.00

Theoretical and practical consideration of the creative and aesthetic aspects of ballet, modern, and theatre dance. Prereq: THDA 633. Special fee.

### **THDA 741 - Directing**

**Credits:** 4.00

A process oriented approach to the art of stage directing. The course begins with an in-depth focus on script analysis. Students then develop their skills as the "master storyteller" through imagination, interpretation, communication, and style. Prereq: THDA 551 and THDA 552. Special fee.

### **THDA 742 - Directing II**

**Credits:** 4.00

In-depth study of the theory and practice of stage direction for the advanced student. Builds on 741, Directing. Students strengthen and expand their existing knowledge of the subject area. Exploration focuses on three areas of directorial communication: application to periods and styles, exploration of avant-garde theory, and directorial technique. Concludes with a major project mounted for public performance. Prereq: THDA 741. Special fee.



### **THDA #750 - Writing for Performance**

**Credits:** 4.00

An intensive exploration of the playwright's process. A mixture of theory and creative writing. Students incorporate the fundamentals of creating a script in a step-by-step process from monologues and scenes to the completion of a one-act play. Though the focus of the course is on writing for the stage, the process is applicable to screen and teleplay writing. Special fee. (Not offered every year.) Writing intensive.

### **THDA 755 - Advanced Musical Theatre**

**Credits:** 4.00

Students learn to integrate and expand on techniques in previous acting, musical theatre, and voice classes, with special emphasis given to audition techniques, repertoire expansion and specialization, and in-depth analysis of the business and personal requirements necessary to be a successful artist in the professional theatre. Prereq: THDA 551 and THDA 655, or permission of the instructor. Special fee.

### **THDA #756 - Producing and Directing the Musical**

**Credits:** 4.00

Focuses on analyzing musical scripts/scores from the viewpoint of the producer and the director. Learning is theoretical and performance-based. Prereq: THDA 555. Special fee.

### **THDA 758 - Acting III**

**Credits:** 4.00

Applies the principles and techniques acquired by students in THDA 551 and THDA 552 to various genres, such as epic and absurdist, and to mediums such as television and film. Special attention is given to characterization beyond the student's standard range and the development of the actor as a creative artist, using the techniques of such methodologists as Lecoq, Laban, and Grotowski. Prereq: THDA 551 and THDA 552. Special fee.

### **THDA 759 - Acting: Period and Style**

**Credits:** 4.00

Techniques of style analysis and period research. For the first time in the students' undergraduate actor training, students synthesize their basic actor training with the heightened language and archetypal characterization inherent in the classical theatre of the ancient Greeks, the Commedia dell' Arte, the Renaissance, the Neoclassical period, and the Restoration period. Prereq: THDA 470, 551, 552; one semester of THDA 436 or THDA 438, or permission. Special fee.

### **THDA 760 - Teacher Planning for Theatre**

**Credits:** 4.00

Focuses on lesson and unit planning for the areas of high school theatre history, play analysis, and play writing. Students will practice various methods of teaching these areas of drama. Prereq: THDA 436 and THDA 438.

### **THDA 781 - Short Courses for Teachers and Directors**

**Credits:** 3.00 or 4.00

Each of these intensive short courses for elementary, middle, and high school teachers focuses on expanding production skills and methods of implementing theatre and dance techniques in the classroom. Topics may include puppetry, storytelling, play production for the elementary and middle school teacher; makeup; performing the musical with elementary and middle school students; play production for middle school and high school teacher; basic choreography for the school musical; script adaptation; the use of drama to enhance reading and writing; set and lighting design; and design and construction techniques; teaching/directing Shakespeare; theatre pedagogy/advanced methods of teaching theatre; analysis and research; putting arts in the classroom; and integrated arts. Continuing education and professional

development is also available for graduate education credit. (Also offered as EDUC 998.) Special fee. May be repeated.

### **THDA 786 - Dance Pedagogy**

**Credits:** 4.00

Methods course that focuses on the art and science of teaching the movement forms of ballet, modern, jazz and tap. Designed to prepare students who are seeking dance certification with a M.Ed. or a M.A.T., or who wish to open their own studio. Provides background into the nature of teaching, standards that make up good teaching, awareness of National/State standards, and study and practice of lesson plans in K-12 school curricula or private studios. Prereq: THDA 462 and THDA 562, or THDA 463 and THDA 563, or permission of the instructor.

### **THDA 791 - Internship in Theatre and Dance**

**Credits:** 2.00 to 8.00

Fieldwork with a regional or touring theatre or with a theatre education program. This advanced-level internship allows the student to experience a professional theatre/theatre education setting prior to graduation. Normally supervised by a qualified theatre professional, with frequent consultation with a faculty sponsor. Written report required. May be part- or full-time with credits assigned accordingly. Permission required. May be repeated up to a maximum of 12 credits.

### **THDA 795 - Independent Study**

**Credits:** 1.00 to 8.00

Advanced individual study. Specific independent study opportunities are sometimes posted in the Theatre and Dance Department Office. Project, which includes a substantial piece of writing, must be developed with supervising instructor. May be repeated up to a maximum of 8 credits.

### **THDA 795W - Independent Study**

**Credits:** 1.00 to 8.00

Advanced individual study. Specific independent study opportunities are sometimes posted in the Theatre and Dance Department Office. Project, which includes a substantial piece of writing, must be developed with supervising instructor. May be repeated up to a maximum of 8 credits. Writing intensive.

### **THDA 796 - Independent Study**

**Credits:** 1.00 to 8.00

Advanced individual study. Specific independent study opportunities are sometimes posted in the Theatre and Dance Department Office. Project, which includes a substantial piece of writing, must be developed with supervising instructor. May be repeated up to a maximum of 8 credits.

### **THDA 796W - Independent Study**

**Credits:** 1.00 to 8.00

Advanced individual study. Specific independent study opportunities are sometimes posted in the Theatre and Dance Department Office. Project, which includes a substantial piece of writing, must be developed with supervising instructor. May be repeated up to a maximum of 8 credits. Writing intensive.

### **THDA 798 - Senior Thesis**

**Credits:** 2.00

Supervised research leading to the presentation of a major research paper. Prereq: permission, majors only, senior standing. Writing intensive.

### **THDA 798H - Honors Senior Thesis**

**Credits:** 4.00

Supervised research leading to the presentation of a major research paper; the resulting paper is defended

in an oral presentation before department faculty. Required for graduation from the honors program in Theatre and Dance. Prereq: permission, majors only, and senior standing. Writing intensive.

**THDA 799 - Capstone Project**

**Credits:** 2.00 or 4.00

This required course incorporates and tests the knowledge that majors have learned over their careers in the Department of Theatre and Dance. Capstone experiences are tailored to each student through conference with their adviser in their specific Theatre and Dance track. Writing intensive.

**THDA 799H - Honors/Capstone Project**

**Credits:** 4.00

See description for THDA 799. Writing intensive.

## **Tourism Planning & Development**

### **TOUR 400 - Introduction to Tourism**

**Credits:** 4.00

Provides an informational foundation in tourism and gives a more extensive knowledge of the tourism industry. Examines historical perspectives, tourism organization, and supply and demand of the tourism industry. Discusses the dynamic and pluralistic nature of the tourism industry. Writing intensive.

### **TOUR 510 - Tourism and Global Understanding**

**Credits:** 4.00

Introduces ways in which tourism can act as a vehicle to understanding foreign cultures. Responsible tourism, has the potential to help bridge cultural and psychological distances that separate people of different races, religions, and socio-economic classes. Through responsible tourism we can learn to appreciate, trust, and respect the human diversity that our world has to offer. Helps students gain an informed acquaintance with other cultures and customs, and to understand the central role of tourism in international and cross-cultural understanding. Cr/F option.

### **TOUR 560 - Special Topics**

**Credits:** 2.00 to 4.00

A) Heritage Tourism Planning, B) Rural Tourism Development. Prereq: TOUR 400. May be repeated.

### **TOUR 560H - Honors/Special Topics**

**Credits:** 4.00

A) Heritage Tourism Planning, B) Rural Tourism Development. Prereq: TOUR 400. May be repeated.

### **TOUR 615 - Tourism Planning and Development**

**Credits:** 4.00

The planning and development of tourist resources and programs within a geographic region. Planning models are reviewed and analyzed. The relationship among tourists, tourist developments, and the planning of tourist attractions and services is examined. A strategic planning process is applied to the development of a regional tourism plan in New Hampshire. Prereq: TOUR 400.

### **TOUR 633 - Economics of Travel and Tourism**

**Credits:** 4.00

Provides an understanding of both the microeconomic and macroeconomic aspects of travel and tourism. Using economics as a theory base, the course attempts to identify what is significant or special about travel and tourism compared with other activities. Special attention is given to issues such as resource immobility, capacity constraints, seasonality, and consumers' inability to experience the product before purchase. Prereq: EREC 411. (Also offered as EREC 633.)

### **TOUR 700 - Marketing Communications Research: Methodological Foundations**

**Credits:** 4.00

Concepts, tools, and techniques to facilitate accurate product, service, and idea marketing communications. Specific application to tourism and economic/community development initiatives are included. Prereq: Basic statistics course or permission.

### **TOUR 705 - Ecotourism: Managing for the Environment**

**Credits:** 4.00

Ecotourism embraces both the environment and economics. Provides a comprehensive framework for

planning and managing ecotourism in order to both maximize potential benefits and minimize potential costs for people and the environment. Seminar format. Case studies used to assess the role of ecotourism in the sustainable development of natural resources. Prereq: TOUR 400, juniors or seniors only

### **TOUR 767 - Social Impact Assessment**

**Credits:** 4.00

Provides a cross-disciplinary perspective on the issues, problems, and methods of Social Impact Assessment (SIA). Provides analytic approach and theoretical framework for the assessment of diverse events, including changes in the natural environment, the local economy, or dominant technology. SIA is required of most U.S. and Canadian federal- and state-sponsored projects that come under the National Environmental Protection Act, as well as all projects funded by international donor agencies. (Juniors and seniors only.) Writing intensive.

### **TOUR 792 - International Experience**

**Credits:** 1.00 to 4.00

Travel to foreign country for study of a specific topic to be approved by the student's major adviser. Prereq: permission.

### **TOUR 794 - Internship**

**Credits:** 4.00 to 12.00

Fieldwork brings students in a full-time, 15-week (600 hours) supervised situation where they have an opportunity to achieve a synthesis, transfer, and application of the academic experience in a setting similar to that associated with professional employment. Prereq: permission. May be repeated up to a maximum of 12 credits.

### **TOUR 798 - Independent Study**

**Credits:** 1.00 to 4.00

Special assignments in readings, investigations, field problems. May include teaching experience. Prereq: permission.

### **TOUR 798W - Independent Study**

**Credits:** 1.00 to 4.00

Special assignments in readings, investigations, field problems. May include teaching experience. Prereq: permission. Writing intensive.

## **TSAS Communication**

### **COM 209 - Expository Writing and Reading**

**Credits:** 4.00

Weekly writing and individual conferences. Frequent reading assignments related to the writing. 3 lec/1 tutorial.

### **COM 210 - Public Speaking**

**Credits:** 2.00

Frequent speaking exercises to develop the skill and confidence to speak in a variety of public situations. 2 lec.

### **COM 211 - Critical Reading**

**Credits:** 2.00

Frequent readings of short nonfiction and fiction. Class discussions and writing assignments designed to develop skill in reading with critical discernment. 2 lec.

### **COM 212 - Technical Writing**

**Credits:** 2.00

Practice in various forms of technical writing: technical instructions and descriptions, reports, proposals, business letters, and more, with particular emphasis on the importance of layout and design. 2 lec.

### **COM 291 - Studies in Communications**

**Credits:** 1.00 to 3.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research or scholarly endeavor is to explore new areas in the student's field of study or to pursue course materials in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include the art of persuasive speaking, writing, literature, or technical reporting. Permission required.

### **COM 292 - Studies in Communications**

**Credits:** 1.00 to 3.00

See description for COM 291.

**TSAS 205 - Computers in the Workplace**

**Credits:** 2.00

A foundation course in the practical use of computer technology with a focus on applications common in the workplace, including word processing, basic publishing, spreadsheet and database creation and manipulation, digital presentation, internet resources and the university network, hard disk management, and other pertinent software applications. 2 lecture/lab.

## TSAS Mathematics

### **MTH 201 - Math I**

**Credits:** 3.00

Arithmetic of whole numbers, integers, decimals, percents, and fractions. Applications of mathematics, measurement and the metric system. Probability, problem solving and business graphing. 3 lec.

### **MTH 202 - Math II**

**Credits:** 3.00

Creative reasoning and problem solving. Algebraic topics, powers, roots, equations, ratios, and proportions. Geometry topics, triangles, similar figures, polygons, measurement (English and Metric), linear functions, business functions and graphing. Prereq: pass a pretest. 3 lec.

### **MTH 203 - Algebra and Trigonometry**

**Credits:** 3.00

Basic algebra topics, radicals, exponents, introduction to functions and graphs, simple applications of algebra. Trigonometric functions of angles; applications of right triangles, identities, and equations. 3 lec.



## **TSAS Social Science**

### **SSCI 201 - Human Relations**

**Credits:** 4.00

Learn theories of human behavior and develop skills for applying these concepts in the creation of more effective interpersonal and professional relationships.

### **SSCI 202 - Social Issues**

**Credits:** 4.00

Study of social problems in today's world. Particular emphasis on various viewpoints of their causes and solutions. Issues covered range from individual to worldwide

### **SSCI 203 - Environmental Issues and Society**

**Credits:** 2.00

Course focuses on contemporary environmental problems and their relationship to society. Students examine the nature and extent of specific problems, such as pollution or global warming, and review current thinking about causes, possible interrelationships, and proposed solutions. 2 lec.

### **SSCI 204 - Leadership Effectiveness and Group Performance**

**Credits:** 2.00

By studying various theories of group development and leadership approaches, students explore the ways leaders influence group behavior and goal attainment. Students practice applying theories to specific situations and explore their own individual strengths and weaknesses as both leaders and group members.

### **SSCI 291 - Studies**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include a specific social science topic. Course may be repeated up to a maximum of 8 credits.

### **SSCI 292 - Studies**

**Credits:** 1.00 to 4.00

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Areas may include a specific social science topic. Course may be repeated up to a maximum of 8 credits.

## **UNHM Independent Study**

### **UMIS 599 - Independent Study**

**Credits:** 1.00 to 4.00

Independent study with the approval and sponsorship of UNHM faculty of material not covered in regular course offerings. Barring duplication of subject, may be repeated for credit up to a maximum of 8 credits.

## UNHM Special Topics

### **UMST 401 - First Year Seminar**

**Credits:** 1.00

The focus of this seminar is not on a specific academic subject or field of study; instead, the focus is on the student. This course is intentionally designed and proactively delivered for the purpose of promoting personal success-in college and in life after college--by fostering the development of skills or strategies that are both applicable and valuable across subjects. The course focuses on the following topics: college expectations and opportunities, campus resources, learning styles and strategies including lecture note-taking, test taking, memory and concentration; life management, goal setting, educational planning, career decision-making, health maintenance, diversity and instructor/student relationships. The course integrates personal growth, academic and career success with problem solving, critical and creative thinking.

### **UMST 500 - Internship**

**Credits:** 1.00 to 4.00

The UNHM internship places students in a variety of business and organizational settings under the direction of a faculty adviser and workplace supervisor. Students fulfill the obligations of the workplace internship plan, as well as complete individually-designed projects of academic merit under the direction of UNH faculty. Open to matriculated students with a 2.5 GPA or better. Students must receive approval of the UNHM internship coordinator. May be taken from 1-4 elective credits per semester, to a maximum of 8 credits. Credit/Fail.

### **UMST 501 - Money and Independence**

**Credits:** 1.00

This course provides students with an objective, neutral and current introduction to personal financial literacy. Students develop the skills necessary to establish good financial habits and a healthy financial future. This course helps students to become familiar with fundamental financial concepts including budgeting, credit, contracts, student loans, identity theft and planning for the future. No credit for students who have completed UMST 599 Financial Literacy and Advocacy or UMST 599 Money Management and Independence.

### **UMST 521 - Tutor Development**

**Credits:** 2.00 or 4.00

This interdisciplinary course, team-taught by the Director and Assistant Director of the Learning Center, is intended to prepare undergraduates for working as peer tutors. Students will study theories of adult development, learn several approaches to tutoring in their discipline(s), and practice their tutoring and communication skills. This course may be taken for 2- or 4-credits. Cannot be repeated. Prereq: permission of instructor is required.

### **UMST 523 - Shared Learning**

**Credits:** 2.00

Shared Learning aims to teach students about theories of collaborative learning, tutoring, and mentoring and to provide opportunities for the students to apply the theories. Students discuss ethical issues, conflict resolution, and differences in styles or goals. They develop and practice effective communication skills, including reflective listening and constructive feedback.

### **UMST 531 - Engaging in the Community: Learning through Service**

**Credits:** 1.00 to 4.00

Students provide service to the community while engaging in meaningful experiences that build upon their

skills and interests and help develop an awareness of civic issues and community needs. The primary purpose of the course is to work in the community to meet a community need. Student critically reflect on their experiences in a bi-weekly seminar through in-class discussions, readings, and journaling. Course may be repeated for a total of 8 credits.

### **UMST 599 - Special Topics**

**Credits:** 1.00 to 4.00

Occasional offerings dependent on availability and interest of faculty, barring duplication of subject, may be repeated for credit.

### **UMST 601 - Community Based Research**

**Credits:** 4.00

Students will conduct an authentic research project(s) focused on a local community issue(s) in partnership with a local nonprofit organization(s). The primary purpose of the course is for students to experience the research process working closely with faculty and community partners. All phases of the research process are explored in this seminar style class. Course may be repeated for a total of 8 credits. Instructor permission required.

### **UMST 799 - Pre-Pharmacy Concurrent Enrollment**

**Credits:** 1.00 to 20.00

Registration place-holder for students completing the fourth year of their B.A. Biology Program at Massachusetts College of Pharmacy and Health Studies in the Pre-Pharmacy articulation program.

## Women's Studies

### **WS 401 - Introduction to Women's Studies**

**Credits:** 4.00

Interdisciplinary survey of the major areas of women's studies: women's history, cross-cultural perspectives, women in literature, psychology of women, etc. Basic principles and concepts fundamental to more advanced women's studies research. Topics vary. Required for major and minor. Writing intensive.

### **WS 401H - Honors/Introduction to Women's Studies**

**Credits:** 4.00

Interdisciplinary survey of the major areas of women's studies: women's history, cross-cultural perspectives, women in literature, psychology of women, etc. Basic principles and concepts fundamental to more advanced women's studies research. Topics vary. Required for major and minor. Writing intensive.

### **WS 405 - Gender, Power and Privilege**

**Credits:** 4.00

This course explores the diversity of women's lives through the dynamics of status, power, privilege, and inequality in contemporary United States. Students will examine women's diverse experiences by using the theoretical framework of the social construction of race, gender, economic class, and sexual orientation in historical context. We will examine categories of difference and the processes, philosophical developments, institutions, and conditions that lead to and rely on power and privilege in modern American society.

### **WS 444 - Trans/Forming Gender**

**Credits:** 4.00

Using a social construction approach, students explore the multiple ways in which gender is constructed within the lives of children, women, men, and transgender people. Specific attention focuses on the social institutions and systems that encourage both the construction and reproduction of gender identity and expression across the lifespan. Students actively participate in identifying historical and current day factors and institutions that shape gender. Students explore the roles of families, schools, educational settings, media, the workplace, recreation activities, the medical system, religion, laws, and the laws and the legal system in the construction of gender.

### **WS 444A - Race Matters**

**Credits:** 4.00

Class examines race categories in the United States and how these historically changing categories shape our diverse realities across racial, ethnic, gendered, classed, and national identities. Students examine race as a category of difference and explore the multiple ways that individuals claim racial identities. Specific attention focuses on how diverse women have made history in their own lives and in the lives of others by resisting the interlocking systems of oppression.

### **WS 444B - Score!: Gender and Diversity in Sports**

**Credits:** 4.00

Utilizing guest lectures, films, readings, projects and discussion, this writing intensive course provides first-year students with the opportunity to investigate the social, historic, economic and political factors that shape sports opportunities for girls and women in the United States. Students examine the extent to which sports experiences are the same for all girls and women in their diversity, as well as comparable to males across their differences. Writing intensive.

### **WS 444C - On the Roads to Equality**

**Credits:** 4.00

Looking beyond what is traditionally thought of as the women's rights movement in the United States, this course remaps women's history and activism to include a diversity of women's experiences. A multicultural examination of history focuses on women's leadership and participation in immigrant rights, labor, the Black Women's Club, economic justice, reproductive rights, self determination and feminist movements during the 19th and early 20th centuries. Writing intensive.

### **WS 444D - Cyborgs, Avatars, and Feminists: Gender in the Virtual World**

**Credits:** 4.00

Utilizing feminist theoretical and critical investigations of gender and techno culture, students explore women's popular and theoretical conceptions of cyberspace. Students explore numerous digital communication systems within cyberspace and examine how and why a diversity of women utilize these systems. This course provides students with the opportunity to investigate the impact that advancements in virtual technology have in the lives of women.

### **WS 505 - Survey in Women's Studies**

**Credits:** 4.00

The course explores the breadth and depth of Women's Studies from an historical perspective. In order to understand Women's Studies currently, students look at the historical foundations that contribute social, political, and economic influences on the topics.

### **WS 595 - Special Topics**

**Credits:** 1.00 to 4.00

In-depth study of topics not covered in regular course offerings. Prereq: permission; WS 401.

### **WS 595W - Special Topics**

**Credits:** 1.00 to 4.00

In-depth study of topics not covered in regular course offerings. Prereq: permission; WS 401. Writing intensive.

### **WS 632 - Feminist Thought**

**Credits:** 4.00

Theories of women's oppression and emancipation explored from various historical, political, cultural, and social perspectives. A major goal of the course is to increase awareness of historical and contemporary feminist approaches to understanding women's experiences, representations, and relative positions in societies. The course also considers the interrelation of theory and practice and the impact of past feminist theories on feminist movements. Prereq: WS 401. Writing intensive.

### **WS 795 - Independent Study**

**Credits:** 1.00 to 4.00

For advanced students who have the preparation to carry out an individual project of supervised research on a specific women's studies topic. Preparation should include WS 401 or equivalent, and/or other women's studies courses. Barring duplication of topic, may be repeated for a maximum of 8 credits. Prereq: permission of instructor and women's studies coordinator.

### **WS 796 - Advanced Topics**

**Credits:** 1.00 to 4.00

Advanced or specialized topics not normally covered in regular course offerings. May be repeated, but not in duplicate areas. Prereq: permission.

### **WS 796W - Advanced Topics**

**Credits:** 1.00 to 4.00

Advanced or specialized topics not normally covered in regular course offerings. May be repeated, but not in duplicate areas. Prereq: permission. Writing intensive.

**WS 797 - Internship**

**Credits:** 4.00

Students gain practical experience in a woman-focused agency or organization. Plan of study and requirements are developed together with a faculty adviser and the student's workplace adviser. Bi-monthly seminar with all internship students and instructor. Prereq: permission. WS majors or minors. May be repeated up to a maximum of 8 credits.

**WS 798 - Colloquium**

**Credits:** 4.00

Intensive study of specialized topic for advanced students. Topics vary with instructor. Prereq: permission. Required for WS minors. Barring duplication of topic, may be repeated for credit. Writing intensive.

**WS 799 - Honors Thesis**

**Credits:** 4.00 to 8.00

With a faculty sponsor, students enrolled in the honors-in-major program develop an independent, investigative project in women's studies. Written thesis. Prereq: majors only; one other WS 700-level course prior to or concurrently with WS 799; permission.

## Zoology

### **ZOOL 400 - Professional Perspectives in Zoology**

**Credits:** 1.00

Presentations by departmental faculty provide an informal overview of various zoological topics and professional opportunities. The course acquaints students with faculty, provides information on departmental research projects, and facilitates early research involvement for students. Required for all first-year zoology majors. (Fall only). Cr/F.

### **ZOOL 401 - Human Biology**

**Credits:** 4.00

Elementary study of structure, function, and development of all systems of the body. No credit toward major or minor. Cannot be taken for credit after BMS 507-508. Special fee. Lab.

### **ZOOL 410 - Marine Immersion**

**Credits:** 2.00

An intensive 2-credit course for incoming freshmen, surveying a range of marine-related fields (with an emphasis on biology and ecology), research approaches, and organisms. The course is based at the Shoals Marine Laboratory on Appledore Island, where students and some faculty will be in residence. "Marine Immersion" introduces students to the breadth, excitement, and challenges of marine sciences through lectures, demonstrations, and field experiences offered by a cohort of UNH faculty, and through short research projects carried out on the island. It also introduces them to resources and opportunities available at UNH, provides an opportunity to get to know some of their professors, and lets them begin building a network among their peers even before they arrive in Durham. Special fee.

### **ZOOL 412 - Biology of Animals**

**Credits:** 4.00

Fundamentals of modern animal biology from cells to organisms, including structure, function, genetics, development, ecology, and the diversity produced by animal evolution. Weekly demonstrations and virtual e-labs provide a hands-on introduction to the animal kingdom. Special fee. Lab. (Fall semester only.)

### **ZOOL #444 - Dogs to Dragons: Origins of Species**

**Credits:** 4.00

A freshman "inquiry" seminar introducing fundamental evolutionary concepts and mechanisms, as well as examining the nature of science, and the ways in which scientists use imagination and inference to better understand the natural world. Through evolutionary case studies ranging from the very real to the purely imaginary, students learn to compare and assess explanatory hypotheses, and to use creative, scientifically-disciplined inference as working scientists do. They also develop their abilities to decide what is or isn't science, and to judge the relevance and adequacy of evidence claimed to support hypotheses. The course begins by introducing the mechanism of natural selection through the engaging example of dog domestication, move from there to broader discussions of speciation (including species definitions, and case studies of speciation in progress). The central portion of the course focuses on issues of definitions (what is a "hypothesis" anyway?), and developing increasingly sophisticated and well-informed judgments about different sorts of biological information. In the final section, we explore proper and improper roles of imagination and creativity in science: how (and why) real scientists use fictional species, and how to tell the difference between fictions and frauds while leaving room for humor and invention. Writing intensive.

### **ZOOL 444A - Introduction to Aquatic Invasive Species**

**Credits:** 4.00



This is an inquiry course for first-year students interested in issues relating to the management of aquatic invasive plants and animals based on an understanding of the ecology and biology. Course is a combination of lectures, laboratory and field exercises and discussions focusing on the selected freshwater and marine invasive species and their management. Special fee.

### **ZOOL 503 - Introduction to Marine Biology**

**Credits:** 4.00

Organization of marine biological communities in various marine environments pelagic, benthic, temperate, tropical. Major emphasis on the approaches (e.g., analysis of energy flow and predator-prey interactions) used to analyze marine communities and on the sampling techniques employed for each approach and the habitat type. Prereq: BIOL 411-412. (Also offered as P BIO 503.) Special fee. Lab.

### **ZOOL 518 - Vertebrate Morphology**

**Credits:** 5.00

Evolutionary and comparative examination of vertebrate anatomy. Covers the structure of the major systems at both the macroscopic and microscopic levels. Prereq: BIOL 411-412 or equivalent. Special fee. Lab.

### **ZOOL 529 - Developmental Biology**

**Credits:** 4.00

Introduces developmental biology, examining basic developmental mechanisms and their evolutionary contexts. Principles and tools of the trade, overview of major developmental events in various phyla, current areas of research and other special topics. Labs include different ways to observe development (from low- to high-tech), and work with selected live material. Prereq: BIOL 411-412 or equivalent. No credit if credit earned for ZOOL 729. Special fee. Lab.

### **ZOOL 542 - Ornithology**

**Credits:** 4.00

Identification and biology of birds, especially those of northeastern United States. Involves field trips, laboratory work, and lectures. Prereq: one semester of biology. (Spring semester only.)

### **ZOOL 547 - Wildlife Photography**

**Credits:** 2.00

Introduction to nature photography emphasizing macro- and telephoto techniques, and photo enhancement using Photoshop Elements. Cr/F.

### **ZOOL 600 - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F.

### **ZOOL 600W - Field Experience**

**Credits:** 1.00 to 4.00

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. May be repeated to a maximum of 8 credit hours. Prereq: permission. Cr/F. Writing intensive.

### **ZOOL 610 - Principles of Aquaculture**

**Credits:** 3.00

Introduces the culture practices employed for production of aquatic organisms. Topics include ecological and environmental considerations, selective breeding, nutrition, diseases, processing, and marketing. Emphasis on finfish. Prereq: BIOL 411-412 or equivalent.

### **ZOOL 611 - Principles of Aquaculture Lab**

**Credits:** 2.00

Laboratory exercises in aquaculture covering the use of chemical reagents to monitor water quality; brood stock feeding and management; use of anesthesia and fish handling; spawning marine finfish; culturing algae, rotifers and artemia for marine larviculture; larviculture of marine finfish; assessing fish growth; hatchery hygiene. Includes site visits to local production facilities. Prereq: BIOL 411-412 or equivalent. Coreq: ZOOL 610.

**Co-requisites:** ZOOL 610

### **ZOOL 625 - Principles of Animal Physiology**

**Credits:** 3.00

Introduces the principles of animal function. The major systems (digestion, metabolism, respiration, circulation, osmotic and ionic regulation, nerve-muscle function, endocrine control) are covered with emphasis on functional mechanisms at the cell and tissue levels. Prereq: two years of the biology core curriculum.

**Co-requisites:**

### **ZOOL 626 - Animal Physiology Laboratory**

**Credits:** 2.00

Basic training in the measurement of function in animals, data analysis and expression, and the development of scientific communication skills. Special fee. Writing intensive.

**Co-requisites:** ZOOL 625

### **ZOOL 628 - Marine Invertebrate Evolution and Ecology**

**Credits:** 5.00

Stresses the rich diversity of marine invertebrates by integrating phylogenetic trends with physiological and behavioral adaptation, and with ecological and symbiotic interactions. Offers a comparative survey of invertebrates from protozoans to protochordates; deals with aspects of form and function, development, evolution, classification, ecology, and natural history. Students work with live and preserved animals. Extensive dissections and a field component are required. Prereq: BIOL 411-412. Special fee. Lab. (Not offered every year.)

### **ZOOL 675 - Field Marine Biology and Ecology**

**Credits:** 8.00

Introductory marine science course emphasizing field work in natural habitats with a focus on marine ecology. Examines the ecology of the intertidal zone and the ecological, evolutionary, and physiological adaptations of marine organisms. Course includes lectures; discussions; field work, including quantitative field sampling methods; experience aboard a coastal research vessel; and excursions to distinctive habitats. Offered in cooperation with Cornell University. Students may not take this course after taking Field Marine Science. Prereq: one full year of college-level biology. (Summers only at Shoals Marine Lab.)

### **ZOOL 690 - Evolution**

**Credits:** 4.00

Biological evolution is the changes within populations of organisms that extend beyond the lifetime of individuals. Darwin's mechanism of evolution by natural selection, and other evolutionary forces, explain the diverse adaptations of organisms to different environments. Topics include principles of heredity, sources and maintenance of variation, adaptation, speciation, classification, development, the history of life and the earth, and current controversies. Prereq: BIOL 411-412 or equivalent. Writing intensive.

### **ZOOL 708 - Stream Ecology**

**Credits:** 4.00

Ecological relationships of organisms in flowing water; streams as ecosystems. Lectures on physical and chemical features of streams, floral and faunal communities, and factors controlling populations and behavior of stream organisms. Lab exercises employ both field and laboratory experimental techniques. Special fee. Lab. (Not offered every year.)

### **ZOOL 710 - Ichthyology**

**Credits:** 4.00

Introduces the evolution, systematics, anatomy, physiology, and ecology of fishes, with emphasis on New England species. Prereq: principles of biology or equivalent. Lab. (Offered in alternate years.)

### **ZOOL #711 - Zooplankton Ecology**

**Credits:** 4.00

Methods of sampling populations, factors regulating temporal and spatial distribution, trophic interactions of communities, role of zooplankton in the food web of lakes. Experimental techniques employed in field trips to freshwater habitats; seminars examine current research. Prereq: general biology. Special fee. Lab. (Not offered every year.)

### **ZOOL 712 - Mammalogy**

**Credits:** 4.00

Evolution, ecology, behavior, physiology, and diversity of mammals. Focuses on conceptual issues such as the relations of structure, function, physiology, and ecology of species; reproductive physiology and life history strategies; and the evolution of mating systems and social structure. Requires familiarity with mammalian groups to the family level and identification of local fauna to species. Prereq: BIOL 411-412 or equivalent. Lab. (Not offered every year.) Special fee.

### **ZOOL 713 - Animal Behavior**

**Credits:** 4.00

Introduces the naturalistic study of animal behavior. Emphasizes the evolution, development, physiology, and ecology of behavior. Topics include the genetic and acquired bases of behavior, neuroethology and behavioral endocrinology, communication, orientation, foraging strategies, reproductive ecology, and the evolution of altruistic behavior. Prereq: BIOL 411-412 or equivalent. Lab. Writing intensive.

### **ZOOL 717 - Lake Ecology**

**Credits:** 4.00

Introduces the ecology of freshwater systems, with emphasis on lakes. Origins of lakes and the effects of watersheds on lake chemistry, nutrient cycling, and the lake food web are explored. Other topics include the impact of human disturbances on productivity and aquatic food webs and methods used for the management and restoration of lakes. Comparisons are made of the structure and functions of lake ecosystems found in temperate, tropical and arctic regions. Prereq: general biology. (Also offered as P BIO 717.)

### **ZOOL 719 - Field Studies in Lake Ecology**

**Credits:** 4.00

Ecology of lakes and other freshwater habitats examined through field studies. Emphasizes modern methods for studying lakes; analysis and interpretation of data; and writing of scientific papers. Seminars on research papers and student presentations of class studies. Field trips to a variety of lakes, from the coastal plain to White Mountains to investigate problems, such as eutrophication, acidification, biodiversity and biotoxins. Capstone experiences include interaction with state agencies lake stakeholders, and the submission of written manuscripts for publication. Prereq: introductory biology. (Also offered as P BIO 719.)

Special fee. Lab. Writing intensive.

### **ZOOL 721 - Aquatic Invasive Species**

**Credits:** 4.00

Capstone course for a limited number of biological science majors to work closely with and help teach a Discovery course for non-majors in biology. Involves lectures, discussions, and laboratory and field exercises and write-ups focusing on managing aquatic invasive species based on an understanding of their ecology. Special fee.

### **ZOOL 725 - Marine Ecology**

**Credits:** 4.00

Marine environment and its biota, emphasizing intertidal and estuarine habitats. Includes field, laboratory, and an independent research project. Prereq: general ecology; permission. Marine invertebrate zoology, oceanography, and statistics are desirable. (Also offered as P BIO 725.) Special fee. (Not offered every year.)

### **ZOOL 732 - Lake Management: A Multidisciplinary Approach**

**Credits:** 4.00

Lectures and seminars on interpreting lake water quality, developing a natural history inventory for lakes, the process of creating a lake management plan, and resolution of conflicting uses of lakes. Students develop actual lake management plans in cooperation with government agencies and lake associations. Guest speakers from state agencies and non-governmental organizations. Introduction to GIS (Geographic Information Systems) methods for the analysis of lakes and watersheds. Present lake management issues from scientific and social science points of view. Open to students from all disciplines. (Also offered as P BIO 732.) Special fee. Lab.

### **ZOOL 733 - Behavioral Ecology**

**Credits:** 4.00

Behavioral adaptations of animals to their environment, including the evolution of behavior and behavioral genetics; foraging and competition for resources; reproductive ecology, mating systems and parental care; and the evolution of cooperative behavior. Examples include both vertebrates and invertebrates. Emphasizes critical understanding of concepts as exhibited in oral and written exercises. Students conduct independent investigations. Prereq: ZOOL 713 or permission. Lab. (Offered in alternate years.) Writing intensive.

### **ZOOL 745 - Biology and Diversity of Insects**

**Credits:** 4.00

Study of the biology of insects, the most diverse group of organisms, focusing on why they are unique, how they have become so diverse, and the basis of their success. The laboratory is designed to develop an understanding of insect diversity through utilization of different sampling techniques in several habitats, sorting to "morphospecies," and use of biodiversity indices. Prereq: BIOL 411-412 or equivalent. Special fee. (Not offered every year.)

### **ZOOL 750 - Biological Oceanography**

**Credits:** 4.00

Biological processes of the oceans, including primary and secondary production, trophodynamics, plankton diversity, zooplankton ecology, ecosystems and global ocean dynamics. Field trips on R/V Gulf Challenger and to the Jackson Estuarine Laboratory. Prereq: one year of biology or permission of the instructor. (Also offered as ESCI 750.) Special fee. Lab. (Not offered every year.)

### **ZOOL 772 - Fisheries Biology**

**Credits:** 3.00

Principles of fisheries science, with emphasis on techniques used to assess the biological characteristics of exploited fish populations, and the use of such information for fisheries management. Prereq: ZOOL 710 or equivalent; permission. (Not offered every year.)

### **ZOOL 773 - Physiology of Fish**

**Credits:** 4.00

Investigates the physiological processes responsible for maintaining homeostasis in fishes. Focuses on the function and regulation of the major organ systems during stress and environmental adaptation. Topics include reproduction, osmoregulation, digestion, endocrinology, and sensory perception.

### **ZOOL 777 - Neurobiology and Behavior**

**Credits:** 4.00

Survey of fundamental concepts and recent discoveries in neurobiology. Topics include structure and function of neurons, development, cellular basis of behavior (sensory and motor systems), neuropharmacology, and neural plasticity (learning). Prereq: BIOL 411-412 or permission. Physiology (ZOOL 625) also desirable.

### **ZOOL 795 - Special Investigations**

**Credits:** 1.00 to 4.00

Independent study in various areas including but not limited to animal behavior, developmental biology, ecology, endocrinology, evolution, ichthyology, genetics, history of biology, invertebrate biology, neurobiology and behavior, protozoology, teaching practices, underwater research, vertebrate biology, and biological techniques. Course sections for advanced work, individual or group seminar. May include reading, laboratory work, organized seminars, and conferences. Prereq: permission of department chairperson and staff concerned.

### **ZOOL 795W - Special Investigations**

**Credits:** 1.00 to 4.00

Independent study in various areas including but not limited to animal behavior, developmental biology, ecology, endocrinology, evolution, ichthyology, genetics, history of biology, invertebrate biology, neurobiology and behavior, protozoology, teaching practices, underwater research, vertebrate biology, and biological techniques. Course sections for advanced work, individual or group seminar. May include reading, laboratory work, organized seminars, and conferences. Prereq: permission of department chairperson and staff concerned. Writing intensive.

### **ZOOL 799 - Honors Senior Thesis**

**Credits:** 1.00 to 4.00

Working under the direction of a faculty sponsor, the student plans and carries out independent research resulting in a written thesis. Limited to students entering their senior year; required for students in the honors program or working toward honors-in-major. Prereq: permission. A two-semester sequence. 2-4 credits each semester; 8 credits maximum. IA (continuous grading) given at the end of the first semester. Writing intensive.



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## UNH Faculty | Emeritus Faculty

\* Graduate Faculty

<u>Name</u>	<u>Title</u>	<u>Department</u>	<u>Degree Code</u>	<u>Institution</u>	<u>Degree Year</u>
<b>Abbott, Katherine R</b>	LECTURER	Sociology	B.S.	Arizona State University	2007
			M.S.	Arizona State University	2010
			Ph.D.	Arizona State University	2013
<b>Aber, John D*</b>	PROFESSOR	Natural Resources & The Environment	B.S.	Yale University	1971
			B.S.	Yale University	1971
			M.F.S.	Yale University	1973
			M.F.S.	Yale University	1973
			Ph.D.	Yale University	1976
			Ph.D.	Yale University	1976
<b>Abrams, Eleanor D*</b>	EXECUTIVE DIRECTOR	Engagement & Academic Outreach	B.S.	University of Massachusetts - Amherst	1983
			Ph.D.	Louisiana State University	1994
<b>Abramson, Seth D</b>	ASSISTANT PROFESSOR	English	B.A.	Dartmouth College	1998
			J.D.	Harvard Law School	2001
			M.F.A.	University of Iowa	2009
			M.A.	University of Wisconsin	2010
<b>Abril Sanchez, Jorge</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	Universidad de Oviedo, Spain	2001
			M.A.	University of Massachusetts - Amherst	2004

<b>Afolayan, Funso S*</b>	ASSOCIATE PROFESSOR	History	B.A.	Obafemi Awolowo University, Nigeria	1980
			M.A.	Obafemi Awolowo University, Nigeria	1984
			Ph.D.	Obafemi Awolowo University, Nigeria	1991
<b>Akiyama, Sachiko</b>	ASSISTANT PROFESSOR	Art and Art History	B.A.	Amherst College	1995
			M.F.A.	Boston University	2002
<b>Aktekin, Tevfik *</b>	ASSISTANT PROFESSOR	Decisions Sciences	B.S.	Yildiz Technical University, Turkey	2002
			M.B.A.	George Washington University	2004
			Ph.D.	George Washington University	2009
<b>Aliano, Richard A</b>	LECTURER	Political Science	B.A.	City University of New York	1968
			M.A.	City University of New York	1969
			J.D.	St. John's University - New York	1981
<b>Aliouche, El-Hachemi *</b>	ASSOCIATE PROFESSOR	Hospitality Management	B.S.	University of New Hampshire	1980
			M.A.	University of New Hampshire	1982
			Ph.D.	University of New Hampshire	1992
			M.B.A.	University of New Hampshire	1995
<b>Amato, Christopher *</b>	ASSISTANT PROFESSOR	Computer Science	B.A.	Tufts University	1999
			B.S.	University of Massachusetts - Amherst	2004
			M.S.	University of Massachusetts - Amherst	2007
			Ph.D.	University of Massachusetts - Amherst	2010
<b>Amato-Wierda, Carmela C*</b>	ASSOCIATE PROFESSOR	Dean's Office - CEPS	B.A.	Harvard University	1988
			Ph.D.	Rensselaer Polytechnic Institute Western Illinois	1993

<b>Ames, Raina S</b>	ASSOCIATE PROFESSOR	Theatre & Dance	B.A.	University	1990
			M.Ed.	Western Illinois University	1999
			M.F.A.	Virginia Commonwealth University	2002
<b>Andrade, Arturo S*</b>	ASSISTANT PROFESSOR	Biological Sciences	B.S.	University of Michoacan, Mexico	2001
			Ph.D.	National Polytechnic Institute of Toulouse, France	
<b>Andrews, Tama H</b>	SENIOR LECTURER	Political Science	B.A.	University of New Hampshire	1997
			M.A.	University of New Hampshire	2001
<b>Annicchiarico, Michael J*</b>	PROFESSOR	Music	B.M.	University of New Hampshire	1976
			M.F.A.	Brandeis University	1981
			Ph.D.	Brandeis University	1993
<b>Arcand, Carolyn L</b>	LECTURER	Political Science	B.S.	Syracuse University	2001
			M.P.A.	University of Southern Maine	2006
			M.S.	University of Massachusetts - Boston	2011
			Ph.D.	University of Massachusetts - Boston	2014
<b>Armstrong, Jennifer K</b>	PRINCIPAL LECTURER	Philosophy	A.B.	Colby College	1985
			MTS	Harvard Divinity School	1987
			M.A.	University of Massachusetts - Amherst	1991
<b>Arthanat, Sajay *</b>	ASSOCIATE PROFESSOR	Occupational Therapy	B.S.	Santosh College Occupational Therapy, India	1997
			C.A.G.S.	State University of New York at Buffalo	2004
			Ph.D.	State University of New York at Buffalo	2007
<b>Asbjornsen, Heidi *</b>	ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.A.	Carleton College	1989



			Ph.D.	Yale University	1999
			M.S.	Yale University	1993
<b>Ashcraft, Catherine M*</b>	ASSISTANT PROFESSOR	Natural Resources & The Environment	B.A.	University of Pennsylvania	1998
			M.S.	Yale University	2002
			Ph.D.	Massachusetts Institute of Technology	2011
<b>Ashton-Savage, Audrey</b>	LECTURER	Marketing	B.A.	University of New Hampshire	1971
			M.B.A.	University of New Hampshire	1978
<b>Ashwell, Thomas W</b>	SENIOR LECTURER	Kinesiology	B.A.	University of Massachusetts - Amherst	1988
			M.A.	University of Massachusetts - Amherst	1989
			Ph.D.	University of Massachusetts - Amherst	1994
<b>Atallah, Shady S*</b>	ASSISTANT PROFESSOR	Natural Resources & The Environment	B.S.	Holy Spirit University of Kaslik, Lebanon	2003
			MENGR	Holy Spirit University of Kaslik, Lebanon	2003
			M.Sc.	American Univ of Beirut	2006
			M.S.	University of California	2009
			Ph.D.	Cornell University	2014
<b>Aydelott, Kathrine C</b>	ASSISTANT PROFESSOR	Reference	B.A.	Colby College	1990
			M.A.	University of Connecticut	1995
			Ph.D.	University of Connecticut	2005
			M.L.I.S.	Simmons College	2006
<b>Aytur, Semra A*</b>	ASSOCIATE PROFESSOR	Health Management & Policy	B.A.	Brown University	1991
			M.P.H.	Boston University	1996
			Ph.D.	University of North Carolina	2005

<b>Babbitt, Kimberly J*</b>	ASSOCIATE DEAN	Natural Resources & The Environment	B.S.	University of New Hampshire	1984
			M.S.	Texas A & M University	1988
			Ph.D.	University of Florida	1996
<b>Bachrach, David S*</b>	PROFESSOR	History	B.A.	Carleton College	1994
			M.A.	University of Notre Dame	1997
			Ph.D.	University of Notre Dame	2001
<b>Bailey, Brigitte G*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of Virginia	1977
			A.M.	Harvard University	1980
			Ph.D.	Harvard University	1985
<b>Bailey, Cristina J*</b>	ASSISTANT PROFESSOR	Accounting and Finance	M.	University of New Mexico	2005
<b>Baker, Alan L*</b>	ASSOCIATE PROFESSOR	Biological Sciences	B.A.	State University of New York at Binghamton	1965
			Ph.D.	University of Minnesota	1973
<b>Baldwin, Kenneth C*</b>	PROFESSOR	Mechanical Engineering	B.S.	Northeastern University	1973
			M.S.	University of New Hampshire	1977
			Ph.D.	University of Rhode Island	1982
<b>Ballestero, Thomas P*</b>	ASSOCIATE PROFESSOR	Civil and Environmental Engineering	B.S.	Pennsylvania State University	1975
			M.S.	Pennsylvania State University	1977
			Ph.D.	Colorado State University	1981
<b>Banach, Mary *</b>	ASSOCIATE PROFESSOR	Social Work	B.A.	University of Wisconsin - Milwaukee	1975
			M.S.W.	New York University	1978
			D.S.W.	Columbia University in the City of New York	1995
<b>Banyard, Victoria L*</b>	PROFESSOR	Psychology	B.A.	Brown University	1988
			M.A.	University of Michigan	1990

			Ph.D.	University of Michigan	1994
<b>Bao, Xiaoyan *</b>	ASSISTANT PROFESSOR	Accounting and Finance	B.A.	Dongbei University, China	1977
			M.	Southern Illinois University	2003
			Ph.D.	University of Nebraska	2012
<b>Barber, Heather *</b>	ASSOCIATE PROFESSOR	Kinesiology	B.S.	St. Lawrence University	1978
			M.S.	Pennsylvania State University	1982
			Ph.D.	University of Oregon	1992
<b>Barber, Nelson A*</b>	ASSOCIATE PROFESSOR	Hospitality Management	B.S.	San Jose State University	1978
			A.O.S.	Culinary Institute of America	2004
			M.S.	Purdue University	2005
			Ph.D.	Texas Tech University	2008
<b>Barcelona, Robert J*</b>	ASSOCIATE PROFESSOR	Recreation Management & Policy	B.A.	University of Mississippi	1993
			M.S.	Indiana University - Bloomington	1995
			Ph.D.	Indiana University - Bloomington	2001
<b>Barkey, Dale P*</b>	PROFESSOR	Chemical Engineering	M.S.	University of Cincinnati	1982
			Ph.D.	University of California - Berkeley	1987
			B.A.	Clark University	1979
<b>Barksdale, Pamela J</b>	PRINCIPAL LECTURER	English	B.A.	University of New Hampshire	1989
			M.A.	University of New Hampshire	1990
			M.A.	University of New Hampshire	1991
<b>Barnett, Carole K*</b>	ASSOCIATE PROFESSOR	Management	B.A.	University of Michigan	1989
			M.A.	University of Michigan	1992
			Ph.D.	University of Michigan	1994

<b>Barretto, Timothy E</b>	PROFESSOR	Thompson School of Applied Science	B.A.	University of New Hampshire	1974
			M.A.	University of New Hampshire	1982
<b>Barrows, Clayton W*</b>	PROFESSOR	Hospitality Management	B.S.	University of Massachusetts - Amherst	1982
			M.S.	University of Massachusetts - Amherst	1987
			Ed.D.	University of Massachusetts - Amherst	1990
<b>Barth, Brian M</b>	ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Colorado State University	2004
			M.S.	Colorado State University	2005
			Ph.D.	University of Alaska	2009
<b>Bartos, Radim *</b>	ASSOCIATE PROFESSOR	Computer Science	M.S.	Czech Technical University, Czech Republic	1987
			M.S.	University of Denver	1996
			Ph.D.	University of Denver	1997
<b>Bartow, Ann M</b>	PROFESSOR	UNHL FP IP Center	B.S.	Cornell University	1985
			J.D.	University of Pennsylvania	1990
<b>Basterra, Maria *</b>	PROFESSOR	Mathematics & Statistics	B.S.	University of Texas at Austin	1992
			M.S.	University of Chicago	1993
			Ph.D.	University of Chicago	1998
<b>Batterson, Sarah A</b>	LECTURER	History	B.A.	Vassar College	2001
			M.A.	Brandeis University	2005
			Ph.D.	University of New Hampshire	2013
<b>Bauer, Christopher F*</b>	PROFESSOR	Chemistry	B.S.	University of Notre Dame	1974
			M.S.	University of Illinois at Urbana- Champaign	1976
			Ph.D.	Colorado State University	1979

<b>Baughman, Reagan A*</b>	ASSOCIATE PROFESSOR	Economics	B.A.	Drew University	1996
			M.A.	Syracuse University	1999
			Ph.D.	Syracuse University	2001
<b>Bean, Gretchen H</b>	CLINICAL ASSISTANT PROFESSOR	Social Work	B.A.	University of New Hampshire	1995
			M.A.	University of Chicago	2002
<b>Beasley, Joan B*</b>	RESEARCH ASSOCIATE PROFESSOR	Social Work	Ph.D.	Brandeis University	2000
<b>Bedker, Patricia D*</b>	ASSOCIATE PROFESSOR	Biological Sciences	B.S.	University of Massachusetts - Amherst	1976
			M.S.	University of New Hampshire	1980
			Ph.D.	Cornell University	1985
<b>Beemer, Cristy A*</b>	ASSISTANT PROFESSOR	English	B.A.	Hofstra University	1993
			B.A.	State University of New York	1996
			B.A.	State University of New York at New Paltz	2000
			M.A.	State University of New York at New Paltz	2002
			Ph.D.	Miami University - Ohio	2008
<b>Beemer, Lawrence W</b>	LECTURER	English	B.A.	State University of New York at Purchase	1996
			M.A.	State University of New York at New Paltz	2002
			Ph.D.	Ohio University	2011
<b>Begis, Maggie D</b>	CLINICAL ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Pennsylvania State University	1998
			M.S.	Pennsylvania State University	2001
			Ph.D.	Boston University	2009
<b>Bell, Brent J*</b>	ASSOCIATE PROFESSOR	Kinesiology	M.S.	New England College	1997
			Ph.D.	University of New Hampshire	2005
			B.A.	University of New Hampshire	1989

<b>Bell, Erin S*</b>	ASSOCIATE PROFESSOR	Civil and Environmental Engineering	B.C.E.	Georgia Institute of Technology	1996
			M.S.	Tufts University	1998
			Ph.D.	Tufts University	2003
<b>Beller-McKenna, Daniel *</b>	ASSOCIATE PROFESSOR	Music	B.A.	Temple University	1985
			M.M.	Temple University	1988
			Ph.D.	Harvard University	1994
<b>Benassi, Victor A*</b>	PROFESSOR	Psychology	B.S.	California State College in Pe	1969
			M.A.	City University of New York	1973
			Ph.D.	City College, New York, Ny	1974
<b>Benchetrit, Assaf</b>	ASSISTANT PROFESSOR	Theatre & Dance	B.F.A.	Montclair State College	2012
			B.S.	Montclair State College	2012
			M.F.A.	Hollins College	2014
<b>Bennett, Jessie L*</b>	CLINICAL ASSISTANT PROFESSOR	Recreation Management & Policy	B.S.	Green Mountain College	2004
			M.S.	Brigham Young University	2010
			Ph.D.	Indiana University - Bloomington	2013
<b>Bennett, Karen Patricia</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Natural Resources	B.S.	University of New Hampshire	1979
			M.S.	University of New Hampshire	1992
<b>Benoit, Jean *</b>	PROFESSOR	Civil and Environmental Engineering	B.S.	University of Montreal, Canada	1977
			M.S.	Stanford University	1980
			Ph.D.	Stanford University	1984
<b>Berda, Erik B*</b>	ASSOCIATE PROFESSOR	Chemistry	B.S.	Pennsylvania State University	2003
			Ph.D.	University of Florida	2008
<b>Berenguier, Nadine S</b>	PROFESSOR	Languages, Literatures, & Cultures	D.E.U.G.	University of Paris IV Sorbonne, France	1976
			M.A.	University of Pittsburgh	1983

			Ph.D.	Stanford University	1988
<b>Bergeron, L Rene*</b>	ASSOCIATE PROFESSOR	Social Work	B.A.	University of New Hampshire	1973
			M.S.W.	University of Connecticut	1981
			Ph.D.	Boston College	1997
<b>Bergeron, R Daniel *</b>	PROFESSOR	Computer Science	B.S.	Brown University	1966
			Ph.D.	Brown University	1973
<b>Berglund, Per *</b>	PROFESSOR	Physics	B.S.	Lund University, Sweden	1988
			Ph.D.	University of Texas at Austin	1993
<b>Berguin, Mary E</b>	LECTURER	English	B.A.	University of Southern Maine	1971
<b>Berlinsky, David L*</b>	PROFESSOR	Biological Sciences	B.S.	Michigan State University	1977
			M.S.	University of New Hampshire	1981
			Ph.D.	University of Rhode Island	1989
<b>Berndtson, William E*</b>	PROFESSOR	Biological Sciences	B.S.	University of Connecticut	1966
			Ph.D.	Cornell University	1971
<b>Berst, John R</b>	ASSISTANT PROFESSOR	Theatre & Dance	B.A.	State University of New York	1989
			M.F.A.	Purdue University	1999
<b>Berube, Scott R</b>	LECTURER	Accounting and Finance	B.S.	University of New Hampshire	2002
			M.S.	University of New Hampshire	2003
<b>Birch, Thomas D</b>	PROFESSOR	Natural & Social Sciences	B.A.	Kenyon College	1977
			M.A.	Indiana University - Bloomington	1980
			Ph.D.	Indiana University - Bloomington	1983
<b>Bloser, Peter F*</b>	RESEARCH ASSOCIATE PROFESSOR	Space Science Center	A.B.	Princeton University	1994
			Ph.D.	Harvard University	2000
<b>Bochert, Mark L</b>	LECTURER	Computer Science	B.A.	University of Southern Maine	1986
			Ph.D.	University of New	1995

<b>Boettcher, Margaret S*</b>	ASSOCIATE PROFESSOR	Earth Sciences	B.S.	Hampshire Brown University	1998
			Ph.D.	Massachusetts Institute of Technology	2005
<b>Bolduc, Brandie L</b>	LECTURER	Education	B.A.	Humboldt State Univ	1994
			M.Ed.	University of New Hampshire	2009
<b>Bolker, Jessica A*</b>	ASSOCIATE PROFESSOR	Biological Sciences	B.S.	Yale University	1986
			Ph.D.	University of California - Berkeley	1993
<b>Bolster, W Jeffrey *</b>	PROFESSOR	History	B.A.	Trinity College - Conn	1976
			M.A.	Brown University	1984
			Ph.D.	Johns Hopkins University	1992
<b>Bonica, Mark J*</b>	ASSISTANT PROFESSOR	Health Management & Policy	B.A.	University of Massachusetts - Amherst	1992
			M.S.	Univ Colorado/Denver	1999
			M.B.A.	University of Massachusetts - Amherst	2000
			Ph.D.	George Mason University	2013
<b>Bonzani, Paul</b>	CLINICAL ASSISTANT PROFESSOR	Occupational Therapy	M.H.S.	University of Florida	2007
<b>Borda, Jennifer L</b>	ASSOCIATE PROFESSOR	Communication	B.A.	Villanova University	1995
			M.A.	Pennsylvania State University	1998
			Ph.D.	Pennsylvania State University	2002
<b>Bornstein, Steven P*</b>	ASSOCIATE PROFESSOR	Communications Disorders	B.S.	Northeastern University	1975
			M.A.	Northeastern University	1977
			Ph.D.	University of Connecticut	1981
<b>Boucher, Adam N</b>	LECTURER	Mathematics & Statistics	B.S.	Rensselaer Polytechnic Institute	2001
			M.S.	Rensselaer Polytechnic Institute	2003



<b>Boucher, Ronald J</b>	LECTURER	Hospitality Management	A.	Culinary Institute of America	1978
<b>Boudreau, Marc A*</b>	ASSISTANT PROFESSOR	Chemistry	B.S.	Mount Allison University	1997
			B.S.	University of Victoria, Canada	2001
			Ph.D.	University of Alberta, Canada	2007
<b>Boudreau, Scott D</b>	LECTURER	Thompson School of Applied Science	B.S.F.	University of New Hampshire	1999
<b>Boulton, Elizabeth P*</b>	ASSOCIATE PROFESSOR	Biological Sciences	D.V.M.	University of Georgia	1980
<b>Boylan, Amy</b>	ASSOCIATE PROFESSOR	Classics, Humanities & Ital Studies	B.A.	University of California - Los Angeles	1992
			M.A.	San Francisco State University	1997
			M.A.	University of California - Los Angeles	2000
			Ph.D.	University of California - Los Angeles	2007
<b>Boyle, Phillip D</b>	LECTURER	Decisions Sciences	MENGR	Cornell University	1976
			M.B.A.	University of New Hampshire	2005
<b>Boysen, Andrew A*</b>	PROFESSOR	Music	B.M.	University of Iowa	1991
			M.M.	Northwestern University	1993
			D.F.A.	University of Rochester	1998
			D.M.A.	University of Rochester	1998
<b>Bradt, Shane R</b>	ASSOCIATE STATE SPECIALIST/PROFESSOR	Natural Resources	B.S.	Nazareth College	1996
			M.S.	University of New Hampshire	2000
			Ph.D.	University of New Hampshire	2012
<b>Braswell, Angela M</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	A.D.N.	New Hampshire Community Techni	1999
			M.S.	University of New Hampshire	2006

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<b>Brettschneider, Marla B*</b>	PROFESSOR	Political Science	B.A.	State University of New York at Binghamton	1986
			M.A.	New York University	1988
			Ph.D.	New York University	1993
<b>Brewer, Jennifer F</b>	ASSOCIATE PROFESSOR	Geography	A.B.	University of Michigan	1989
			B.A.	University of Michigan	1989
			M.S.	University of Maine	2002
			Ph.D.	Clark University	2007
<b>Brito, Andre Fonseca De*</b>	ASSOCIATE PROFESSOR	Biological Sciences	D.V.M.	Federal University of Minas Gerais, Brazil	1996
			M.S.	Federal University of Minas Gerais, Brazil	1999
			Ph.D.	University of Wisconsin - Madison	2004
<b>Britton, Dennis A*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of Southern California	1998
			M.A.	University of Wisconsin	2000
			Ph.D.	University of Wisconsin	2007
<b>Bromberg, Daniel E*</b>	ASSISTANT PROFESSOR	Political Science	B.A.	University at Albany	2001
			M.P.A.	University of Vermont	2006
			Ph.D.	Rutgers University	2009
<b>Bronstein, Arna B</b>	ASSOCIATE PROFESSOR	Languages, Literatures, & Cultures	B.A.	Colgate University	1975
			M.A.	University of Pennsylvania	1978
			Ph.D.	University of Pennsylvania	1986
<b>Brooks, Courtney E Q</b>	ASSOCIATE PROFESSOR	UNHL JD Instruction	B.A.	University of Massachusetts - Amherst	1998
			J.D.	Univ of San Francisco	2001
<b>Broussard, C Anne*</b>	PROFESSOR	Social Work	B.A.	University of Texas at Austin	1974
			M.S.W.	Louisiana State University	1977

			Ph.D.	Washington State University	1986
<b>Brouwer Burg, Marieka E</b>	LECTURER	Anthropology	B.A.	University of Wisconsin - Madison	2005
			M.A.	Michigan State University	2008
			Ph.D.	Michigan State University	2011
<b>Brown, Benjamin Cliff*</b>	ASSOCIATE PROFESSOR	Sociology	B.A.	Earlham College	1987
			M.A.	Emory University	1992
			Ph.D.	Emory University	1996
<b>Brunet, Stephen A</b>	ASSOCIATE PROFESSOR	Classics, Humanities & Ital Studies	B.A.	Pomona College	1976
			M.A.	University of Pittsburgh	1978
			Ph.D.	University of Texas at Austin	1998
<b>Bryce, Julia G*</b>	ASSOCIATE PROFESSOR	Earth Sciences	B.A.	University of Virginia	1993
			Ph.D.	University of California - Santa Barbara	1998
<b>Bstieler, Ludwig A*</b>	ASSOCIATE PROFESSOR	Marketing	M.B.A.	University of Innsbruck, Austria	1989
			Ph.D.	University of Innsbruck, Austria	1997
<b>Buchbinder, Orly *</b>	ASSISTANT PROFESSOR	Mathematics & Statistics	B.S.	Technion- Israel Institute of Technology, Israel	1998
			M.S.	Technion- Israel Institute of Technology, Israel	2005
			Ph.D.	Technion- Israel Institute of Technology, Israel	2010
<b>Buckley, Louise A</b>	ASSOCIATE PROFESSOR	Reference	B.A.	St. John's University - New York	1979
			M.A.	St. John's University - New York	1981
			M.L.S.	Rutgers University	1992
<b>Budd, Jordan C</b>	INTERIM DEAN	UNHL Dean's Office Operations	B.A.	Harvard University	1983
			B.A.	Harvard University	1983
			J.D.	Harvard Law School	1986

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<b>Burdick, David M*</b>	RESEARCH ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.S.	Hobart and William Smith College	1977
			Ph.D.	Louisiana State University	1988
<b>Burger, John F*</b>	PROFESSOR	Biological Sciences	B.A.	Grinnell College	1962
			M.S.	University of Arizona	1965
			Ph.D.	University of Arizona	1971
<b>Burke, Cynthia A</b>	CLINICAL ASSISTANT PROFESSOR	Biological Sciences	M.B.A.	University of New Hampshire	
<b>Burke, Joanne D*</b>	CLINICAL ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of Rhode Island	1975
			M.Ed.	Tufts University	1977
			Ph.D.	University of New Hampshire	2001
<b>Burvikova, Ekaterina V</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	State Pushkin Institute	2005
			M.A.	State Pushkin Institute	2007
			M.	State Pushkin Institute	2009
			Ph.D.	State Pushkin Institute	2012
<b>Butkiewicz, Thomas J*</b>	RESEARCH ASSISTANT PROFESSOR	Center for Coastal & Ocean Mapping	B.S.	Ithaca College	2005
			M.S.	University of North Carolina	2007
			Ph.D.	University of North Carolina	2010
<b>Byam, Martha A</b>	CLINICAL ASSISTANT PROFESSOR	Social Work	B.A.	University of New Hampshire	1975
			M.S.W.	University of Utah	1979
<b>Cacarillo, Aimee L</b>	LECTURER	Theatre & Dance	A.	Edith Cowan Univ, Australia	2003
			Diploma	Western Australia Academy of Performing Arts, Australia	2003
			Diploma	Edith Cowan Univ, Australia	

<b>Calculator, Stephen N*</b>	PROFESSOR	Communications Disorders	B.A.	State University of New York at Oswego	1974
			Ph.D.	University of Wisconsin	1980
			M.S.	State University of New York at Geneseo	1975
<b>Calder, Brian R*</b>	RESEARCH ASSOCIATE PROFESSOR	Center for Coastal & Ocean Mapping	M.S.	Heriot-Watt University, Edinbu	1994
			Ph.D.	Heriot-Watt University, Edinbu	1997
<b>Came, Rosemarie E*</b>	ASSISTANT PROFESSOR	Earth Sciences	B.S.	Boston College	1994
			M.A.	Boston College	1998
			M.A.	Massachusetts Institute of Technology	2002
			Ph.D.	Massachusetts Institute of Technology	2005
<b>Campagna, Rachel L*</b>	ASSISTANT PROFESSOR	Management	B.A.	Allegheny College	2000
			M.	Ohio State University	2005
			Ph.D.	Washington University - St Louis	2011
<b>Campbell, Molly C</b>	LECTURER	English	B.A.	University of New Hampshire	2006
			M.A.T.	University of New Hampshire	2007
<b>Capozzoli, Michelle Hopkins</b>	LECTURER	Mathematics & Statistics	B.S.	Bridgewater State University	1992
			M.S.	University of New Hampshire	1995
			Ph.D.	University of New Hampshire	1999
<b>Cappiello, Joyce D*</b>	ASSISTANT PROFESSOR	Nursing	B.S.	Marycrest College	1971
			M.S.	Boston College	1977
			Ph.D.	Swansea University	2010
<b>Caputo, Christine A*</b>	ASSISTANT PROFESSOR	Chemistry	B.S.	Carleton University	2001
			M.S.	Mcgill University Canada	2004
			Ph.D.	University of Western Ontario, Canada	2009
		Thompson		University of New	

<b>Caramihalis, Charles A</b>	PROFESSOR	School of Applied Science	B.S.	Hampshire	1981
			M.O.E.	University of New Hampshire	1987
<b>Cardinali, Michael C</b>	LECTURER	Art and Art History	B.F.A.	State University of New York at Purchase	2001
			M.F.A.	Mass College of Art	2006
<b>Carey, Gale B*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of Massachusetts - Amherst	1974
			M.S.	University of Wisconsin	1976
			Ph.D.	University of California - Davis	1981
<b>Cariens, Benjamin S*</b>	ASSOCIATE PROFESSOR	Art and Art History	B.A.	College of William and Mary	1991
			M.F.A.	Boston University	1993
			MTS	Harvard University	1999
<b>Caron, Rosemary M*</b>	PROFESSOR	Health Management & Policy	B.A.	Regis College	1990
			Ph.D.	Dartmouth College	1996
			M.P.H.	Boston University	1998
<b>Carr, Russell T*</b>	PROFESSOR	Chemical Engineering	B.S.	Brigham Young University	1980
			M.S.	University of Rochester	1983
			Ph.D.	University of Rochester	1984
<b>Carroll, John E*</b>	PROFESSOR	Natural Resources & The Environment	A.B.	La Tech Univ	1966
			M.A.	Western Michigan University	1968
			Ph.D.	Michigan State University	1974
<b>Carter, Elizabeth A*</b>	ASSISTANT PROFESSOR	Political Science	B.A.	Whitman College	1997
			M.A.	University of Washington	2003
			M.P.A.	University of Washington	2004
			M.A.	University of California - Berkeley	2005

			Ph.D.	University of California - Berkeley	2012
<b>Carter, Michael J*</b>	ASSOCIATE PROFESSOR	Electrical & Computer Eng Dept	B.S.E.	University of Michigan	1975
			M.S.	Stanford University	1976
			Ph.D.	University of Michigan	1984
<b>Carter, Vernon B*</b>	ASSOCIATE PROFESSOR	Social Work	A.A.	Orange County Community College	1968
			B.A.	State University of New York	1970
			M.S.W.	University of New Hampshire	1998
			Ph.D.	Boston College	2003
<b>Cashman, Holly R*</b>	ASSOCIATE PROFESSOR	Languages, Literatures, & Cultures	B.A.	Hood College	1994
			M.A.	University of Michigan	1997
			Ph.D.	University of Michigan	2001
<b>Cassily, Shaleen A</b>	CLINICAL INSTRUCTOR	Education	B.A.	University of Pennsylvania	1993
			M.S.Ed.	University of Pennsylvania	1994
<b>Cavicchi, Jon R</b>	SENIOR LECTURER	UNHL Library	B.A.	Stonehill College	1981
			J.D.	Franklin Pierce Law Center	1984
			Ph.D.	IIS University, India	2011
			LL.M.	Franklin Pierce Law Center	1999
<b>Celikkol, Barbaros *</b>	PROFESSOR	Mechanical Engineering	B.S.	Elon University	1964
			M.S.	Stevens Institute of Technology	1967
			Ph.D.	University of New Hampshire	1972
<b>Cerullo, John J</b>	PROFESSOR	Humanities	B.A.	University of Pennsylvania	1971
			M.A.	University of Pennsylvania	1976
			Ph.D.	University of Pennsylvania	1980

<b>Chagnon, Matthew C</b>	PROFESSOR	Thompson School of Applied Science	A.A.S.	University of New Hampshire	1979
			B.S.	University of New Hampshire	1986
			M.S.	University of New Hampshire	1988
<b>Chamberlin, Kent A*</b>	PROFESSOR	Electrical & Computer Eng Dept	B.S.	Ohio University	1974
			M.S.	Ohio University	1976
			Ph.D.	Ohio University	1982
<b>Chandler, Donald S*</b>	PROFESSOR	Biological Sciences	A.A.	Shasta College	1969
			B.S.	University of California - Davis	1971
			M.S.	University of Arizona	1973
			Ph.D.	Ohio State University	1976
<b>Chandran, Benjamin D G*</b>	PROFESSOR	Physics - Joint Positions	B.A.	Yale University	1990
			M.A.	Princeton University	1994
			Ph.D.	Princeton University	1997
<b>Chapman, Erik W*</b>	ASSISTANT STATE SPECIALIST/PROFESSOR	Natural Resources	B.A.	Wesleyan University	1990
			M.S.	University of Wisconsin - Madison	1999
			Ph.D.	Old Dominion University	2009
<b>Chapman-Bosco, Laurie</b>	PROFESSOR	Thompson School of Applied Science	B.S.	University of New Hampshire	1986
			M.O.E.	University of New Hampshire	1995
<b>Charntikov, Sergios *</b>	ASSISTANT PROFESSOR	Psychology	M.A.	California State University, S	2002
			M.A.	California State University, S	2009
			Ph.D.	University of Nebraska	2015
<b>Charpentier, Michel H*</b>	ASSOCIATE PROFESSOR	Computer Science	B.S.	National Polytechnic Institute of Toulouse, France	1993
			M.S.	National Polytechnic Institute of Toulouse,	1993



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<b>Chaston, John M*</b>	ASSOCIATE PROFESSOR	Languages, Literatures, & Cultures	B.A.	Brigham Young University	1980
			M.A.	Brigham Young University	1982
			Ph.D.	University of Texas	1987
<b>Chavajay, Juan Pablo*</b>	ASSOCIATE PROFESSOR	Psychology	M.A.	University de San Carlos, Guatemala	1989
			M.A.	University of California - Santa Cruz	1995
			Ph.D.	University of California - Santa Cruz	1999
<b>Chavez, Daniel *</b>	ASSISTANT PROFESSOR	Languages, Literatures, & Cultures	B.S.	Instituto Tech Monterrey	1991
			M.A.	Ohio University	1994
			M.A.	Ohio University	1999
			Ph.D.	University of Michigan	2002
<b>Chen, Jianhong *</b>	ASSISTANT PROFESSOR	Management	B.A.	Shandong University, China	2006
			M.A.	Shandong University, China	2009
			Ph.D.	Drexel University	2014
<b>Chen, Meng</b>	CLINICAL ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Nanjing University, China	2003
			Ph.D.	University of Texas Health Sci	2009
<b>Chen, Szu-Feng</b>	ASSISTANT PROFESSOR	Theatre & Dance	B.F.A.	National Taipei University of Technology, Taiwan	2000
			M.F.A.	University of Texas	2008
<b>Chen, Xuanmao</b>	ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Nanchang University, China	1997
			M.S.	Fudan University, China	2000
				University of	

			Ph.D.	Tuebingen, Germany	2006
<b>Chini, Gregory P*</b>	ASSOCIATE PROFESSOR	Mechanical Engineering	B.S.	University of Virginia	1993
			M.S.	Cornell University	1996
			Ph.D.	Cornell University	1999
<b>Chiu, Monica Elizabeth*</b>	PROFESSOR	English	B.A.	St. Catherine University	1987
			M.A.	State University of New York at Binghamton	1992
			Ph.D.	Emory University	1996
<b>Cho, Eun Kyeong *</b>	ASSOCIATE PROFESSOR	Education	B.A.	Ewha Womans University, Korea	1991
			M.A.	Ewha Womans University, Korea	1993
			Ed.M.	Columbia University in the City of New York	2001
			Ed.D.	Columbia University in the City of New York	2005
<b>Christie, Andrew D*</b>	ASSOCIATE PROFESSOR	Philosophy	A.B.	Princeton University	1974
			M.S.L.	Yale University	1979
			Ph.D.	Massachusetts Institute of Technology	1983
<b>Chu, Brian Wei-Kuo*</b>	PROFESSOR	Art and Art History	B.F.A.	Queens College of the City University of New York	1991
			M.F.A.	Queens College of the City University of New York	1993
<b>Chu, Feixia *</b>	ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Wuhan University, China	1995
			M.S.	University of South Florida	1998
			Ph.D.	University of California - San Francisco	2004
<b>Churchard, Timothy J</b>	PRINCIPAL LECTURER	Education	B.A.	University of New Hampshire	1967
			M.Ed.	Salem State College	1973
<b>Ciccone, Stephen J*</b>	ASSOCIATE PROFESSOR	Accounting and	B.S.	University of Florida	1994

		Finance	M.A.	University of Florida	1994
			Ph.D.	Florida State University	2000
<b>Clairmont, Richard E</b>	PRINCIPAL LECTURER	Classics, Humanities & Ital Studies	B.A.	University of New Hampshire	1971
			M.A.	University of Virginia	1973
			Ph.D.	Univ of Chicago-Loyola	1983
<b>Clark, Kimberly E</b>	LECTURER	Economics	A.A.	Mcintosh College	1986
			B.A.	Salem State College	1993
			M.Ed.	University of New Hampshire	2000
<b>Clark, Maryann</b>	LECTURER	Decisions Sciences	B.S.	Bryant University	1988
<b>Clark, Rebecca R</b>	LECTURER	Political Science	B.A.	Bowdoin College	2001
			Ph.D.	Boston College	2012
<b>Clarke, Stephanie L</b>	CLINICAL ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of New Hampshire	2007
			M.	Saint Josephs Coll	2015
<b>Clyde, William C*</b>	PROFESSOR	Earth Sciences	B.A.	Princeton University	1990
			M.S.	University of Michigan	1993
			Ph.D.	University of Michigan	1997
<b>Coffin, Jaed M</b>	ASSISTANT PROFESSOR	English	B.A.	Middlebury College	2002
			M.F.A.	University of Southern Maine	2009
<b>Cohn, Ellen S*</b>	PROFESSOR	Psychology	B.A.	Clark University	1974
			M.A.	Temple University	1976
			Ph.D.	Temple University	1978
<b>Colliander, John D</b>	LECTURER	Accounting and Finance	B.A.	University of New Hampshire	1967
			M.A.	Lehigh University	1968
			J.D.	Boston University	1971
			LL.M.	Boston University	1975
<b>Collins, John J*</b>	ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	Colgate University	1976

			Ph.D.	University of Wisconsin	1984
<b>Collins, Karen E*</b>	ASSOCIATE PROFESSOR	Kinesiology	B.A.	Princeton University	1994
			M.S.	University of New Hampshire	1998
			Ph.D.	University of North Carolina	2002
<b>Collins, Michael Robin*</b>	PROFESSOR	Civil and Environmental Engineering	B.S.	Virginia Polytechnic Institute and State University	1970
			M.S.	Virginia Polytechnic Institute and State University	1972
			Ph.D.	University of Arizona	1985
<b>Conaway, Carol B</b>	ASSOCIATE PROFESSOR	Women's Studies Program	A.B.	Bryn Mawr College	1970
			S.M.	Massachusetts Institute of Technology	1981
			Ph.D.	Massachusetts Institute of Technology	1994
<b>Condon, Patricia B</b>	CONTRACT LIBRARIAN	Scholarly Communication	M.A.	Univ of Southern Miss	2005
			M.L.I.S.	Univ of Southern Miss	2005
			Ph.D.	Simmons College	2015
<b>Congalton, Russell G*</b>	PROFESSOR	Natural Resources & The Environment	B.S.	Rutgers University	1979
			M.S.	Virginia Polytechnic Institute and State University	1981
			Ph.D.	Virginia Polytechnic Institute and State University	1984
<b>Connell, James J*</b>	ASSOCIATE PROFESSOR	Physics - Joint Positions	B.A.	Washington University - St Louis	1981
			M.A.	Washington University - St Louis	1983
			Ph.D.	Washington University - St Louis	1988
<b>Connelly, Vincent J*</b>	ASSOCIATE PROFESSOR	Education	B.A.	Loyola University - Maryland	1988
			M.S.Ed.	Johns Hopkins	1993

				Ed.D.	University Johns Hopkins University	2004
<b>Conroy, Andrew B</b>	PROFESSOR	Thompson School of Applied Science		B.S.	University of New Hampshire	1986
				M.S.	Northwest Missouri State University	1987
				Ph.D.	University of New Hampshire	2001
<b>Conway, Karen Smith*</b>	PROFESSOR	Economics		B.A.	Eastern Illinois University	1982
				Ph.D.	University of North Carolina at Chapel Hill	1987
<b>Cook, Jenni Carbaugh*</b>	ASSOCIATE PROFESSOR	Music		B.M.	Bradley University	1995
				M.M.	University of Illinois at Urbana- Champaign	1997
				D.M.A.	University of Illinois at Urbana- Champaign	2001
<b>Cook, Raymond A*</b>	ASSOCIATE PROFESSOR	Civil and Environmental Engineering		A.B.	University of Illinois at Urbana- Champaign	1981
				B.S.	University of Illinois at Urbana- Champaign	1981
				M.S.	Cornell University	1991
				Ph.D.	Cornell University	1992
<b>Cook, Summer B*</b>	ASSOCIATE PROFESSOR	Kinesiology		B.S.	Syracuse University	1999
				M.S.	Syracuse University	2002
				Ph.D.	Syracuse University	2009
<b>Coppens, Andrew D*</b>	ASSISTANT PROFESSOR	Education		B.S.	University of New Hampshire	2004
				M.S.	University of California	2010
				Ph.D.	University of California	2015
<b>Corcoran, Erin B</b>	ASSOCIATE PROFESSOR	UNHL JD Instruction		J.D.	Georgetown University	2000
				B.A.	Montana State University	2007
		Molecular,				

<b>Cote, Richard H*</b>	PROFESSOR	Cellular, & Biomedical	B.S.	Tufts University	1974
			Ph.D.	University of Wisconsin	1980
<b>Couse, Leslie J*</b>	ASSOCIATE PROFESSOR	Education	B.S.Ed.	State University of New York at Cortland	1980
			M.S.Ed.	State University of New York at Brockport	1980
			M.Ed.	State University of New York at Brockport	1985
			M.S.	Russell Sage College	1993
<b>Couser, Jonathan B</b>	LECTURER	History	Ph.D.	Syracuse University	2001
			B.A.	Yale University	1992
			M.Div.	Yale University	1999
			M.A.	University of Notre Dame	2004
<b>Cox, Patricia H</b>	CLINICAL ASSISTANT PROFESSOR	Social Work	Ph.D.	University of Notre Dame	2006
			B.S.	Trinity College - Conn	1995
			M.S.Ed.	Bank St College of Ed	2000
<b>Craig, Patricia J*</b>	ASSOCIATE PROFESSOR	Recreation Management & Policy	M.S.W.	University of New Hampshire	2008
			B.S.	University of Scranton	1987
			M.Ed.	Temple University	1997
<b>Croce, Ronald V*</b>	PROFESSOR	Kinesiology	Ph.D.	University of New Hampshire	2010
			B.S.	Brooklyn College of the City University of New York	1973
			M.Ed.	Temple University	1975
<b>Crosby, Peter R</b>	LECTURER	Research, Learning, & Outreach Svcs	Ph.D.	University of New Mexico	1983
			B.A.	Keene State College (Nh)	1971
			AMLS	University of Michigan	1974
			A.A.S.	University of New	1977

				Hampshire	
<b>Cross, Charlotte W</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Youth and Family	B.S.	University of Maine	1970
			M.S.	Oregon State University	1978
<b>Crowley, Karen A</b>	LECTURER	Nursing	B.A.	Duke University	1986
			M.S.	MGH Institute of Health Profes	1995
			Post-Master	University of New Hampshire	1996
<b>Cullen, Kelly L*</b>	ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.A.	Ithaca College	1992
			M.S.	West Virginia University	1996
			Ph.D.	Colorado State University	1999
<b>Curran-Celentano, Joanne *</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Rutgers University	1976
			M.S.	Rutgers University	1978
			Ph.D.	University of Illinois at Urbana- Champaign	1982
<b>Curren, Leslie J</b>	LECTURER	Biological Sciences	B.A.	Amherst College	2005
			Ph.D.	Michigan State University	2012
<b>Curry, Susan A</b>	LECTURER	Classics, Humanities & Ital Studies	B.A.	Grinnell College	1998
			M.A.	University of Kansas	2001
			M.A.	Indiana University	2007
			Ph.D.	Indiana University	2009
<b>Da Silva Belezza Correia Pinto, Fernando Bruno</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	University of Coimbra, Portugal	2005
			M.A.	University of Porto, Portugal	2009
			Ph.D.	University of Massachusetts - Dartmouth	2015
<b>Daniel, Jo Sias*</b>	PROFESSOR	Civil and Environmental Engineering	B.S.	University of New Hampshire	1994

			M.S.	North Carolina State University	1996
			Ph.D.	North Carolina State University	2001
<b>Dave, Eshan V*</b>	ASSISTANT PROFESSOR	Civil and Environmental Engineering	B.E.	Sardar Patel University, India	2001
			M.S.	University of Illinois at Urbana-Champaign	2003
			Ph.D.	University of Illinois at Urbana-Champaign	2009
<b>Davis, Jennifer M</b>	ASSOCIATE PROFESSOR	UNHL Graduate Instruction	B.A.	University of Massachusetts - Amherst	1990
			J.D.	Suffolk University	1996
<b>Davis, John Matthew*</b>	ASSOCIATE PROFESSOR	Earth Sciences	B.S.	Montana State University	1987
			M.S.	New Mexico Institute of Mining and Technology	1990
			Ph.D.	New Mexico Institute of Mining and Technology	1994
<b>Davis, Thomas M*</b>	PROFESSOR	Biological Sciences	B.S.	California Polytechnic State University - San Luis Obispo	1980
			Ph.D.	University of California - Davis	
<b>Deen, Phillip D</b>	SENIOR LECTURER	Humanities	B.A.	Texas A & M University	1994
			M.A.	Southern Illinois University - Carbondale	1996
			Ph.D.	Southern Illinois University - Carbondale	2004
<b>Del Hierro, Marcos J</b>	ASSISTANT PROFESSOR	English	B.A.	Baylor University	2006
			M.A.	El Paso Univ of Texas	2009
			Ph.D.	Texas A & M University	2014
<b>DeMitchell, Todd A*</b>	PROFESSOR	Education	B.A.	University of La Verne	1969



			M.A.T.	University of La Verne	1973
			Ed.D.	University of Southern California	1979
			M.A.	University of California - Davis	1990
<b>Denis, Clyde L*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of Illinois at Urbana-Champaign	1973
			M.S.	University of Washington	1976
			Ph.D.	University of Washington	1982
<b>Deravi, Leila F*</b>	ASSISTANT PROFESSOR	Chemistry	B.S.	University of Alabama	2005
			Ph.D.	Vanderbilt University	2009
<b>DeSoye, Caitlin A</b>	LECTURER	Accounting and Finance	J.D.	Suffolk University	2012
<b>Desrosiers, Denise S</b>	LECTURER	English	B.A.	Mount Holyoke College	2003
			M.A.	University of California - Los Angeles	2009
<b>DeTurk, Mark S*</b>	ASSOCIATE PROFESSOR	Music	B.S.E.	Princeton University	1972
			B.M.	University of Wisconsin	1975
			M.M.	Ohio State University	1982
			Ph.D.	University of Wisconsin	1988
<b>deVries, Willem A</b>	PROFESSOR	Philosophy	B.A.	Haverford College	1972
			M.A.	University of Pittsburgh	1975
			Ph.D.	University of Pittsburgh	1981
<b>Di Filippo, Giuseppina</b>	LECTURER	Classics, Humanities & Ital Studies	Laurea	University of L'Aquila, Italy	1999
			M.A.	Ateno Impresa, Italy	2002
			Ph.D.	University of Wisconsin - Madison	2012
<b>Dibb, Jack E*</b>	RESEARCH ASSOCIATE PROFESSOR	Earth Systems Research Center	B.S.	University of Puget Sound	1981
			Ph.D.	State University of New York at	1983

					Binghamton	
				M.A.	State University of New York at Binghamton	1988
<b>Diefendorf, Jeffrey M*</b>	PROFESSOR	History		A.B.	Stanford University	1967
				M.A.	University of California - Berkeley	1968
				Ph.D.	University of California - Berkeley	1975
<b>Dijkstra, Semme J</b>	LECTURER	Center for Coastal & Ocean Mapping		B.S.	Algemene Hogeschool Amsterdam	1990
				Ph.D.	University of New Brunswick	2000
<b>Dillon, Ann E</b>	CLINICAL ASSISTANT PROFESSOR	Institute on Disability		B.S.	University of New Hampshire	1975
				M.Ed.	University of New Hampshire	1998
<b>Dillon, Michele M*</b>	PROFESSOR	Sociology		M.Soc.Sci.	University College Dublin, Ireland	1983
				M.A.	University of California - Berkeley	1987
				Ph.D.	University of California - Berkeley	1989
				B.Soc.Sci.	University College Dublin, Ireland	1980
<b>Dinapoli, Pamela P*</b>	ASSOCIATE PROFESSOR	Nursing		B.S.N.	Thomas Jefferson University of	1981
				M.S.N.	University of Pennsylvania	1984
				Ph.D.	University of Massachusetts - Lowell	2000
<b>Dobbins, Lori E*</b>	PROFESSOR	Music		B.A.	San Jose State University	1980
				M.F.A.	California Institute of the Arts	1982
				Ph.D.	University of California - Berkeley	1990
<b>Donahue, Ann Elizabeth*</b>	ASSOCIATE PROFESSOR	Humanities		B.A.	University of New Hampshire	1994
				M.L.S.	Southern Connecticut State University	1995
				ALM	Harvard University	2005

<b>Dorsey, Kurk *</b>	PROFESSOR	History	B.A.	Cornell University	1987
			M.A.	Northwestern University	1989
			Ph.D.	Yale University	1994
<b>Dorsey, Marion Girard*</b>	ASSOCIATE PROFESSOR	History	B.A.	Stanford University	1993
			J.D.	Harvard University	1997
			M.Phil.	Yale University	2001
			Ph.D.	Yale University	2002
<b>Dowd, Eleanne Solorzano*</b>	ASSOCIATE PROFESSOR	Decisions Sciences	B.S.	University of Florida	1993
			M.S.	University of Florida	1995
			Ph.D.	University of South Carolina	1999
<b>Dowd, Matthew J</b>	LECTURER	Philosophy	B.A.	University of New Hampshire	1996
			M.A.	University of New Hampshire	1998
<b>Draper, Nora R A</b>	ASSISTANT PROFESSOR	Communication	B.P.A.	Carleton University	2007
			M.A.	Carleton University	2009
			M.A.	University of Pennsylvania	2011
			Ph.D.	University of Pennsylvania	2014
<b>Drugan, Robert C*</b>	PROFESSOR	Psychology	B.A.	Susquehanna University	1979
			M.A.	University of Colorado at Boulder	1981
			Ph.D.	University of Colorado at Boulder	1984
<b>Drum, Charles E</b>	DIRECTOR	Institute on Disability	B.S.	University of Oregon	1983
			M.S.	University of Oregon	1985
			J.D.	University of Oregon	1988
			Ph.D.	Brandeis University	1995
<b>Drum, Monica R</b>	RESEARCH ASSOCIATE PROFESSOR	Institute on Disability	B.A.	United States International University	1989
			M.S.	Virginia Polytechnic Institute and State University	1997
			Ph.D.	Tulane University	2001
		Art and Art			

<b>Drumheller, Grant H*</b>	PROFESSOR	History	B.F.A.	Boston University	1976
			M.F.A.	Boston University	1978
<b>Druskat, Vanessa G U*</b>	ASSOCIATE PROFESSOR	Management	B.A.	Indiana University - Bloomington	1982
			M.A.	Columbia University in the City of New York	1988
			Ph.D.	Boston University	1996
<b>Drysdale, Alasdair Duncan</b>	ASSOCIATE DEAN	Dean's Office - Liberal Arts	B.A.	University of Durham, United Kingdom	1971
			M.A.	University of Durham, United Kingdom	1972
			Ph.D.	University of Michigan	1977
<b>Du, Shuili *</b>	ASSISTANT PROFESSOR	Marketing	B.A.	Tsinghua Univ Beijing,China	1996
			M.A.	Fudan University, China	2002
			D.B.A	Boston University	2007
<b>Dubnick, Melvin J*</b>	PROFESSOR	Political Science	B.S.	Colorado State University	1968
			M.A.	University of Colorado at Boulder	1969
			Ph.D.	University of Colorado at Boulder	1974
<b>Ducey, Mark J*</b>	PROFESSOR	Natural Resources & The Environment	B.A.	Yale University	1990
			M.F.	Yale University	1992
			Ph.D.	Yale University	1996
<b>Dudley, Kari L</b>	LECTURER	Psychology	B.A.	University of New Hampshire	2000
			M.S.W.	Boston College	2002
			M.A.	University of New Hampshire	2010
			M.S.T.	University of New Hampshire	2013
			Ph.D.	University of New Hampshire	2013
<b>Dunn, Joseph C</b>	LECTURER	English	B.A.	University of New Hampshire	2003

			M.A.	University of New Hampshire	2007
<b>Dunn, Meaghan C</b>	LECTURER	English	B.A.	University of California - Santa Cruz	2000
			M.S.	University of Amsterdam, the Netherlands	2006
<b>Durkis-Stokes, Jessica M</b>	ASSOCIATE PROFESSOR	UNHL Graduate Instruction	B.A.	University of New Hampshire	2000
			J.D.	Vermont Law School, So Royalto	2004
<b>Dusek, R Valentine</b>	PROFESSOR	Philosophy	B.A.	Yale University	1963
			Ph.D.	University of Texas at Austin	1972
<b>Dutta, Devkamal *</b>	ASSOCIATE PROFESSOR	Management	B.Eng.	Birla Inst of Tech	1986
			Certificate	University of Western Ontario, Canada	1986
			M.A.F.	Indian Institute of Finance	1991
			Ph.D.	University of Western Ontario, Canada	2007
<b>Dwyer, Joseph Richard*</b>	PROFESSOR	Physics - Joint Positions	B.S.	University of California	1986
			Ph.D.	University of Chicago	1994
			M.S.	University of Chicago	1998
<b>Earle, Andrew G*</b>	ASSISTANT PROFESSOR	Management	B.A.	Western Washington University	2002
			M.A.	Washington State University	2006
			M.B.A.	University of Oregon	2008
<b>Earle, Sarah E</b>	LECTURER	English	B.A.	Concordia University, Montreal,	2005
<b>Eastwood, Megan M</b>	ASSISTANT PROFESSOR	Library Administration			
<b>Eaton, Alan T*</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Food and Agriculture	B.S.	University of Massachusetts - Amherst	1972
			M.S.	Virginia Polytechnic Institute and State University	1975
			Ph.D.	North Carolina State University	1978
<b>Echt, Olof E*</b>	PROFESSOR	Physics	Diploma	Free University of	1975

			Ph.D.	Berlin, Germany	
			University of Konstanz, Germany	1979	
<b>Eckstein, Robert P</b>	SENIOR LECTURER	Justice Studies Program	B.A.	City University of New York	1998
			M.S.	Loyola University - Maryland	2000
<b>Edwards, Katie M*</b>	ASSISTANT PROFESSOR	Psychology	B.S.	Athens State University	2005
			M.S.	Ohio University	2007
			Ph.D.	Ohio University	2011
<b>Elmslie, Bruce T*</b>	PROFESSOR	Economics	B.S.	Westminster College - Utah	1983
			Ph.D.	University of Utah	1988
<b>Emison, Patricia A*</b>	PROFESSOR	Art and Art History	B.A.	Bryn Mawr College	1978
			M.A.	Columbia University in the City of New York	1980
			M.Phil.	Columbia University in the City of New York	1982
			Ph.D.	Columbia University in the City of New York	1985
<b>Endrizzi, Susan I</b>	LECTURER	Theatre & Dance	B.F.A.	Butler University	1994
<b>England, Richard W*</b>	PROFESSOR	Economics	B.A.	Oakland University	1965
			M.A.	University of Michigan	1967
			Ph.D.	University of Michigan	1974
<b>Erickson, Peter S*</b>	PROFESSOR	Biological Sciences	B.S.	University of Massachusetts - Amherst	1982
			M.S.	University of Maine	1984
			Ph.D.	University of Illinois	1989
<b>Eshbach, Robert W*</b>	ASSOCIATE PROFESSOR	Music	B.A.	Yale University	1973
			M.M.	The New England Conservatory of Music	1976
<b>Etebari, Ahmad *</b>	PROFESSOR	Accounting and Finance	B.B.A.	Teheran Business College, Iran	1973
			M.B.A.	Texas A & M University	1975

			Ph.D.	University of North Texas	1979
<b>Evans, Elizabeth J*</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	B.S.	University of New Hampshire	2002
			M.S.	University of New Hampshire	2004
<b>Evans, Risa</b>	ASSOCIATE PROFESSOR	UNHL JD Instruction	B.A.	Barnard College	1986
			J.D.	Yale University	1993
<b>Exline, Eleta C</b>	ASSOCIATE PROFESSOR	Library Administration	B.A.	Smith College	1995
			C.A.S.	Syracuse University	2005
			M.S.	Syracuse University	2005
			M.A.	University of New Hampshire	2014
<b>Fagerberg, Wayne R*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of Wyoming	1967
			M.A.	University of South Florida	1972
			Ph.D.	University of South Florida	1975
<b>Fairchild, Elizabeth A*</b>	RESEARCH ASSISTANT PROFESSOR	Biological Sciences	B.A.	University of New Hampshire	1991
			M.S.	University of New Hampshire	1998
			Ph.D.	University of New Hampshire	2002
<b>Farrell, James M</b>	PROFESSOR	Communication	B.A.	Bridgewater State University	1979
			M.A.	University of Maine	1982
			Ph.D.	University of Wisconsin - Madison	1988
<b>Farrugia, Charles J*</b>	RESEARCH PROFESSOR	Space Science Center	B.S.	University of Malta	1966
			Diploma	University of London, United Kingdom	1978
			M.S.	University of Bern, Switzerland	1978
			Diploma	University of Munich, Germany	1982
			Ph.D.	University of Bern, Switzerland	1984

<b>Feintuch, Burt *</b>	PROFESSOR	Center for the Humanities	B.A.	Pennsylvania State University	1971
			M.A.	University of Pennsylvania	1972
			Ph.D.	University of Pennsylvania	1975
<b>Feldman, David V*</b>	ASSOCIATE PROFESSOR	Mathematics & Statistics	B.A.	Yale University	1977
			Ph.D.	Wesleyan University	1987
<b>Fensom, Gail A</b>	ASSOCIATE PROFESSOR	Humanities	B.A.	University of Rhode Island	1970
			M.A.	Oklahoma State University	1973
			Ph.D.	University of New Hampshire	2007
<b>Ferber, Michael K*</b>	PROFESSOR	English	B.A.	Swarthmore College	1966
			M.A.	Harvard University	1969
			Ph.D.	Harvard University	1975
<b>Ferrara, Michael *</b>	DEAN	Dean's Office - Health & Human Svcs	B.S.	Ithaca College	1980
			M.A.	Michigan State University	1983
			Ph.D.	Pennsylvania State University	1990
<b>Fertik, Harriet H</b>	ASSISTANT PROFESSOR	Classics, Humanities & Ital Studies	B.A.	University of Chicago	2008
			Ph.D.	University of Michigan	2014
<b>Fetzer, Susan Jane*</b>	PROFESSOR	Nursing	B.A.	University of Connecticut	1973
			B.S.N.	University of Connecticut	1975
			M.S.N.	University of Alabama	1979
			M.B.A.	Southern New Hampshire University	1990
			Ph.D.	Adelphi University	1998
<b>Finkelhor, David *</b>	PROFESSOR	Sociology	B.A.	Harvard University	1968
			M.Ed.	Harvard University	1971
			Ph.D.	University of New Hampshire	1978



<b>Fischer, Shawna M*</b>	ASSISTANT PROFESSOR	Physics	B.S.	Occidental College	2005
			M.S.	Brown University	2008
<b>Fisher, Carol J</b>	PRINCIPAL LECTURER	Theatre & Dance	B.A.	University of South Florida	1979
			M.A.	Arizona State University	1981
<b>Fitch, Nathan F</b>	LECTURER	Kinesiology	B.A.	Union College - New York	1993
			B.S.	University of New Hampshire	1998
			M.S.	University of New Hampshire	2007
<b>Fitzpatrick, Ellen F*</b>	PROFESSOR	History	B.A.	Hampshire College	1974
			Ph.D.	Brandeis University	1981
<b>Fjelstad, Per E</b>	LECTURER	Communication	B.A.	The Evergreen State College, O	1984
			M.A.	University of Washington	1989
			Ph.D.	Pennsylvania State University	1995
<b>Fleese, Kelly S</b>	LECTURER	Communications Disorders	B.A.	Springfield College	1995
			M.S.	Assumption College	2005
<b>Fleese, Kevin J</b>	SENIOR LECTURER	Communications Disorders	B.S.	Gallaudet University	1980
			B.A.	Gallaudet University	1985
			M.Ed.	Boston University	1997
<b>Flesher, Kenneth L</b>	PROFESSOR	Thompson School of Applied Science	B.S.	University of Pittsburgh	1981
			M.S.	University of New Hampshire	1994
<b>Flippo, Tara R</b>	CLINICAL ASSISTANT PROFESSOR	Kinesiology	B.A.	Hampshire College	1994
			M.A.	Vermont College of Fine Arts	2000
<b>Ford, Roger A</b>	ASSISTANT PROFESSOR	UNHL JD Instruction	S.B.	Massachusetts Institute of Technology	2002
			J.D.	University of Chicago	2005
<b>Foreman, Maria C</b>	RESEARCH ASSISTANT PROFESSOR	Earth Systems Research Center	B.S.	University of Philippines	2005
				University of Illinois	

			Ph.D.	at Urbana-Champaign	2014
			M.S.	Michigan State University	2009
<b>Foster, Diane L*</b>	PROFESSOR	Mechanical Engineering	B.S.	University of Massachusetts - Amherst	1989
			M.S.	University of Maine	1991
			Ph.D.	Oregon State University	1996
<b>Foster, Jeffrey T*</b>	ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	Northwestern University	1995
			Ph.D.	University of Illinois	2005
<b>Fowler, Benjamin P</b>	ASSOCIATE PROFESSOR	Thompson School of Applied Science	B.A.	Campus Free College, Boston	1976
			M.B.A.	University of New Hampshire	1978
			C.A.G.S.	University of New Hampshire	1993
<b>Fox, Nicole S*</b>	ASSISTANT PROFESSOR	Sociology	Ph.D.	Brandeis University	2004
			B.A.	University of California	2005
			M.A.	State University of New York at Buffalo	2008
<b>Fox, Richard D</b>	LECTURER	Art and Art History	B.F.A.	University of Massachusetts - Amherst	1990
			M.F.A.	Mass College of Art	1994
<b>Fox, Susan W</b>	CLINICAL ASSISTANT PROFESSOR	Institute on Disability	B.S.	University of Massachusetts - Amherst	1977
			M.A.	University of New Hampshire	1981
			M.S.	Lesley College	1981
<b>Foxall, Thomas L*</b>	PROFESSOR	Biological Sciences	B.S.	Lebanon Valley College	1968
			M.S.	University of Bridgeport	1977
			Ph.D.	University of New Hampshire	1980
<b>Franczak, Jennifer L*</b>	ASSISTANT PROFESSOR	Management	B.S.	Bradley University	2006
			M.B.A.	Bradley University	2009

			Ph.D.	Southern Illinois University - Carbondale	2013
<b>Frank, Johannes T</b>	PRINCIPAL LECTURER	Languages, Literatures, & Cultures	Staatsexamen	Free University of Berlin, Germany	1974
			M.A.	University of Wisconsin - Madison	1985
<b>Frankel, Barbara R*</b>	ASSOCIATE PROFESSOR	Human Development & Family Studies	B.A.	University of Wisconsin	1970
			M.S.	University of Louisville	1976
<b>Freedman, Diane P*</b>	PROFESSOR	English	Ph.D.	Purdue University	1988
			A.B.	Cornell University	1977
			M.A.T.	Cornell University	1978
			M.A.	Boston University	1982
			Ph.D.	University of Washington	1989
<b>French, Charles A*</b>	TEAM LEADER	Community and Economic Development	B.A.	Dartmouth College	1994
			M.A.	Western Illinois University	1999
			Ph.D.	University of New Hampshire	2008
<b>Frerking, Christopher J</b>	LAW PROFESSOR	UNHL JD Instruction	B.S.	University of California - Riverside	1988
			M.S.	University of California - Davis	1990
			J.D.	Santa Clara University	1999
			LL.M.	University of Cambridge, Engla	2006
<b>Frey, Serita D*</b>	PROFESSOR	Natural Resources & The Environment	B.A.	University of Virginia	1988
			M.S.	University of Virginia	1992
			Ph.D.	Colorado State University	1999
<b>Friedman, Mary Adamo</b>	SENIOR LECTURER	Natural Resources & The Environment	B.S.	Western Illinois University	1981
			M.S.	University of Illinois	1990

			Ph.D.	University of New Hampshire	2010
<b>Frierson, Cathy A*</b>	PROFESSOR	History	B.A.	University of North Carolina at Chapel Hill	1975
			A.M.	Harvard University	1978
			Ph.D.	Harvard University	1985
<b>Frolking, Stephen E*</b>	RESEARCH PROFESSOR	Earth Systems Research Center	B.S.	University of New Hampshire	1980
			Ph.D.	University of New Hampshire	1983
			M.S.	University of New Hampshire	1993
<b>Frye, Jennifer M</b>	CLINICAL ASSISTANT PROFESSOR	Recreation Management & Policy	B.S.	University of Southern Maine	2001
			Certificate	University of Southern Maine	2003
			M.S.	University of Southern Maine	2005
<b>Fu, Tat S*</b>	ASSISTANT PROFESSOR	Civil and Environmental Engineering	B.S.	University of Southern California	2003
			M.S.	University of Southern California	2004
			M.S.	University of Southern California	2006
			M.B.S.	University of Southern California	2007
			Ph.D.	University of Southern California	2009
<b>Fuld, Kenneth *</b>	DEAN	Dean's Office - Liberal Arts	B.A.	Northeastern University	1971
			Ph.D.	Dartmouth College	1976
<b>Fussell, Barry K*</b>	PROFESSOR	Mechanical Engineering	B.S.	Ohio State University	1975
			M.S.	Ohio State University	1980
			Ph.D.	Ohio State University	1987
<b>Galvin, Antoinette B*</b>	RESEARCH PROFESSOR	Space Science Center	B.S.	Purdue University	1974
			Ph.D.	University of Maryland	1976
			M.S.	University of Maryland	1982

<b>Gamtso, Carolyn B</b>	ASSOCIATE PROFESSOR	UNHM Degree Programs	B.A.	Coll of The Holy Cross	1989
			M.A.	Indiana University	1991
<b>Gangi, Mariagabriella</b>	LECTURER	Classics, Humanities & Ital Studies	M.A.	Naples Eastern University, Italy	1996
<b>Garcia-Rasilla, Carmen *</b>	ASSOCIATE PROFESSOR	Languages, Literatures, & Cultures	Licence	Universidad de Valladolid, Spain	1985
			Ph.D.	Universidad de Valladolid, Spain	1990
			M.A.	Johns Hopkins University	1991
			Ph.D.	Johns Hopkins University	1997
<b>Gardner, James V*</b>	RESEARCH PROFESSOR	Center for Coastal & Ocean Mapping	B.S.	San Diego State Univ	1967
			M.A.	Columbia University in the City of New York	1969
			Ph.D.	Columbia University in the City of New York	1973
<b>Gardner, Kevin H*</b>	PROFESSOR	Civil and Environmental Engineering	B.S.	Union College	1989
			M.S.	Clarkson University	1991
			Ph.D.	Clarkson University	1996
<b>Garland, Virginia E*</b>	ASSOCIATE PROFESSOR	Education	B.A.	University of South Carolina	1969
			M.A.T.	Harvard University	1972
			Ph.D.	University of Connecticut	1981
<b>Garofalo, Piero</b>	ASSOCIATE PROFESSOR	Classics, Humanities & Ital Studies	B.A.	University of Wisconsin - Madison	1988
			M.A.	University of California - Berkeley	1991
			Ph.D.	University of California - Berkeley	1996
<b>Garvey, John B</b>	LAW PROFESSOR	UNHL Daniel Webster Scholars Progra	A.B.	Harvard University	1974
			J.D.	Suffolk University	1978

<b>Gass, Michael A*</b>	PROFESSOR	Kinesiology	B.A.	St. Olaf College	1978
			M.A.	Colorado State University	1979
			Ph.D.	University of Colorado at Boulder	1986
<b>Gaudissart, Claire-Helene S</b>	PRINCIPAL LECTURER	Languages, Literatures, & Cultures	D.E.U.G.	University of Paris IV Sorbonne, France	1985
			B.A.	University of Reims, France	1986
			M.A.	University of Reims, France	1988
<b>Ge, Liming *</b>	PROFESSOR	Mathematics & Statistics	B.S.	Beijing University, China	1984
			M.S.	Qufu Normal University, China	1987
			Ph.D.	University of Pennsylvania	1995
<b>Gerard, Jeanne G</b>	LECTURER	UNHM Degree Programs	B.A.	University of Massachusetts - Amherst	1972
			M.S.	Bank St College of Ed	1976
			M.S.	University at Albany	
<b>Germaschewski, Kai K*</b>	ASSOCIATE PROFESSOR	Physics - Joint Positions	Diploma	Heinrich Heine University Düsseldorf, Germany	1998
			Ph.D.	Heinrich Heine University Düsseldorf, Germany	2001
<b>Ghayoomi, Majid *</b>	ASSISTANT PROFESSOR	Civil and Environmental Engineering	B.S.	University of Tehran, Iran	2004
			M.S.	Shariff University of Technology, Iran	2006
			Ph.D.	University of Colorado at Boulder	2011
<b>Gibbons, Kimberly C</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	B.S.N.	Saint Anselm'S College	1993
			M.S.	Univ of Minnesota-Minneapolis	1998
<b>Gibson, Brett M*</b>	ASSOCIATE PROFESSOR	Psychology	B.A.	University of Minnesota	1991
			M.S.	Bucknell University University of	1995

			Ph.D.	Nebraska	1999
<b>Gibson, John F*</b>	ASSISTANT PROFESSOR	Mathematics & Statistics	B.A.	St. John's College	1988
			Ph.D.	Cornell University	2002
<b>Gilbert, Joseph P</b>	LECTURER	English as a Second Language	B.A.	University of New Hampshire	2006
			M.F.A.	University of New Hampshire	2013
<b>Gildersleeve, A Michael</b>	LECTURER	Computer Science	B.A.	Dartmouth College	1989
			M.S.	University of New Hampshire	2002
<b>Gillespie, Maureen</b>	LECTURER	Psychology	B.A.	University of New Hampshire	2006
			M.A.	Northeastern University	2008
			Ph.D.	Northeastern University	2011
<b>Gingras, Rene J</b>	PROFESSOR	Thompson School of Applied Science	B.S.	University of New Hampshire	1975
			M.S.	Virginia Polytechnic Institute and State University	1997
<b>Giordano, Jennifer A</b>	ASSOCIATE PROFESSOR	Library Administration	B.A.	University of New Hampshire	1991
			M.L.S.	Simmons College	1998
			M.B.A.	University of New Hampshire	2005
<b>Girdner, Shelley R</b>	PRINCIPAL LECTURER	English	B.A.	University of Virginia	1997
			M.A.	University of New Hampshire	2000
<b>Gittell, Ross J*</b>	PROFESSOR	Management	A.B.	University of Chicago	1979
			M.B.A.	University of California - Berkeley	1981
			Ph.D.	Harvard University	1989
<b>Glass, Christopher *</b>	RESEARCH PROFESSOR	Ocean Process Analysis Lab	B.S.	Queen's University, Belfast	1979
			Ph.D.	University of Glasgow, United Kingdom	1985
<b>Glauber, Rebecca K*</b>	ASSOCIATE PROFESSOR	Sociology	B.A.	University of Massachusetts -	2000

				Amherst	
			M.A.	New York University	2005
			Ph.D.	New York University	2007
<b>Glutting, Joan H</b>	CLINICAL ASSOCIATE PROFESSOR	Psychology	B.A.	University of New Hampshire	1987
			M.A.	Vanderbilt University	1993
			Ph.D.	Vanderbilt University	1995
<b>Goethals, Jessica L</b>	LECTURER	Classics, Humanities & Ital Studies	B.A.	Northwestern University	2003
			M.A.	New York University	2007
			Ph.D.	New York University	2012
<b>Gold, Janet N*</b>	PROFESSOR	Languages, Literatures, & Cultures	B.A.	Albertus Magnus College	1971
			M.Ed.	Worcester State College	1981
			Ph.D.	University of Massachusetts - Amherst	1990
<b>Goldberg, Michael D*</b>	PROFESSOR	Economics	B.S.	Lehigh University	1980
			Ph.D.	New York University	1991
<b>Golinski, Jan V*</b>	PROFESSOR	History	B.A.	Cambridge University, England	1979
			M.A.	Cambridge University, England	1983
			Ph.D.	University of Leeds, United Kingdom	1984
<b>Goodspeed, Charles H*</b>	ASSOCIATE PROFESSOR	Civil and Environmental Engineering	B.S.C.E.	Worcester Polytechnic Institute	1967
			M.S.C.E.	Worcester Polytechnic Institute	1969
			Ph.D.	University of Cincinnati	1972
<b>Goodwin, Casey S</b>	SENIOR LECTURER	Music	B.M.	University of New Hampshire	2001
			M.A.	University of New Hampshire	2006
<b>Gordon, Kiernan O*</b>	ASSISTANT PROFESSOR	Kinesiology	B.A.	University of California - Santa Cruz	2005
			M.S.	High Point College	2007



			Ph.D.	Ohio State University	2013
<b>Gottel, Debra A</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	M.H.S.	Keene State College (Nh)	1990
			M.S.N.	Western Governor's University	2012
<b>Gottwald, Sheryl R*</b>	CLINICAL ASSISTANT PROFESSOR	Communications Disorders	B.S.	Northeastern University	1976
			M.S.	Pennsylvania State University	1977
<b>Gough, Robert A</b>	LECTURER	Management	Ph.D.	Temple University	1990
			A.B.	Bates College	1968
			M.A.	Duke University	1971
<b>Gould, Eliga H*</b>	PROFESSOR	History	Ph.D.	Duke University	1975
			A.B.	Princeton University	1983
			M.Sc.	University of Edinburgh, United Kingdom	1987
			M.A.	Johns Hopkins University	1988
<b>Graham, Karen J*</b>	PROFESSOR	Mathematics & Statistics	Ph.D.	Johns Hopkins University	1993
			B.A.	State University of New York at Cortland	1975
			M.S.	University of New Hampshire	1983
			M.A.	State University of New York at Cortland	1986
<b>Graham, Suzanne E*</b>	ASSOCIATE PROFESSOR	Education	Ph.D.	University of New Hampshire	1986
			B.S.	Brown University	1985
			Ed.M.	Harvard University	1990
			Ed.D.	Harvard University	1997
<b>Grandy, Andrew Stuart*</b>	ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.S.	The Evergreen State College, O	1995
			M.S.	University of Maine	1998
			Ph.D.	Michigan State University	2005
<b>Gravink, Jill K</b>	CLINICAL ASSISTANT PROFESSOR	Recreation Management & Policy	M.S.	University of New Hampshire	2007
			B.S.	University of New Hampshire	

<b>Greabe, John M</b>	PROFESSOR	UNHL JD Instruction	B.A.	Dartmouth College	1985
			J.D.	Harvard Law School	1988
<b>Greenberg, Arthur *</b>	PROFESSOR	Chemistry	B.S.	Fairleigh Dickinson University	1967
			M.A.	Princeton University	1970
			Ph.D.	Princeton University	1971
<b>Greenslade, Margaret E*</b>	ASSOCIATE PROFESSOR	Chemistry	B.A.	Bryn Mawr College	1998
			Ph.D.	University of Pennsylvania	2005
<b>Grenier, Michelle A*</b>	ASSOCIATE PROFESSOR	Kinesiology	B.S.	University of Massachusetts - Amherst	1978
			M.S.	University of New Hampshire	1995
			Ph.D.	University of New Hampshire	2004
<b>Grimm, Curt D*</b>	RESEARCH ASSOCIATE PROFESSOR	Carsey School	B.A.	University of New Hampshire	1979
			M.A.	State University of New York at Binghamton	1985
			Ph.D.	State University of New York at Binghamton	1991
<b>Grinde, Roger B*</b>	ASSOCIATE PROFESSOR	Decisions Sciences	B.A.	Carroll College	1984
			M.S.	Oregon State University	1986
			Ph.D.	Pennsylvania State University	1993
<b>Griswold, Lou Ann *</b>	ASSOCIATE PROFESSOR	Occupational Therapy	B.S.	Colorado State University	1979
			M.S.	Colorado State University	1986
			Ph.D.	University of New Hampshire	1995
<b>Grizzle, Raymond Edward*</b>	RESEARCH PROFESSOR	Biological Sciences	B.S.	Florida State University	1972
			M.S.	University of Central Florida,	1981
			Ph.D.	Rutgers University	1988
<b>Gross, Todd Stuart*</b>	PROFESSOR	Mechanical Engineering	B.S.	Carnegie Mellon University	1975

			Ph.D.	Northwestern University	1981
<b>Gruen, Thomas W*</b>	PROFESSOR	Marketing	B.A.	Gordon College	1977
			M.B.A.	Indiana University	1980
			M.S.	Indiana University	1995
			M.A.	Gordon College	1997
			Ph.D.	Indiana University	1997
<b>Grunkemeyer, Vanessa L</b>	LECTURER	Biological Sciences	D.V.M.	Cornell University	2007
<b>Guerdat, Todd C*</b>	ASSISTANT PROFESSOR	Biological Sciences	B.S.	University of North Carolina	1999
			M.S.	North Carolina State University	2008
			Ph.D.	North Carolina State University	2012
<b>Gullace, Nicoletta F*</b>	ASSOCIATE PROFESSOR	History	B.A.	University of Rochester	1983
			M.A.	University of California - Berkeley	1987
			Ph.D.	University of California - Berkeley	1993
<b>Gullion, Laurie</b>	CLINICAL ASSOCIATE PROFESSOR	Kinesiology	B.S.	University of Massachusetts - Amherst	1976
			M.S.	University of Massachusetts - Amherst	1991
<b>Gumprecht, Blake</b>	ASSOCIATE PROFESSOR	Geography	B.S.	University of Kansas	1983
			M.L.I.S.	Louisiana State University	1990
			M.A.	University of California - Los Angeles	1995
			Ph.D.	University of Oklahoma	2000
<b>Gunlogson, Elizabeth M*</b>	ASSOCIATE PROFESSOR	Music	B.A.	Luther College	1993
			M.M.	Indiana University	1996
			D.M.	Florida State University	2006
<b>Guo, Lin *</b>	ASSISTANT PROFESSOR	Marketing	M.A.	Renmin University of China	1995
			Ph.D.	University of Arizona	2010
<b>Gupta, Nivedita Ranbir*</b>	ASSOCIATE PROFESSOR	Chemical	B.S.E.T.	Indian Institutes of	1993

		Engineering		Technology, India	
			Ph.D.	Pennsylvania State University	1999
<b>Guyette, Julienne M</b>	LECTURER	Thompson School of Applied Science	A.S.	Culinary Institute of America	1990
			B.S.	University of Maine	1997
			M.Ed.	Plymouth State University	2015
<b>Gwebu, Kholekile L*</b>	ASSOCIATE PROFESSOR	Decisions Sciences	B.S.	National University of Lesotho, South Africa	1998
			M.B.A.	Kent State University	2002
			Ph.D.	Kent State University	2006
<b>Hackett, Robin Michelle*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of California - Davis	1986
			M.A.	Sonoma State University	1993
			Ph.D.	City University of New York	2000
<b>Hadwin, Donald W*</b>	PROFESSOR	Mathematics & Statistics	B.S.	Michigan State University	1967
			M.A.	University of Wisconsin	1968
			Ph.D.	Indiana University - Purdue University Fort Wayne	1975
<b>Haines, Thomas W*</b>	ASSISTANT PROFESSOR	English	B.A.	Dartmouth College	1990
			M.J.	University of California - Berkeley	1994
			Ph.D.	University of New Hampshire	1994
<b>Hale, Iago L*</b>	ASSISTANT PROFESSOR	Biological Sciences	B.A.	Dartmouth College	1997
			M.S.	University of California - Davis	2007
			Ph.D.	University of California - Davis	2011
<b>Hall, Carrie L*</b>	ASSISTANT PROFESSOR	Biological Sciences	A.A.	Community College of the Air Force	2002
			B.S.	Univ of Tulsa	2006
			M.S.	Univ of Tulsa	2008
			Ph.D.	Idaho State University	2011

			Ph.D.	Univ of Tulsa	2011
<b>Halpern, Jeffrey M*</b>	ASSISTANT PROFESSOR	Chemical Engineering	B.S.	Case Western Reserve University	2003
			Ph.D.	Case Western Reserve University	2010
<b>Halpin, Patricia A</b>	ASSISTANT PROFESSOR	Natural & Social Sciences	B.S.	Old Dominion University	1983
			M.S.	University of Connecticut	1995
			Ph.D.	University of Connecticut	1996
<b>Halstead, John M*</b>	PROFESSOR	Natural Resources & The Environment	B.A.	University of Notre Dame	1976
			M.S.	University of Massachusetts - Amherst	1981
			Ph.D.	Virginia Polytechnic Institute and State University	1989
<b>Hambacher, Elyse L*</b>	ASSISTANT PROFESSOR	Education	B.A.	University of Florida	2005
			M.A.	Columbia University in the City of New York	2006
			Ph.D.	University of Florida	2013
<b>Hamilton, Lawrence C*</b>	PROFESSOR	Sociology	B.A.	University of California - Santa Barbara	1970
			M.A.	University of Colorado at Boulder	1974
			Ph.D.	University of Colorado at Boulder	1978
<b>Haney, James F*</b>	PROFESSOR	Biological Sciences	A.B.	Miami University - Ohio	1961
			M.A.	Miami University - Ohio	1963
			Ph.D.	University of Toronto, Canada	1970
<b>Harkless, Gene E*</b>	ASSOCIATE PROFESSOR	Nursing	B.S.N.	Duke University	1976
			M.S.N.	Vanderbilt University	1980
			D.N.Sc.	Boston University	1991
<b>Harper, Valerie L</b>	ASSOCIATE PROFESSOR	Reference	B.A.	University of Rhode Island	1980
			M.S.	Simmons College	1982

			M.A.	Northeastern University	1990
<b>Harris, Benjamin *</b>	PROFESSOR	Psychology	B.A.	Hampshire College	1971
			M.A.	Vanderbilt University	1973
			Ph.D.	Vanderbilt University	1975
<b>Harris, J William*</b>	PROFESSOR	History	B.S.	Massachusetts Institute of Technology	1968
			M.A.	Johns Hopkins University	1976
			Ph.D.	Johns Hopkins University	1982
<b>Harris, Larry *</b>	PROFESSOR	Biological Sciences	B.A.	University of California - Berkeley	1965
			Ph.D.	University of California - Berkeley	1970
<b>Harrison, Keith M</b>	PROFESSOR	UNHL JD Instruction	B.A.	St. John's College	1977
			J.D.	University of Chicago	1981
<b>Harrison-Buck, Eleanor</b>	ASSOCIATE PROFESSOR	Anthropology	B.S.	Skidmore College	1994
			M.A.	Boston University	2001
			Ph.D.	Boston University	2007
<b>Hartman, Cindy L*</b>	ASSISTANT PROFESSOR	Recreation Management & Policy	M.S.	Clemson University	2011
			B.S.	Texas A & M University	
			Ph.D.	Clemson University	
<b>Hartt, S. Allen *</b>	ASSISTANT PROFESSOR	Accounting and Finance	B.A.	Mcgill University Canada	1993
			M.P.A.	Indiana University - Bloomington	1995
			M.S.	Bentley College	2008
			Ph.D.	Bentley College	2015
<b>Harvey, N Paul *</b>	ASSOCIATE PROFESSOR	Management	B.S.	University of Connecticut	2000
			M.B.A.	State University of New York at Binghamton	2002
			Ph.D.	Florida State University	2006
<b>Harzewski, Stephanie</b>	LECTURER	English	B.A.	Vassar College	1996
			M.A.	Rutgers University	1998

			Ph.D.	University of Pennsylvania	2006
<b>Haskins, Robert C*</b>	ASSOCIATE PROFESSOR	Music	B.M.	Johns Hopkins University	1982
			M.M.	Johns Hopkins University	1984
			Diploma	Guildhall School M&D, London	1986
			M.M.	Johns Hopkins University	1992
			M.A.	University of Rochester	1996
			D.M.A.	University of Rochester	1997
			Ph.D.	University of Rochester	2004
<b>Hasseldine, David J*</b>	PROFESSOR	Accounting and Finance	B.S.	University of Canterbury, New Zealand	1985
			M.S.	University of Canterbury, New Zealand	1987
<b>Hassey, William A</b>	LECTURER	Management	Ph.D.	Indiana University	1997
			B.S.	Univ of Lowell	1966
			M.S.	Keene State College (Nh)	1973
<b>Hatcher, Philip John*</b>	PROFESSOR	Computer Science	Ed.D.	Boston University	1979
			B.S.	Purdue University	1978
			M.S.	Purdue University	1979
			Ph.D.	Illinois Institute of Technology	1985
<b>Hausner, Alejandro</b>	LECTURER	Computer Science	B.S.	Mcgill University Canada	1988
			M.S.	Mcgill University Canada	1991
			M.S.	Queen'S University (Ca)	1993
<b>Healey, Kevin</b>	ASSISTANT PROFESSOR	Communication	Ph.D.	Brown University	2013
			B.A.	Drew University	1996
			M.A.	The New School	2005
			Ph.D.	University of Illinois at Urbana-	2011

				Champaign	
<b>Heath, Renee G</b>	LECTURER	Communication	B.S.	Oregon State University	1990
			M.A.	Washington State University	1997
			Ph.D.	University of Colorado at Boulder	2005
<b>Hebbard, Elizabeth K</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	University of Georgia	2007
			B.M.	University of Georgia	2007
			M.A.	Yale University	2011
			M.Phil.	Yale University	2011
<b>Heckman, Meghan A</b>	LECTURER	English	B.A.	University of New Hampshire	2001
			M.A.	Northeastern University	2013
<b>Hegarty, Charles B*</b>	ASSISTANT PROFESSOR	Recreation Management & Policy	B.A.	Denison University	1978
			M.S.	Indiana University	1979
			Ph.D.	Indiana University	2008
<b>Hemstock, Thomas E</b>	SENIOR LECTURER	UNHL Library	B.A.	Central Connecticut State Univ	2003
			J.D.	University of Connecticut	2007
			M.L.S.	Southern Connecticut State University	2007
<b>Henn, Mark J</b>	PRINCIPAL LECTURER	Psychology	B.A.	Coll of Wooster	1983
			M.A.	University of New Hampshire	1986
			Ph.D.	University of New Hampshire	1993
<b>Hennessey, Barry J</b>	ASSOCIATE PROFESSOR	Technical Services	A.B.	University of Wisconsin	1967
			Ph.D.	Harvard University	1972
			M.L.S.	Simmons College	1974
<b>Henny, Karen N</b>	LECTURER	Kinesiology	B.S.	University of New Hampshire	1988
			A.S.	N H Technical Inst	1993
<b>Henry, Robert M*</b>	ASSOCIATE PROFESSOR	Civil and Environmental	B.S.	University of Pennsylvania	1973



		Engineering			
			M.S.	University of Pennsylvania	1974
			Ph.D.	University of Pennsylvania	1980
<b>Hepp, Ellen M</b>	LECTURER	Computer Science	B.A.	University of New Hampshire	1977
			M.S.	University of New Hampshire	1995
<b>Herold, Marc W*</b>	ASSOCIATE PROFESSOR	Economics	B.A.	University of Zurich, Switzerland	1962
			M.B.A.	Swiss Federal Institute of Technology, Switzerland	1967
			M.B.A.	University of California - Berkeley	1970
			Ph.D.	University of California - Berkeley	1977
<b>Hersman, F William*</b>	PROFESSOR	Physics	B.S.	University of Cincinnati	1977
			Ph.D.	Massachusetts Institute of Technology	1982
<b>Hertz, Susan M*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of New Hampshire	1978
<b>Hibschweiler, Rita A*</b>	PROFESSOR	Mathematics & Statistics	B.A.	State University of New York at Buffalo	1979
			M.A.	State University of New York at Buffalo	1981
			Ph.D.	University at Albany	1988
<b>Hiller, Marc D*</b>	ASSOCIATE PROFESSOR	Health Management & Policy	B.S.	University of Pittsburgh	1972
			M.P.H.	University of Pittsburgh	1974
			Ph.D.	University of Pittsburgh	1978
<b>Hinson, Edward K*</b>	ASSOCIATE PROFESSOR	Mathematics & Statistics	B.S.	University of Florida	1979
			M.S.	Northwestern University	1982
			Ph.D.	Northwestern University	1985
		Languages,		University of	

<b>Hirsch, Sarah E</b>	LECTURER	Literatures, & Cultures	B.A.	Massachusetts - Boston	1982
			M.S.T.	University of New Hampshire	1992
			M.A.	University of New Hampshire	2004
<b>Hobbie, Erik A*</b>	RESEARCH PROFESSOR	Earth Systems Research Center	B.S.	Yale University	1987
			M.S.	University of Virginia	1994
			Ph.D.	University of Virginia	1997
<b>Holcombe, Julee Ann</b>	ASSOCIATE PROFESSOR	Art and Art History	B.F.A.	University of New Mexico	1998
			M.F.A.	Maryland Institute	2004
<b>Hollis, Eileen H</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	M.S.	University of New Hampshire	2010
<b>Holtrop, Maurik W*</b>	PROFESSOR	Physics	B.S.	University of New Hampshire	1987
			Ph.D.	Massachusetts Institute of Technology	1995
<b>Honwad, Sameer V*</b>	ASSISTANT PROFESSOR	Education	B.A.	Pune Univ Dehradun India	1997
			Ph.D.	Pennsylvania State University	2010
<b>Hood, Craig A*</b>	PROFESSOR	Art and Art History	B.A.	Boston University	1975
			B.A.	Pennsylvania State University	1979
			M.F.A.	Indiana University - Bloomington	1981
<b>Hopkins, Lori J*</b>	ASSOCIATE PROFESSOR	Languages, Literatures, & Cultures	B.A.	University of Virginia	1984
			M.A.	University of Wisconsin - Madison	1987
			Ph.D.	University of Wisconsin - Madison	1993
<b>Horne, Susan E</b>	LECTURER	Decisions Sciences	B.S.	University of Massachusetts - Amherst	1981
			M.B.A.	Babson College	1990
			Ph.D.	Kent State University	2010
<b>Houtenville, Andrew James*</b>	ASSOCIATE PROFESSOR	Economics Dept-Shared Position	B.A.	Richard Stockton College	1988

			M.A.	University of New Hampshire	1991
			Ph.D.	University of New Hampshire	1997
<b>Howard, Daniel R*</b>	ASSISTANT PROFESSOR	Biological Sciences	A.A.	Coll of The Sequoias	1999
			M.S.	Northeastern State University	2004
			Ph.D.	Univ of Tulsa	2007
<b>Howard, Theodore E*</b>	ASSOCIATE DEAN	Dean's Office - LS & A	B.S.	University of Maine	1972
			M.F.	Duke University	1974
			Ph.D.	Oregon State University	1982
<b>Howell, William H*</b>	PROFESSOR	Biological Sciences	B.A.	Otterbein College	1969
			M.S.	University of Rhode Island	1975
			Ph.D.	University of Rhode Island	1980
<b>Howey, Meghan L</b>	ASSOCIATE PROFESSOR	Anthropology	B.A.	University of Delaware	2000
			M.A.	University of Michigan	2002
			Ph.D.	University of Michigan	2006
<b>Howland, David</b>	SENIOR LECTURER	English	B.A.	Pennsylvania State University	1991
			M.S.	University of New Hampshire	2001
			Ph.D.	University of New Hampshire	2006
<b>Hoza, Jack E</b>	PROFESSOR	Humanities	B.S.	University of Northern Colorado	1978
			M.S.	McDaniel College	1991
			Ph.D.	Boston University	2001
<b>Hrabak, Estelle M*</b>	ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Michigan State University	1978
			Ph.D.	University of Wisconsin	1992
<b>Huang, Chia-Lin *</b>	RESEARCH ASSISTANT PROFESSOR	Space Science Center	Ph.D.	Boston University	2007
				National Taiwan	

<b>Huang, Ju-Chin *</b>	PROFESSOR	Economics	B.S.	University, Taiwan	1985
			M.S.	North Carolina State University	1988
			Ph.D.	North Carolina State University	1994
<b>Hubbard, Derek W</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	University of New Hampshire	2008
			M.A.	University of New Hampshire	2013
<b>Huber, Matthew *</b>	PROFESSOR	Earth Sciences - Joint Positions	B.A.	University of Chicago	1994
			M.S.	University of California - Los Angeles	1997
			Ph.D.	University of California - Santa Cruz	2001
<b>Huddleston, Mark W*</b>	PRESIDENT	UNH President's Office	B.A.	State University of New York at Buffalo	1972
			M.A.	University of Wisconsin - Madison	1973
			Ph.D.	University of Wisconsin - Madison	1978
<b>Huff, Lindsay A</b>	LECTURER	English	M.A.	New School for Sound Res	2013
<b>Hughes Clarke, John E*</b>	PROFESSOR	Earth Sciences	B.A.	Oxford Univ-Eng	1983
			M.S.	Southampton University, UK	1984
			Ph.D.	Dalhousie University, Canada	1988
<b>Humphreys, Elizabeth P*</b>	RESEARCH ASSISTANT PROFESSOR	Institute on Disability	A.A.	Cape Cod Comm College	1976
			B.A.	Westfield State College	1979
			M.Ed.	University of New Hampshire	1997
<b>Hungerford, Mark V</b>	LECTURER	Communication	B.A.	Emory University	1992
			M.A.	University of Texas at Austin	2005
			Ph.D.	University of Washington	2011
<b>Hupper, Veronica P</b>	LECTURER	Mathematics & Statistics	B.A.	Caldwell Coll for Women	1996

			M.S.	University of New Hampshire	1999
			Ph.D.	University of New Hampshire	2005
<b>Hurn, Marcus B</b>	PROFESSOR	UNHL JD Instruction	B.S.	Missouri State University	1974
			J.D.	Univ of Missouri-Kansas City	1977
<b>Hutton, Carolyn H</b>	LECTURER	English	B.A.	University of North Carolina	1985
			M.A.	University of New Hampshire	1990
<b>Ikegami, Pamela B</b>	SENIOR LECTURER	Languages, Literatures, & Cultures	B.A.	University of Colorado at Boulder	1987
			M.A.	University of Hawaii Manoa	1994
<b>Ingram, Lionel R</b>	PRINCIPAL LECTURER	Political Science	B.S.	United States Military Academy	1963
			M.P.A.	Harvard University	1966
			Ph.D.	Harvard University	1995
<b>Innis, Daniel E*</b>	PROFESSOR	Dean's Office	B.B.A.	Ohio University	1985
			M.B.A.	Miami University - Ohio	1986
			Ph.D.	Ohio State University	1991
<b>Isenberg, Philip A*</b>	RESEARCH PROFESSOR	Space Science Center	B.S.	Massachusetts Institute of Technology	1971
			M.S.	University of Chicago	1976
			Ph.D.	University of Chicago	1976
<b>Jackman, Krista Law</b>	SENIOR LECTURER	English	B.A.	University of New Hampshire	1991
			M.A.T.	Rivier College	1993
<b>Jackson, Robert Michael</b>	SENIOR LECTURER	Communication	B.A.	Univ of Arkansas	1986
			M.A.	Central Washington University,	1993
			Ph.D.	Rensselaer Polytechnic Institute	2002
<b>Jacobs, Jennifer M*</b>	PROFESSOR	Civil and Environmental Engineering	B.S.	Brown University	1987
			M.S.	Tufts University	1993
			Ph.D.	Cornell University	1997

<b>Jacoby, Robb *</b>	PROFESSOR	Mathematics & Statistics	B.S.	University of Chicago	1941
			M.S.	University of Chicago	1942
			Ph.D.	University of Chicago	1946
<b>Jaffee, Eleanor M</b>	RESEARCH ASSISTANT PROFESSOR	Carsey School	B.A.	State University of New York at Binghamton	1996
			M.S.W.	University at Albany	2003
			Ph.D.	University at Albany	2012
<b>Jago, Barbara J</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.A.	Smith College	1981
			M.A.	New York University	1993
			M.A.	University of South Florida	1993
			Ph.D.	University of South Florida	1998
<b>Jahnke, Leland S*</b>	PROFESSOR	Biological Sciences	B.A.	University of Minnesota	1961
			M.A.	University of Minnesota	1966
			M.S.	University of Minnesota	1968
			Ph.D.	University of Minnesota	1973
<b>Jamison, Tyler B*</b>	ASSISTANT PROFESSOR	Human Development & Family Studies	B.A.	Miami University - Ohio	2006
			M.S.	University of Missouri - Columbia	2008
			Ph.D.	University of Missouri - Columbia	2012
<b>Janson-Sand, Colette H*</b>	ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	Bridgewater State University	1967
			M.S.	University of New Hampshire	1970
			Ph.D.	University of New Hampshire	1980
<b>Jarema, Patricia M</b>	LECTURER	Biological Sciences	A.A.	Greenfield Comm Coll	1995
			B.S.	University of Massachusetts - Amherst	2000
			M.S.	University of New	2008

				Hampshire	
			Ph.D.	University of New Hampshire	2013
<b>Jeong, Kyung Jae *</b>	ASSISTANT PROFESSOR	Chemical Engineering	B.S.	Seoul National University, Korea	2001
			Ph.D.	Purdue University	2008
<b>Jin, Hong</b>	LECTURER	Computer Science	B.S.	Shanghai University, China	1997
			M.S.	University of Windsor, Canada	2001
			Ph.D.	University of Windsor, Canada	2010
<b>Johnson, Jeremiah W</b>	ASSISTANT PROFESSOR	Science and Technology	B.S.	University of New Hampshire	2000
			M.S.	University of New Hampshire	2002
			Ph.D.	University of New Hampshire	2010
<b>Johnson, Joel E*</b>	ASSOCIATE PROFESSOR	Earth Sciences	B.S.	University of Minnesota	1996
			M.S.	University of Illinois at Urbana-Champaign	1998
			Ph.D.	Oregon State University	2004
<b>Johnson, Kenneth M*</b>	PROFESSOR	Sociology	B.A.	University of Michigan	1972
			M.A.	University of North Carolina	1975
			Ph.D.	University of North Carolina	1980
<b>Johnson, Linda B</b>	ASSOCIATE PROFESSOR	Government Documents	B.A.	University of Arizona	1971
			M.L.S.	University of Arizona	1974
			M.A.	Santa Clara University	1988
<b>Johnson, Nancy M</b>	PROFESSOR	Thompson School of Applied Science	B.S.	University of New Hampshire	1979
			M.Ed.	University of Maine	1984
<b>Johnson, Paul C*</b>	ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.S.	Emory and Henry College	1968
			Ph.D.	Cornell University	1974

<b>Johnson, Richard P*</b>	PROFESSOR	Chemistry	B.S.	Syracuse University	1972
			Ph.D.	Syracuse University	1976
<b>Joiner, Sarah L</b>	LECTURER	Chemistry	B.S.	Gannon University	2010
			Ph.D.	University of New Hampshire	2015
<b>Jonas, Michael *</b>	ASSISTANT PROFESSOR	UNHM Degree Programs	B.S.	College of William and Mary	1987
			M.S.	College of William and Mary	1989
			Ph.D.	Tufts University	2003
<b>Jones, Lisa M*</b>	RESEARCH ASSOCIATE PROFESSOR	Psychology	B.A.	University of Virginia	1992
			M.A.	University of Rhode Island	1997
			Ph.D.	University of Rhode Island	1999
<b>Jones, Stephen H*</b>	RESEARCH ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.S.	University of Maine	1976
			M.S.	University of Wisconsin	1980
			Ph.D.	University of Wisconsin	1983
<b>Jorgensen, Nathan A*</b>	ASSISTANT PROFESSOR	Music	B.M.	University of Kansas	1999
			M.M.	University of Missouri - Columbia	2003
			D.M.A.	University of Kansas	2010
<b>Jusseume, Sarah B</b>	LECTURER	English	B.S.	University of New Hampshire	2001
			M.A.	University of Massachusetts - Boston	2012
<b>Kaen, Fred R*</b>	PROFESSOR	Accounting and Finance	B.S.	Lehigh University	1963
			M.B.A.	University of Michigan	1968
			Ph.D.	University of Michigan	1972
<b>Kalargyrou, Valentini *</b>	ASSOCIATE PROFESSOR	Hospitality Management	B.S.	Athens University of Economics and Business	1987
			M.S.	University of Nevada - Las Vegas	1989
				University of Nevada	



			Ph.D.	- Las Vegas	2009
<b>Kallmerten, Pamela S</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	B.S.	Colby-Sawyer College, New Lond	1989
			M.S.	Northeastern University	1997
<b>Kalnejais, Linda H*</b>	ASSISTANT PROFESSOR	Earth Sciences - Joint Positions	B.S.	University of Western Australia, Australia	1993
			B.E.	University of Western Australia, Australia	1995
			Ph.D.	Massachusetts Institute of Technology	2005
<b>Karo, Rebecca W</b>	LECTURER	Art and Art History	B.A.	Wellesley College	1970
			M.A.	Boston College	1973
			M.A.	Harvard University	1987
<b>Kaye, David J</b>	PROFESSOR	Theatre & Dance	B.S.	Castleton State College	1984
			M.F.A.	Brandeis University	1993
<b>Kayser, John R*</b>	ASSOCIATE PROFESSOR	Political Science	B.A.	University of New Hampshire	1962
			M.A.	Ohio State University	1964
			Ph.D.	Claremont Graduate University	1969
<b>Kazura, Kerry *</b>	ASSOCIATE PROFESSOR	Human Development & Family Studies	B.A.	University of Southern Maine	1989
			M.S.	Auburn University	1992
			Ph.D.	Auburn University	1995
<b>Keim, Christina J</b>	LECTURER	Biological Sciences	B.S.	University of New Hampshire	1998
			M.Ed.	University of New Hampshire	2009
<b>Kelsey, Kim S</b>	CLINICAL ASSISTANT PROFESSOR	Social Work	B.A.	Fairleigh Dickinson University	1976
			M.S.W.	Univ of Maryland at Baltimore	1995
<b>Kempster, William G*</b>	PROFESSOR	Music	B.A.	University of New England	1978
			D.M.A.	University of Alberta, Canada	1999
<b>Kerns, Georgia M*</b>	ASSOCIATE PROFESSOR	Education	B.S.E.	University of Delaware	1969

			M.Ed.	University of Delaware	1975
			M.Ed.	University of New Hampshire	1983
			Ph.D.	University of Kansas	1987
<b>Kidwell, Mardi J</b>	ASSOCIATE PROFESSOR	Communication	B.A.	University of California - Santa Cruz	1986
			M.A.	University of California - Santa Barbara	1998
			Ph.D.	University of California - Santa Barbara	2003
<b>Kies, Christopher R*</b>	PROFESSOR	Music	B.M.	The New England Conservatory of Music	1973
			M.F.A.	Brandeis University	1977
			Ph.D.	Brandeis University	1984
<b>Kilbride, Richard C</b>	LECTURER	Accounting and Finance	B.A.	Colorado College	1978
			M.B.A.	Dartmouth College	1980
<b>Kilcrease, Kelly</b>	ASSOCIATE PROFESSOR	UNHM Degree Programs	B.A.	University of Florida	1986
			M.B.A.	Tampa College	1988
			Ph.D.	Union Institute & University	1992
<b>Kim, Bo Rin *</b>	ASSISTANT PROFESSOR	Social Work	B.A.	Yonsei University, Seoul, Korea	2003
			M.A.	Seoul National University, Korea	2005
			M.S.W.	University of Michigan	2007
			Ph.D.	University of Michigan	2014
<b>Kim, Soo Hyon *</b>	ASSISTANT PROFESSOR	English	B.A.	Korea University, Seoul	2005
			M.A.	University of Illinois at Urbana-Champaign	2008
			Ph.D.	Michigan State University	2013
<b>Kinghorn, Deborah A</b>	PROFESSOR	Theatre & Dance	B.A.	SUNY College at Fredonia	1976

			M.F.A.	Trinity University - Texas	1981
<b>Kinner, Nancy E*</b>	PROFESSOR	Civil and Environmental Engineering	B.A.	Cornell University	1976
			M.S.	University of New Hampshire	1980
			Ph.D.	University of New Hampshire	1983
<b>Kinsey, Brad L*</b>	PROFESSOR	Mechanical Engineering	B.S.	University of Michigan	1992
			M.S.	Northwestern University	1998
			Ph.D.	Northwestern University	2001
<b>Kirkpatrick, John T*</b>	ASSOCIATE DEAN	Dean's Office - Liberal Arts	B.A.	Colby College	1977
			B.A.	Colby College	1977
			M.A.	University of New Hampshire	1979
			M.A.	University of New Hampshire	1979
			Ph.D.	University of New Hampshire	1983
			Ph.D.	University of New Hampshire	1983
<b>Kirsch, Nicholas J*</b>	ASSISTANT PROFESSOR	Electrical & Computer Eng Dept	B.S.	University of Wisconsin - Madison	2003
			M.S.	Drexel University	2006
			Ph.D.	Drexel University	2009
<b>Kirshen, Paul H*</b>	RESEARCH PROFESSOR	Civil and Environmental Engineering	B.S.	Brown University	1970
			M.S.	Massachusetts Institute of Technology	1972
			Ph.D.	Massachusetts Institute of Technology	1975
<b>Kistler, Lynn M*</b>	PROFESSOR	Physics - Joint Positions	B.S.	Harvey Mudd College	1981
			M.S.	University of Maryland	1983
				University of	

			Ph.D.	Maryland	1987
<b>Klein, Anita S*</b>	ASSOCIATE PROFESSOR	Biological Sciences	B.A.	University of Rochester	1975
			Ph.D.	Michigan State University	1981
<b>Klenotic, Jeffrey F</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.A.	Pennsylvania State University	1985
			M.A.	University of Massachusetts - Amherst	1988
			Ph.D.	University of Massachusetts - Amherst	1996
<b>Klewicki, Joseph C*</b>	PROFESSOR	Mechanical Engineering	B.S.	Michigan State University	1983
			M.S.	Georgia Institute of Technology	1985
			Ph.D.	Michigan State University	1989
<b>Knezevic, Marko *</b>	ASSISTANT PROFESSOR	Mechanical Engineering	B.S.	University of Novi Sad, Serbia	2004
			M.S.	University of Novi Sad, Serbia	2004
			Ph.D.	Drexel University	2009
<b>Knowles, Clark E</b>	PRINCIPAL LECTURER	English	B.A.	George Mason University	1988
			M.A.	University of New Hampshire	1998
			M.F.A.	Bennington College	2005
<b>Knowles, William F</b>	LECTURER	Accounting and Finance	B.S.	University of New Hampshire	1985
			M.B.A.	University of Massachusetts - Amherst	1986
<b>Kong, Liang</b>	LECTURER	Mathematics & Statistics	B.S.	University of Science and Technology of China	1994
			M.S.	University of Houston	1997
			Ph.D.	Rutgers University	2006
<b>Konzett, Delia C*</b>	ASSOCIATE PROFESSOR	English	B.A.	Georgia State University	1989
			M.A.	University of Chicago	1991
			Ph.D.	University of Chicago	1997

<b>Konzett, Matthias B</b>	LECTURER	English	M.A.	University of Innsbruck, Austria	1985
			M.A.	Emory University	1988
			Ph.D.	Emory University	1991
			Ph.D.	University of Chicago	1995
<b>Korkolis, Ioannis *</b>	ASSISTANT PROFESSOR	Mechanical Engineering	Diploma	National and Kapodistrian University of Athens, Greece	1998
			M.S.	National and Kapodistrian University of Athens, Greece	2002
			Ph.D.	University of Texas at Austin	2009
<b>Kovach, Adrienne I*</b>	RESEARCH ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.S.	University of Kansas	1990
			Ph.D.	North Carolina State University	1998
<b>Kowalski, Stanley P</b>	CLINICAL PROFESSOR	UNHL Intl Tech Transfer Institute	B.S.	Pennsylvania State University	1975
			B.S.	University of Pittsburgh	1980
			Ph.D.	Cornell University	1989
			J.D.	Franklin Pierce Law Center	2005
<b>Krasner, James N*</b>	PROFESSOR	English	B.A.	Hampshire College	1983
			M.A.	University of Pennsylvania	1985
			Ph.D.	University of Pittsburgh	1989
<b>Krzanowski, James E*</b>	PROFESSOR	Mechanical Engineering	B.E.	Stevens Institute of Technology	1978
			M.S.	Massachusetts Institute of Technology	1981
			Ph.D.	Massachusetts Institute of Technology	1983
<b>Kucharek, Harald A*</b>	RESEARCH PROFESSOR	Space Science Center	Ph.D.	Technical University of Munich	1984
			M.S.	University of Regensburg, Germany	1986

			Ph.D.	Technical University of Munich	1989
<b>Kukenberger, Michael R*</b>	ASSISTANT PROFESSOR	Management	B.A.	University of Maine	1998
			M.B.A.	Indiana University	2000
			Ph.D.	University of Connecticut	2012
<b>Kun, Andrew L*</b>	ASSOCIATE PROFESSOR	Electrical & Computer Eng Dept	B.S.	University of New Hampshire	1992
			M.S.	University of New Hampshire	1994
			Ph.D.	University of New Hampshire	1997
<b>Lachance, Rachel A</b>	LECTURER	English	B.A.	Boston University	2004
			M.A.T.	Boston University	2006
<b>LaCourse, John R*</b>	PROFESSOR	Electrical & Computer Eng Dept	B.A.	University of Connecticut	1974
			M.S.	University of Connecticut	1977
			Ph.D.	University of Connecticut	1981
<b>Laflamme, David J*</b>	RESEARCH ASSISTANT PROFESSOR	Health Management & Policy	B.S.	Plymouth State University	1989
			M.P.H.	Tulane University	1997
			Ph.D.	Johns Hopkins University	2003
<b>Laird, Jo *</b>	ASSOCIATE PROFESSOR	Earth Sciences	B.A.	University of California - San Diego	1969
			Ph.D.	California Institute of Technology	1977
<b>Lammers, Richard B*</b>	RESEARCH ASSISTANT PROFESSOR	Earth Systems Research Center	B.S.	University of Toronto, Canada	1989
			M.S.	University of Toronto, Canada	1990
			Ph.D.	University of Toronto, Canada	1998
<b>Lan, Tu</b>	ASSISTANT PROFESSOR	Geography	B.S.	Peking University, China	2006
			M.S.	University of Hong Kong	2007
			Ph.D.	University of North	2014

				Carolina	
<b>Lane, Peter J*</b>	ASSOCIATE DEAN	Dean's Office	B.A.	University of New Hampshire	1981
			M.B.A.	University of Massachusetts - Amherst	1992
			Ph.D.	University of Connecticut	1996
<b>Lanier, Douglas M*</b>	PROFESSOR	English	B.A.	Stetson University	1977
			M.A.	Duke University	1980
			Ph.D.	Duke University	1988
<b>Lannamann, John W</b>	ASSOCIATE PROFESSOR	Communication	B.S.	Babson College	1977
			M.A.	University of Massachusetts - Amherst	1980
			Ph.D.	University of Massachusetts - Amherst	1983
<b>Larkin, Edward T</b>	PROFESSOR	Languages, Literatures, & Cultures	B.A.	Saint Peter's University	1971
			M.A.	St. John's College	1980
			Ph.D.	University of Pennsylvania	1986
<b>LaRoche, Dain P*</b>	ASSOCIATE PROFESSOR	Kinesiology	B.S.	University of New Hampshire	1996
			M.S.	University of Massachusetts - Amherst	1998
			Ph.D.	University of Utah	2004
<b>Lashmore, David S*</b>	RESEARCH PROFESSOR	Material Science Program	B.S.	University of Florida	1969
			M.S.	Michigan Tech Univ	1970
			Ph.D.	University of Virginia	1977
<b>Laue, Thomas M*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	Johns Hopkins University	1971
			Ph.D.	University of Connecticut	1981
<b>Lauer, Josh C</b>	ASSOCIATE PROFESSOR	Communication	B.A.	Indiana University of Pennsylvania	1992
			M.L.I.S.	University of Pittsburgh	1997
				University of	

			M.A.	Pennsylvania	2005
			Ph.D.	University of Pennsylvania	2008
<b>LaValley, Kenneth J*</b>	DEAN	Administration	B.S.	University of New Hampshire	1993
			M.S.	University of Rhode Island	1996
			Ph.D.	University of Rhode Island	2005
<b>LeBlanc, Christopher D</b>	ASSISTANT PROFESSOR	Humanities	B.S.	University of Massachusetts - Lowell	1997
			M.S.	University of Vermont	2007
<b>LeBlanc, Ronald D</b>	PROFESSOR	Languages, Literatures, & Cultures	B.S.	United States Air Force Academy	1971
			B.A.	University of Washington	1977
			M.A.	University of Washington	1979
			Ph.D.	University of Washington	1984
<b>Lee, Jade C*</b>	ASSISTANT PROFESSOR	Education	B.A.	Stanford University	2000
			M.A.	Brooklyn College of the City University of New York	2002
			Ph.D.	Emory University	2011
<b>Lee, Lina *</b>	PROFESSOR	Languages, Literatures, & Cultures	B.A.	Fu Jen Catholic University, China	1979
			M.A.	University of North Texas	1986
			Ph.D.	University of Texas at Austin	1992
<b>Lee, Martin A*</b>	PROFESSOR	Physics - Joint Positions	B.S.	Stanford University	1966
			Ph.D.	University of Chicago	1971
<b>Lee, Thomas D*</b>	ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.S.	SUNY College of Environmental Science and Forestry	1973
			M.S.	University of Alberta, Canada	1976
			Ph.D.	University of Illinois at Urbana-	1980



				Champaign	
<b>Leese, Michael S*</b>	ASSISTANT PROFESSOR	Classics, Humanities & Ital Studies	B.A.	University of Connecticut	2003
			M.A.	University of Connecticut	2004
			Ph.D.	University of Michigan	2014
<b>Leichtman, Michelle D*</b>	ASSOCIATE PROFESSOR	Psychology	B.A.	Wellesley College	1985
			M.A.	Cornell University	1991
			Ph.D.	Cornell University	1994
<b>Lema, Kimberly Jeanne*</b>	RESEARCH ASSOCIATE PROFESSOR	Family Research Lab	B.A.	Rhode Island College	1994
			M.A.	Rhode Island College	1996
			Ph.D.	University of Rhode Island	1999
<b>Lembree, Ashlyn J</b>	CLINICAL PROFESSOR	UNHL Clinic	B.A.	University of Vermont	1991
			J.D.	Franklin Pierce Law Center	1996
			MIP	Franklin Pierce Law Center	2008
<b>Lepler, Jessica M*</b>	ASSOCIATE PROFESSOR	History	B.A.	Tulane University	2000
			M.A.	Brandeis University	2005
			Ph.D.	Brandeis University	2008
<b>Lessard, Marc R*</b>	ASSOCIATE PROFESSOR	Physics - Joint Positions	Ph.D.	Dartmouth College	1997
			B.S.	University of New Hampshire	
<b>Lesser, Michael P*</b>	RESEARCH PROFESSOR	Molecular, Cellular, & Biomedical	A.S.	George Washington University	1977
			B.A.	University of New Hampshire	1983
			M.S.	University of New Hampshire	1985
			Ph.D.	University of Maine	1989
<b>Lewis, James B*</b>	ASSOCIATE PROFESSOR	Health Management & Policy	B.A.	University of Pittsburgh	1972
			M.M.	Northwestern University	1974
			D.Sc.	Johns Hopkins University	1985

<b>Li, Changsheng *</b>	RESEARCH PROFESSOR	Earth Systems Research Center	B.S.	University of Science and Technology	1964
			M.S.	Chinese Academy of Sciences, China	1981
			Ph.D.	Chinese Academy of Sciences, China	1985
			Ph.D.	University of Wisconsin	1986
<b>Li, Gonghu *</b>	ASSOCIATE PROFESSOR	Chemistry	B.S.	Hebei Normal University, China	1997
			M.S.	Chinese Academy of Sciences, China	2000
			Ph.D.	University of Iowa	2005
<b>Li, Huimin *</b>	ASSISTANT PROFESSOR	Accounting and Finance	M.Sc.	Southern Illinois University	2007
			Ph.D.	Georgia State University	2014
<b>Li, Jun *</b>	ASSOCIATE PROFESSOR	Management	B.S.	Beijing University, China	1995
			M.S.	Beijing University, China	1999
			Ph.D.	Texas A & M University	2004
<b>Li, Linyuan *</b>	PROFESSOR	Mathematics & Statistics	B.S.	Xuzhou Teachers College, China	1985
			M.S.	East China Normal University, China	1988
			M.S.	University of New Mexico	1997
			Ph.D.	Michigan State University	2002
<b>Li, Yaning *</b>	ASSISTANT PROFESSOR	Mechanical Engineering	B.S.	Xi'an Jiaotong University, China	2000
			M.S.	Xi'an Jiaotong University, China	2003
			M.S.	University of Michigan	2006
			Ph.D.	University of Michigan	2007
<b>Licciardi, Joseph M*</b>	ASSOCIATE PROFESSOR	Earth Sciences	B.A.	State University of New York at Geneseo	1992
			M.S.	Oregon State University	1995

			Ph.D.	Oregon State University	2000
<b>Lieber, Rochelle *</b>	PROFESSOR	English	A.B.	Vassar College	1976
			Ph.D.	Massachusetts Institute of Technology	1980
<b>Lightbody, Anne F*</b>	ASSISTANT PROFESSOR	Earth Sciences	B.S.	Yale University	1999
			M.S.	Massachusetts Institute of Technology	2004
			Ph.D.	Massachusetts Institute of Technology	2007
<b>Lindblade, Carl E</b>	LECTURER	Hospitality Management	A.B.	Tufts University	1964
			B.A.	Tufts University	1964
<b>Linder, Ernst *</b>	PROFESSOR	Mathematics & Statistics	Ph.D.	Pennsylvania State University	1987
			M.S.	Union College - New York	1980
			Diploma	University of Zurich, Switzerland	1978
<b>Lippmann, Thomas C*</b>	ASSOCIATE PROFESSOR	Earth Sciences	B.A.	Linfield College	1985
			M.S.	Oregon State University	1989
			Ph.D.	Oregon State University	1992
<b>Litvaitis, John A*</b>	PROFESSOR	Natural Resources & The Environment	B.S.	University of New Hampshire	1975
			M.S.	Oklahoma State University	1978
			Ph.D.	University of Maine	1984
<b>Litvaitis, Marianne K*</b>	PROFESSOR	Natural Resources & The Environment	B.S.	Clemson University	1980
			M.S.	Clemson University	1982
			Ph.D.	University of Maine	1985
<b>Liu, Yixin *</b>	ASSOCIATE PROFESSOR	Accounting and Finance	M.S.	Southern Illinois University - Carbondale	2007
			Ph.D.	University of Iowa	2007
<b>Lockwood, Mary Katherine K*</b>	CLINICAL ASSOCIATE PROFESSOR	Molecular, Cellular, &	B.S.	Davidson College	1977

		Biomedical				
				M.S.	Pennsylvania State University	1981
				Ph.D.	University of California	1989
<b>Loos, Michele S</b>	CLINICAL ASSISTANT PROFESSOR	Nursing		B.S.	University of New Hampshire	1990
				M.S.	University of New Hampshire	2006
<b>Lopate, Clifford *</b>	RESEARCH ASSOCIATE PROFESSOR	Space Science Center		B.A.	Swarthmore College	1982
				Ph.D.	University of Chicago	1983
				M.S.	University of Chicago	1988
<b>Lord, Susan A*</b>	CLINICAL ASSOCIATE PROFESSOR	Social Work		B.A.	University of New Hampshire	1975
				M.S.W.	Smith College	1979
				Ph.D.	University of New Hampshire	2004
<b>Lu, Yan *</b>	ASSOCIATE PROFESSOR	History		B.A.	Fudan University, China	1982
				M.A.	Michigan State University	1989
				M.A.	Cornell University	1993
				Ph.D.	Cornell University	1996
<b>Lugalla, Joe L P</b>	PROFESSOR	Anthropology		B.A.	University of Dar-Es-Salaam, Tanzania	1982
				M.A.	University of Dar-Es-Salaam, Tanzania	1983
				Diploma	University of Kassel, Germany	1990
				Ph.D.	University of Bremen, Germany	1990
<b>Lugaz, Noe E*</b>	RESEARCH ASSISTANT PROFESSOR	Space Science Center		M.S.	University of Michigan	2003
				Ph.D.	University of Michigan	2007
<b>Lunak, Michal</b>	ASSISTANT STATE SPECIALIST/PROFESSOR	Food and Agriculture		B.S.	University of Agriculture, Prague	1991
				M.S.	University of Minnesota	1995
				Ph.D.	Iowa State University	2000
<b>Luppold, Deborah</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Youth and Family		B.S.	University of Massachusetts -	1975

			M.S.	Amherst	
				Boston University	1979
<b>Lusenhop, Richard W</b>	LECTURER	Social Work	B.A.	University of Wisconsin	1992
			M.S.W.	Smith College	1995
			M.A.	Brandeis University	2003
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<b>Lyon, Alynna J*</b>	ASSOCIATE PROFESSOR	Political Science	B.A.	New Mexico State University at Alamogordo	1991
			M.A.	New Mexico State University at Alamogordo	1993
			Ph.D.	University of South Carolina	1999
<b>Lyon, Mark E*</b>	ASSOCIATE PROFESSOR	Mathematics & Statistics	B.S.	Brigham Young University	2002
			M.S.	Brigham Young University	2003
			Ph.D.	California Institute of Technology	2009
<b>Lyons, Anthony P*</b>	RESEARCH PROFESSOR	Center for Coastal & Ocean Mapping	M.S.	Texas A & M University	1991
			Ph.D.	Texas A & M University	1995
<b>Macarty, Matthew J</b>	LECTURER	Decisions Sciences	B.S.	University of New Hampshire	1997
			M.B.A.	University of New Hampshire	2002
<b>MacFarlane, Lisa *</b>	PROFESSOR	English	A.B.	Princeton University	1979
			M.A.	University of Michigan	1983
			Ph.D.	University of Michigan	1987
<b>Macieski, Robert L*</b>	ASSOCIATE PROFESSOR	Humanities	B.A.	Boston College	1980
			M.A.	Boston College	1982
			Ph.D.	Boston College	1994
<b>MacLea, Kyle S</b>	ASSISTANT PROFESSOR	Science	Ph.D.	Dartmouth College	2003
			A.B.	Cornell University	1997
<b>Macmanes, Matthew D*</b>	ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	A.A.S.	Broome Comm College	1999

			B.S.	University of Michigan	2005
			Ph.D.	University of California - Berkeley	2011
<b>MacMillan, John J</b>	LECTURER	Thompson School of Applied Science	B.A.	Boston College	1974
			M.B.A.	University of New Hampshire	1996
<b>Macpherson, Andrew M</b>	LECTURER	Political Science	B.A.	Mercyhurst College	1999
			M.A.	London School of Economics	2000
<b>Maddocks, William O</b>	CLINICAL ASSISTANT PROFESSOR	Carsey School	B.S.	Southeastern Mass Univ	1990
			M.S.	Southern New Hampshire University	1996
<b>Madigan, Sean W</b>	LECTURER	English	B.S.	University of Delaware	2002
			M.A.	University of Delaware	2005
			Ph.D.	University of Delaware	2009
<b>Magnifico, Alecia M*</b>	ASSISTANT PROFESSOR	English	B.A.	Swarthmore College	2000
			M.S.	University of Wisconsin - Madison	2007
			Ph.D.	University of Wisconsin - Madison	2010
<b>Mair, Robert G*</b>	PROFESSOR	Psychology	A.B.	Brown University	1972
			Sc.M.	Brown University	1975
			Ph.D.	Brown University	1979
<b>Malarte-Feldman, Claire L</b>	PROFESSOR	Languages, Literatures, & Cultures	D	Universite Paul Valery, France	1970
			Licence	Universite Paul Valery, France	1971
			Maitrise	Universite Paul Valery, France	1972
			Ph.D.	University of California - Davis	1984
<b>Malley, James P*</b>	PROFESSOR	Civil and Environmental Engineering	B.S.	Rutgers University	1980
			M.S.	University of Massachusetts -	1984

				Amherst	
			B.S.	University of Massachusetts - Amherst	1987
			Ph.D.	University of Massachusetts - Amherst	1988
<b>Mallory, Bruce L*</b>	PROFESSOR	Education	B.A.	Allegheny College	1971
			M.Ed.	Allegheny College	1972
			Ph.D.	George Peabody College of Vanderbilt University	1979
<b>Malloy, Joanne M</b>	CLINICAL ASSISTANT PROFESSOR	Institute on Disability	B.A.	University of Massachusetts - Amherst	1976
			M.S.	Univ of Tenn Knoxville	1981
			Ph.D.	University of New Hampshire	2011
<b>Malone, Mary Frances*</b>	ASSOCIATE PROFESSOR	Political Science	B.A.	Saint Joseph's University	1995
			M.A.	University of Pittsburgh	2000
			Ph.D.	University of Pittsburgh	2004
			Ph.D.	University of Pittsburgh	2004
<b>Manalo, Alberto B*</b>	ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.S.	University of The Philippines, Philippines	1976
			M.S.	Kansas State University	1978
			Ph.D.	Kansas State University	1985
<b>Mangan, Michael A</b>	SENIOR LECTURER	Psychology	B.A.	Oregon State University	1985
			M.A.	Humboldt State University	1994
			M.A.	University of New Hampshire	1997
			Ph.D.	University of New Hampshire	2000
<b>Manseau, Melissa A</b>	LECTURER	Theatre & Dance	B.A.	University of New Hampshire	1996
				University of	

			M.M.	Northern Iowa	1999
<b>Mantilla Clavijo, Leticia</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	University of Veracruz, Mexico	1998
			M.A.	University of New Hampshire	2010
<b>Margolin, Aaron B*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of Arizona	1982
			Ph.D.	University of Arizona	1986
<b>Margolin, Davida L</b>	LECTURER	Molecular, Cellular, & Biomedical	A.A.S.	Rochester Institute of Technology	1980
			B.F.A.	Rochester Institute of Technology	1981
			B.S.	University of New Hampshire	2005
			M.A.	University of New Hampshire	2011
<b>Marino, Mary B</b>	LECTURER	Theatre & Dance	B.A.	University of New Hampshire	1999
<b>Marone, Adele J</b>	CLINICAL ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Adelphi University	1985
			B.S.	University of New Hampshire	1998
			M.S.	University of New Hampshire	2007
<b>Marschner, Sarah Jane</b>	PRINCIPAL LECTURER	Theatre & Dance	B.A.	University of Rhode Island	1972
			B.A.	University of Rhode Island	1972
<b>Marshall, Courtney D*</b>	ASSISTANT PROFESSOR	English	B.A.	Rutgers University	2000
			M.A.	University of California - Los Angeles	2005
			Ph.D.	University of California - Los Angeles	2009
<b>Marti-Olivella, Jaume *</b>	ASSOCIATE PROFESSOR	Languages, Literatures, & Cultures	Licenciatura	Univ of Barcelona	1976
			M.A.	University of Illinois at Urbana-Champaign	1978



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			Ph.D.	University of Illinois at Urbana-Champaign	1988
<b>Martin, Alexandra G</b>	LECTURER	Anthropology	B.A.	Mount Holyoke College	2005
			M.A.	College of William and Mary	2010
<b>Martin, Mary E*</b>	RESEARCH ASSISTANT PROFESSOR	Earth Systems Research Center	A.A.S.	University of New Hampshire	1977
<b>Marx, Jerry D*</b>	ASSOCIATE PROFESSOR	Social Work	B.S.	University of Southern Maine	1981
			M.S.W.	Boston College	1984
			D.S.W.	Boston College	1994
<b>Masucci, Peter F</b>	LECTURER	Marketing	B.S.	Boston University	1970
			M.B.A.	Clark University	1984
<b>Mathieson, Arthur C*</b>	PROFESSOR	Biological Sciences	B.S.	University of California - Los Angeles	1960
			M.S.	University of California - Los Angeles	1961
			Ph.D.	University of British Columbia, Canada	1965
<b>Matteucci, Ann-Marie E</b>	LECTURER	Health Management & Policy	B.A.	University of New Hampshire	1991
			M.H.A.	University of New Hampshire	1996
<b>Matthias Powers, Collette M</b>	LECTURER	Computer Science	B.S.	University of New Hampshire	1993
			M.S.	University of New Hampshire	1997
<b>Mattingly, David M*</b>	ASSISTANT PROFESSOR	Physics	B.A.	Dartmouth College	1996
			Ph.D.	University of Maryland	2003
<b>Mattingly, Marybeth J*</b>	RESEARCH ASSISTANT PROFESSOR	Carsey School	B.A.	Dartmouth College	1996
			M.A.	University of Maryland	2000
			Ph.D.	University of Maryland	2005
<b>Mayer, John D*</b>	PROFESSOR	Psychology	B.A.	University of Michigan	1975

			M.A.	Case Western Reserve University	1979
			Ph.D.	Case Western Reserve University	1982
<b>Mayer, Larry A*</b>	PROFESSOR	Earth Sciences - Joint Positions	B.S.	University of Rhode Island	1973
			Ph.D.	University of California	1979
<b>Mayne, Howard R*</b>	PROFESSOR	Chemistry	B.S.	University of Manchester, England	1974
			M.S.	University of Manchester, England	1975
			Ph.D.	University of Manchester, England	1977
<b>McBride, Mekeel D*</b>	PROFESSOR	English	B.A.	Mills College (Calif)	1972
<b>McCann, Michael A</b>	PROFESSOR	UNHL JD Instruction	B.A.	Georgetown University	1998
			J.D.	University of Virginia	2002
			LL.M.	Harvard Law School	2005
<b>McCarthy, Patrick F</b>	LECTURER	UNHM Degree Programs	B.A.	Gallaudet University	1979
			M.S.	McDaniel College	1985
<b>McClain, John F</b>	LECTURER	Mathematics & Statistics	B.S.	Rutgers University	2003
			M.A.	University of Texas	2007
			Ph.D.	University of New Hampshire	2015
<b>McConnell, Mark L*</b>	PROFESSOR	Physics - Joint Positions	B.S.	Case Western Reserve University	1980
			Ph.D.	University of New Hampshire	1987
<b>McCrone, Sharon M*</b>	PROFESSOR	Mathematics & Statistics	A.B.	Dartmouth College	1988
			M.S.	University of New Hampshire	1992
			Ph.D.	University of New Hampshire	1997
<b>McDowell, William H*</b>	PROFESSOR	Natural Resources & The Environment	B.A.	Amherst College	1975
			Ph.D.	Cornell University	1982
<b>McGaughy, Jill A*</b>	ASSOCIATE PROFESSOR	Psychology	B.A.	Bradley University	1991
			M.A.	Ohio State University	1993

			Ph.D.	Ohio State University	1998
<b>McGrath, Robert J*</b>	ASSOCIATE PROFESSOR	Health Management & Policy	B.S.	University of New Hampshire	1996
			M.S.	Harvard University	1998
			M.A.	Brandeis University	2000
			Ph.D.	Brandeis University	2006
<b>McHugh, John P*</b>	ASSOCIATE PROFESSOR	Mechanical Engineering	B.S.	University of Michigan	1978
			Ph.D.	University of Michigan	1986
<b>McIntyre, Gayle R</b>	LECTURER	English as a Second Language	M.A.	Laval University, Quebec	1991
			B.A.	University of Manitoba, Canada	2001
<b>McKinsey, Martin S*</b>	ASSOCIATE PROFESSOR	English	B.A.	Hampshire College	1977
			M.A.	Syracuse University	1990
			M.A.	University of Virginia	1998
			Ph.D.	University of Virginia	2001
<b>McLaughlin, Kevin W</b>	SENIOR LECTURER	Accounting and Finance	B.S.B.A.	Northeastern University	1994
			M.S.	Boston College	1999
<b>McLaughlin, Sean R</b>	LECTURER	Recreation Management & Policy	B.A.	Chico State College	1995
			M.S.	University of New Hampshire	2007
<b>McMahon, Gregory *</b>	ASSOCIATE PROFESSOR	Classics, Humanities & Ital Studies	B.A.	University of Kansas	1975
			M.A.	Miami University - Ohio	1979
			Ph.D.	University of Chicago	1988
<b>McNamara, Paul F</b>	ASSOCIATE PROFESSOR	Philosophy	B.A.	City University of New York	1976
			M.A.	University of Missouri - Columbia	1980
			Ph.D.	University of Massachusetts - Amherst	1990
<b>McNamee, Sheila</b>	PROFESSOR	Communication	B.A.	University of Massachusetts - Amherst	1978

			M.A.	University of Massachusetts - Amherst	1980
			Ph.D.	University of Massachusetts - Amherst	1982
<b>McPhee, Pamela Kerr</b>	CLINICAL ASSISTANT PROFESSOR	Browne Center	B.S.	University of New Hampshire	1983
			M.S.W.	University of Connecticut	1987
<b>McSheehan, Michael C</b>	CLINICAL ASSISTANT PROFESSOR	Institute on Disability	B.S.	University of New Hampshire	1990
<b>Mebert, Carolyn J*</b>	ASSOCIATE PROFESSOR	Psychology	B.A.	Boston University	1974
			Ph.D.	Boston University	1978
<b>Medina, Ricardo A*</b>	ASSOCIATE PROFESSOR	Civil and Environmental Engineering	B.S.	Christian Brothers University	1997
			M.S.	Stanford University	1999
			Ph.D.	Stanford University	2003
<b>Mello, Patrick D</b>	LECTURER	English	B.A.	California State University, C	2005
			M.A.	California State University, C	2007
			Ph.D.	University of Notre Dame	2013
<b>Mellyn, Elizabeth W*</b>	ASSOCIATE PROFESSOR	History	B.A.	University of Chicago	1999
			M.A.	Harvard University	2002
			Ph.D.	Harvard University	2007
<b>Meredith, Dawn C*</b>	PROFESSOR	Physics	B.A.	St. John's College	1980
			M.S.	California Institute of Technology	1984
			Ph.D.	California Institute of Technology	1987
<b>Merenda, Michael J*</b>	PROFESSOR	Management	B.B.A.	Northeastern University	1970
			M.B.A.	Northeastern University	1972
			Ph.D.	University of Massachusetts - Amherst	1978
<b>Messner, Richard A*</b>	ASSOCIATE PROFESSOR	Electrical & Computer Eng Dept	B.S.	Clarkson College	1979

			M.S.	Clarkson College	1981
			Ph.D.	Clarkson University	1984
<b>Meyrowitz, Joshua</b>	PROFESSOR	Communication	B.A.	City University of New York	1972
			M.A.	City University of New York	1974
			Ph.D.	New York University	1978
<b>Mian, Nicholas D</b>	ASSISTANT PROFESSOR	Natural & Social Sciences	A.B.	Bowdoin College	2008
			M.A.	Boston University	2007
			M.A.	University of Massachusetts - Boston	2009
			Ph.D.	University of Massachusetts - Boston	2013
<b>Michaud, Michelle M H</b>	LECTURER	Communication	B.A.	University of Maine	2001
			M.A.	University of Maine	2004
<b>Miles, Russell A</b>	LECTURER	Decisions Sciences	B.S.M.E.	University of New Hampshire	1990
			M.B.A.	University of New Hampshire	1990
<b>Miletkov, Mihail K*</b>	ASSOCIATE PROFESSOR	Accounting and Finance	B.B.A.	University of Georgia	2002
			Ph.D.	University of Georgia	2008
<b>Miller, Brian C</b>	CLINICAL ASSISTANT PROFESSOR	Social Work	B.A.	Boston University	1980
			M.A.	University of New Hampshire	2000
<b>Miller, Glen P*</b>	PROFESSOR	Chemistry	B.S.Chem.	Clarkson University	1987
			Ph.D.	Clarkson University	1991
<b>Miller, John P*</b>	ASSOCIATE PROFESSOR	Kinesiology	B.S.	Brooklyn College of the City University of New York	1981
			M.S.	Long Island University	1983
			Ph.D.	University of Maryland	1992
<b>Miller, Lisa C*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of New Hampshire	1980
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		Electrical &		Pennsylvania State	

<b>Miller, W Thomas*</b>	PROFESSOR	Computer Eng Dept	B.S.	University	1972
			M.S.	Pennsylvania State University	1974
			Ph.D.	Pennsylvania State University	1977
<b>Minard, Maryann *</b>	CLINICAL ASSISTANT PROFESSOR	Education	B.S.Ed.	Westfield State College	1971
			M.P.A.	Troy State Univ	1988
			Ph.D.	University of New Hampshire	2002
<b>Mineau, Madeleine M*</b>	RESEARCH ASSISTANT PROFESSOR	Earth Systems Research Center	B.A.	Colby College	2003
			Ph.D.	Idaho State University	2010
<b>Minnis, Andrea L</b>	LECTURER	English	B.A.	University of New Hampshire	1997
			M.A.	University of New Hampshire	2004
<b>Minocha, Subhash C*</b>	PROFESSOR	Biological Sciences	B.S.	Panjab University, India	1968
			M.S.	Panjab University, India	1969
			Ph.D.	University of Washington	1974
<b>Mirhashem, Behzad</b>	LAW PROFESSOR	UNHL Clinic	B.A.	Williams College	1982
			Ph.D.	University of Maryland	1989
			J.D.	Northwestern University	1993
<b>Mitchell, Clayton R</b>	LECTURER	Natural Resources & The Environment	B.A.	University of Arizona	1991
			J.D.	Vermont Law School, So Royalto	1996
			M.S.	Vermont Law School, So Royalto	1996
			Ph.D.	University of New Hampshire	2008
<b>Mittal, Prashant</b>	CLINICAL ASSISTANT PROFESSOR	Health Management & Policy	B.S.	University of Delhi, India	1996
			M.S.	University of Delhi, India	1998

			M.S.	University of Southern Maine	2000
<b>Mizusawa, Diane D</b>	LECTURER	Marketing	B.A.	Rowan University	
<b>Mizusawa, Leroy R</b>	LECTURER	Management	M.B.A.	Stanford University	1980
<b>Mo, Weiwei *</b>	ASSISTANT PROFESSOR	Civil and Environmental Engineering	B.S.	Shanghai University, China	2008
			M.S.	University of South Florida	2011
			Ph.D.	University of South Florida	2012
<b>Mohr, Robert D*</b>	ASSOCIATE PROFESSOR	Economics	B.A.	University of Virginia	1993
			M.S.	University of Texas at Austin	1998
			Ph.D.	University of Texas at Austin	2001
<b>Montminy, Timothy P</b>	LECTURER	Molecular, Cellular, & Biomedical	B.S.	University of Rochester	2001
			Ph.D.	Tufts University	2009
<b>Moore, Gregg E*</b>	RESEARCH ASSOCIATE PROFESSOR	Biological Sciences	B.S.	Tufts University	1994
			M.S.	Boston University	1997
			Ph.D.	Boston University	2003
<b>Moore, Sean D*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of Massachusetts - Amherst	1991
			M.A.	Georgetown University	1995
			Ph.D.	Duke University	2003
<b>Moore, Timothy S</b>	RESEARCH ASSISTANT PROFESSOR	Ocean Process Analysis Lab	B.S.	Worcester Polytechnic Institute	1989
			Ph.D.	University of New Hampshire	2008
			M.S.	University of Rhode Island	1995
<b>Moran, Catherine L</b>	SENIOR LECTURER	Sociology	B.A.	University of New England	1994
			M.Sc.	London School of Economics	1996
			Ph.D.	University of New Hampshire	2004
<b>Morrell, Jesse Stabile</b>	LECTURER	Molecular, Cellular, &	B.S.	University of New	1999

		Biomedical		Hampshire	
			M.S.	University of New Hampshire	2004
			Ph.D.	University of New Hampshire	2013
<b>Morton, Cory M*</b>	ASSISTANT PROFESSOR	Social Work	D	Rutgers University	2012
			Ph.D.	Rutgers University	2012
<b>Moses, Jennifer K*</b>	PROFESSOR	Art and Art History	B.F.A.	Temple University	1983
			M.F.A.	Indiana University - Bloomington	1987
<b>Moses, Mark D*</b>	CLINICAL ASSOCIATE PROFESSOR	Human Development & Family Studies	B.A.	Northeastern University	1971
			M.Ed.	Springfield College	1972
			C.A.G.S.	University of New Hampshire	1977
			Ph.D.	Ohio University	1979
<b>Mosher, David C*</b>	PROFESSOR	Earth Sciences	B.S.	Acadia Univ	1983
			M.S.	Memorial University - Canada	1987
			Ph.D.	Dalhousie University, Canada	1993
<b>Mukasa, Samuel B*</b>	DEAN	Dean's Office - CEPS	B.S.	University of New Hampshire	1977
			M.S.	Ohio State University	1980
			Ph.D.	University of California - Santa Barbara	1984
<b>Mulligan, Shelley E*</b>	ASSOCIATE PROFESSOR	Occupational Therapy	B.S.	University of Western Ontario, Canada	1985
			M.S.	Colorado State University	1990
			Ph.D.	University of Washington	1997
<b>Munoz Pina, Margarita</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	Monterey Institute	1989
			M.A.	University of Salamanca, Spain	2007
<b>Murphy, William J</b>	PROFESSOR	UNHL JD Instruction	B.A.	Denison University	1971
			J.D.	Pennsylvania State	1974



				University	
			M.B.A.	Harvard University	1981
			D.B.A.	Harvard University	1987
<b>Narayan, Arvind</b>	LECTURER	Computer Science	B.S.	University of Mysore in India	1985
			M.S.	University of Massachusetts - Lowell	1990
<b>Nardone, H Gay</b>	PROFESSOR	Theatre & Dance	B.F.A.	The Boston Conservatory	1974
			M.F.A.	The Boston Conservatory	1990
<b>Neal, Catherine A*</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Food and Agriculture	B.S.	University of Massachusetts - Amherst	1976
			M.S.	Cornell University	1981
			Ph.D.	Cornell University	1983
<b>Nedyalkov, Ivaylo</b>	LECTURER	Mechanical Engineering	B.S.	Sofia University, Bulgaria	2007
			Ph.D.	University of New Hampshire	2015
			M.S.	Chalmers University of Technology, Sweden	2013
<b>Needle, David B</b>	CLINICAL ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	Tufts University	2003
			D.V.M.	Tufts University	2011
<b>Neefus, Christopher D*</b>	PROFESSOR	Biological Sciences	B.A.	Boston University	1971
			Ph.D.	University of New Hampshire	1982
<b>Negron-Gonzales, Melinda</b>	ASSISTANT PROFESSOR	UNHM Degree Programs	B.A.	University of Florida	1997
			M.A.	University of Florida	2004
			Ph.D.	University of Florida	2009
<b>Nesbitt, Kimberly T*</b>	ASSISTANT PROFESSOR	Child Study and Development Center	Ph.D.	North Carolina State University	2010
<b>Newman, Anna C</b>	LECTURER	Classics, Humanities & Ital Studies	Lizenziat	University of Zurich, Switzerland	1981
<b>Nikshych, Dmitri *</b>	PROFESSOR	Mathematics & Statistics	B.S.	National Technical University, Ukraine	1994

			M.S.	National Technical University, Ukraine	1996
			Ph.D.	University of California - Los Angeles	2001
<b>Niland, Karen Sue</b>	LECTURER	Nursing	B.S.	University of New Hampshire	1989
			M.S.	University of New Hampshire	1999
<b>Niman, Neil B*</b>	ASSOCIATE DEAN	Dean's Office	B.A.	University of California - Santa Cruz	1978
			M.A.	University of California - Riverside	1980
			Ph.D.	University of Texas	1985
<b>Nisbet, Jane A*</b>	SENIOR VICE PROVOST FOR RESEARCH	Research Office Central Operations	B.S.	Simmons College	1977
			M.S.	University of Wisconsin	1980
			Ph.D.	University of Wisconsin	1983
<b>Nolte, Kerry L</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	B.S.	Northeastern University	2006
			M.S.N.	University of New Hampshire	2009
<b>O'Brien, Edward J*</b>	PROFESSOR	Psychology	B.A.	Framingham State College	1978
			M.A.	State University of New York at Oswego	1980
			Ph.D.	University of Massachusetts - Amherst	1984
<b>O'Hern, Matthew S*</b>	ASSISTANT PROFESSOR	Marketing	M.B.A.	Indiana University	1989
			B.A.	Grinnell College	1990
			Ph.D.	University of Wisconsin	2009
<b>O'Keefe, Christine Marie</b>	LECTURER	English	B.A.	Rivier College	1993
			M.A.	Midwestern State University	1996
			M.F.A.	Emerson College (Mass)	2004
<b>O'Sullivan, Jeanne H</b>	CLINICAL ASSOCIATE PROFESSOR	Communications Disorders	B.A.	Bates College	1976

			M.Ed.	Northeastern University	1979
<b>Ogden, Andrew B</b>	LECTURER	Biological Sciences	B.A.	University of North Carolina at Chapel Hill	1998
			M.S.	University of Georgia	2009
<b>Ogembo, Justus M*</b>	ASSOCIATE PROFESSOR	Education	B.A.	Kenyatta University, Kenya	1986
			M.A.	University of Nairobi, Kenya	1990
			Ph.D.	Harvard University	1997
<b>Ollinger, Scott V*</b>	PROFESSOR	Natural Resources & The Environment	B.S.	State University of New York	1989
			M.S.	University of New Hampshire	1992
			Ph.D.	University of New Hampshire	2000
<b>Onosko, Joseph J*</b>	ASSOCIATE PROFESSOR	Education	B.S.	University of Wisconsin - Madison	1979
			M.S.	University of Wisconsin - Madison	1984
			Ph.D.	University of Wisconsin - Madison	1988
<b>Orcutt, John L</b>	PROFESSOR	UNHL JD Instruction	B.A.	University of California - Berkeley	1990
			J.D.	University of California - Berkeley	1993
<b>Orhon, Mehmet</b>	LECTURER	Mathematics & Statistics	B.S.	University of New Castle, UK	1965
			Ph.D.	Univ of Wales Eng	1969
<b>Orliac, Pascal</b>	LECTURER	Management	M.B.A.	HEC Paris, France	1980
<b>Ormeçi Matoglu, Melda *</b>	ASSISTANT PROFESSOR	Decisions Sciences	B.S.	University of Jordan, Amman	1999
			M.S.	Georgia Institute of Technology	2001
			Ph.D.	Georgia Institute of Technology	2006
<b>Orovich, Nicholas N*</b>	PROFESSOR	Music	B.A.	University of Wisconsin - Madison	1976
			M.M.	The New England Conservatory of Music	1978
				University of	

<b>Ortmeier, Christina M*</b>	ASSOCIATE PROFESSOR	English	B.A.	Massachusetts - Amherst	1995
			M.A.T.	University of New Hampshire	1998
			Ph.D.	University of New Hampshire	2007
<b>Ozabaci, Deniz *</b>	ASSISTANT PROFESSOR	Economics	Ph.D.	State University of New York at Binghamton	2014
<b>Pack, Thomas L</b>	LECTURER	Thompson School of Applied Science	M.	Southern Nh University	2008
<b>Paglia, Alison Kolbe</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.A.	Texas Tech University	1992
			M.A.	Texas Tech University	1994
			Ph.D.	Texas Tech University	1998
<b>Palace, Michael W*</b>	ASSOCIATE PROFESSOR	Earth Systems Research Center	B.A.	University of Virginia	1992
			M.S.	University of Virginia	1995
			Ph.D.	University of New Hampshire	2006
<b>Paquin, Andrea M</b>	LECTURER	English	B.A.	New York University	2007
			M.Ed.	Boston University	2011
<b>Paterson, Susanne F</b>	ASSOCIATE PROFESSOR	Humanities	B.A.	University of East Anglia, United Kingdom	1989
			M.A.	Purdue University	1992
			Ph.D.	University of Texas at Austin	2001
<b>Payne, Thomas L*</b>	ASSOCIATE PROFESSOR	English	B.A.	Princeton University	1984
			M.F.A.	Columbia University in the City of New York	1996
			M.F.A.	Princeton University	2006
<b>Pazicni, Samuel *</b>	ASSOCIATE PROFESSOR	Chemistry	B.A.	Washington & Jefferson College	2001
			M.S.	University of Wisconsin	2003
			Ph.D.	University of Wisconsin	2006
<b>Pe'eri, Shachak *</b>	RESEARCH ASSOCIATE PROFESSOR	Center for Coastal & Ocean	B.S.	Tel Aviv University	1996

		Mapping	M.S.	Tel Aviv University	1997
			Ph.D.	Tel Aviv University	2005
<b>Peebles, Catherine M</b>	PRINCIPAL LECTURER	Classics, Humanities & Ital Studies	B.A.	University of Virginia	1990
			M.A.	State University of New York at Binghamton	1994
			Ph.D.	State University of New York at Binghamton	2000
<b>Pekins, Peter J*</b>	PROFESSOR	Natural Resources & The Environment	B.A.	State University of New York at Plattsburgh	1976
			M.S.	University of New Hampshire	1981
			Ph.D.	Utah State University	1988
<b>Pelletier, Donna M*</b>	CLINICAL ASSOCIATE PROFESSOR	Nursing	B.S.	University of Massachusetts - Amherst	1977
			M.S.	University of New Hampshire	2000
<b>Pennock, Jonathan Rhoads*</b>	DIRECTOR	Marine Sciences & Ocean Engineering	B.A.	Earlham College	1978
			M.S.	University of Delaware	1981
			Ph.D.	University of Delaware	1983
<b>Peracchi, Kelly Ann</b>	SENIOR LECTURER	Psychology	B.A.	Saint Anselm'S College	1999
			M.A.	University of New Hampshire	2001
			Ph.D.	University of New Hampshire	2004
<b>Perkins, Donna M*</b>	CLINICAL ASSOCIATE PROFESSOR	Justice Studies Program	B.A.	University of Southern Maine	1997
			M.A.	University of New Hampshire	2000
			M.S.	University of New Hampshire	2003
			Ph.D.	University of New Hampshire	2003
<b>Pescosolido, Anthony T*</b>	ASSOCIATE PROFESSOR	Management	B.A.	Harvard University	1991

			Ph.D.	Case Western Reserve University	2001
<b>Peshkova, Svetlana A</b>	ASSOCIATE PROFESSOR	Anthropology	M.A.	Moscow State Linguistic University, Russia	1996
			MTS	Emory University	1999
			M.A.	Syracuse University	2002
			Ph.D.	Syracuse University	2006
<b>Peterson, Julia M</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Natural Resources	B.A.	Connecticut College	1982
			M.S.	Antioch New England, Keene, N.	1989
<b>Pfeiffer, Bruce E*</b>	ASSOCIATE PROFESSOR	Marketing	B.S.	University of Colorado at Boulder	1991
			M.B.A.	Rockhurst University	1997
			M.S.	University of Colorado at Boulder	2005
			Ph.D.	University of Cincinnati	2008
<b>Phan, Loan T*</b>	ASSOCIATE PROFESSOR	Education	B.S.	University of Washington	1994
			M.A.	University of Nevada - Reno	1998
			Ph.D.	University of Nevada - Reno	2001
<b>Phillips, Prentiss</b>	LECTURER	English	B.A.	Antioch College	1972
			M.A.T.	School for International Training	1975
<b>Pietro, Kevin J</b>	CLINICAL ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Illinois State Univ	2010
			M.S.	Illinois State Univ	2012
<b>Pillemer, David B*</b>	PROFESSOR	Psychology	B.A.	University of Chicago	1972
			Ed.D.	Harvard University	1979
<b>Pillet-Shore, Danielle M</b>	ASSOCIATE PROFESSOR	Communication	B.A.	University of California - Los Angeles	1998
			M.A.	University of California - Los Angeles	2001
			Ph.D.	University of California - Los Angeles	2008

<b>Pimpare, Stephen</b>	LECTURER	Political Science			
<b>Piotrowski, Thaddeus M</b>	PROFESSOR	Natural & Social Sciences	B.A.	Saint Francis University	1963
			M.A.	University of Pennsylvania	1969
			Ph.D.	University of Pennsylvania	1972
<b>Pistole, Thomas G*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	Ph.D.	Wayne State University	1964
			M.S.	Wayne State University	1966
			Ph.D.	University of Utah	1969
<b>Plachetzki, David C*</b>	ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Northern Michigan Univ	1996
			M.S.	Northern Michigan Univ	2000
			Ph.D.	University of California - Santa Barbara	2009
<b>Planalp, Roy P*</b>	ASSOCIATE PROFESSOR	Chemistry	B.S.	Massachusetts Institute of Technology	1979
			Ph.D.	University of California - Berkeley	1983
<b>Plante, Amy Solomon</b>	CLINICAL ASSOCIATE PROFESSOR	Communications Disorders	B.S.	University of New Hampshire	1980
			M.S.	University of New Hampshire	1982
<b>Plante, Catherine Craycraft*</b>	ASSOCIATE PROFESSOR	Accounting and Finance	B.A.	University of Cincinnati	1983
			M.A.	University of Missouri - Columbia	1985
			Ph.D.	Ohio State University	1991
<b>Plante, Donald J</b>	LECTURER	UNHM Degree Programs	B.S.	University of Rhode Island	2005
			M.S.	University of Rhode Island	2007
			Ph.D.	Tufts University	2012
<b>Plunkett, Leah A W</b>	ASSOCIATE PROFESSOR	UNHL Academic Success Program	A.B.	Harvard University	2001
			B.A.	Harvard University	2001

			J.D.	Harvard University	2006
<b>Pohl, Karsten *</b>	PROFESSOR	Physics	Diploma	Ludwig Maximilian University of Munich, Germany	1990
			Ph.D.	University of Pennsylvania	1997
<b>Pokorny, Ruwa M</b>	LECTURER	Languages, Literatures, & Cultures	B.S.	University of New Hampshire	1985
<b>Polasky, Janet L*</b>	PROFESSOR	History	B.A.	Carleton College	1973
			M.A.	Stanford University	1974
			Ph.D.	Stanford University	1978
<b>Portnoy, Neil</b>	LECTURER	Mathematics & Statistics	A.A.S.	Univ of Hartford	1976
			B.A.	University of Southern Maine	1992
			M.S.	University of New Hampshire	1996
			Ph.D.	University of New Hampshire	1998
<b>Potter, Sharyn J*</b>	ASSOCIATE PROFESSOR	Sociology	B.S.	State University of New York	1989
			M.P.H.	Emory University	1994
			Ph.D.	Emory University	1998
<b>Poworoznek, Emily LeViness</b>	ASSOCIATE PROFESSOR	Math/Engineering Library	B.A.	State University of New York at Purchase	1982
			M.S.	University of New Hampshire	1986
			M.L.S.	University of Rhode Island	1993
<b>Prelli, Lawrence J*</b>	PROFESSOR	Communication	B.S.	State University of New York at Brockport	1977
			M.A.	University at Albany	1979
			Ph.D.	Pennsylvania State University	1984
			M.S.	University of New Hampshire	1998
<b>Prescott, Sarah Grace</b>	ASSOCIATE PROFESSOR	UNHM Degree Programs	B.S.	Worcester Polytechnic Institute	1993
			M.Ed.	University of New Hampshire	1999
				University of New	



			Ph.D.	Hampshire	2006
<b>Price, William N</b>	ASSISTANT PROFESSOR	UNHL JD Instruction	A.B.	Harvard University	2004
			Ph.D.	Columbia University in the City of New York	2010
			J.D.	Columbia University in the City of New York	2011
<b>Pringle, James M*</b>	ASSOCIATE PROFESSOR	Earth Sciences - Joint Positions	B.S.	Dartmouth College	1990
			Ph.D.	Massachusetts Institute of Technology	1998
<b>Proctor, Sarah E</b>	CLINICAL ASSISTANT PROFESSOR	Thompson School of Applied Science	B.S.	University of New Hampshire	1996
			D.V.M.	Cornell University	2000
<b>Provost, Lauren E*</b>	RESEARCH ASSISTANT PROFESSOR	Computer Science	B.S.	University of Texas at Austin	2002
			M.S.T.	University of New Hampshire	2009
			Ph.D.	University of New Hampshire	2013
<b>Pruiksmas, Rose A</b>	LECTURER	Music	B.A.	Calvin College	1989
			M.M.	University of Michigan	1992
			M.A.	University of Michigan	1994
			Ph.D.	University of Michigan	1999
<b>Puccilli, Patricia A*</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	B.S.	University of New Hampshire	2005
			M.S.	University of New Hampshire	2007
<b>Pugh, R Michael</b>	LECTURER	UNHM Degree Programs	B.A.	Dartmouth College	1966
			M.A.	Paterson State College	1986
			Ph.D.	University of New Hampshire	1994
<b>Pugh, Stephen R</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.A.	Ripon College	1976
			M.S.	University of North	1980

			Ph.D.	Dakota	
				Boston University	1989
<b>Pulkkinen, Cindy Ann</b>	PRINCIPAL LECTURER	Languages, Literatures, & Cultures	B.A.	University of Texas	1983
			M.A.	University of New Hampshire	1997
<b>Purrenhage, Jennifer L</b>	LECTURER	Natural Resources & The Environment	B.S.	University of Wisconsin	1998
			M.S.	University of Akron	2004
			Ph.D.	Miami University - Ohio	2009
<b>Putnam, Charles T*</b>	CLINICAL PROFESSOR	Dean's Office - Liberal Arts	B.A.	Yale University	1979
			J.D.	University of Connecticut	1985
<b>Quigley, Donald W</b>	PROFESSOR	Thompson School of Applied Science	B.S.F.	University of New Hampshire	1976
			M.S.	University of New Hampshire	1978
<b>Quinn, Timothy J*</b>	ASSOCIATE PROFESSOR	Kinesiology	B.S.	Bradley University	1979
			M.A.	Michigan State University	1983
			Ph.D.	Michigan State University	1987
<b>Raeder, Joachim *</b>	PROFESSOR	Physics - Joint Positions	Diploma	University of Cologne, Germany	1985
			Ph.D.	University of Cologne, Germany	1989
<b>Ragland, Linda G*</b>	ASSISTANT PROFESSOR	Accounting and Finance	B.S.	University of Tennessee	1993
			M.Acc.	University of Tennessee	1999
			Ph.D.	University of South Florida	2011
<b>Ramadanovic, Petar *</b>	PROFESSOR	English	B.A.	University of Belgrade, Serbia	1989
			M.A.	State University of New York at Binghamton	1993
			Ph.D.	State University of New York at Binghamton	1997

<b>Ramsay, James D</b>	PROFESSOR	Political Science	M.A.	University of Wisconsin	
			Ph.D.	University of Wisconsin	
<b>Ramsey, David L</b>	PROFESSOR	Theatre & Dance	B.A.	Plymouth State University	1973
			M.F.A.	University of North Carolina	1977
<b>Ramsey, Philip J</b>	LECTURER	Mathematics & Statistics	B.A.	University of New Hampshire	1974
			M.S.	Southern Ill Univ-Edwardsville	1986
			Ph.D.	Virginia Polytechnic Institute and State University	1989
<b>Ranfoss, Lisa M</b>	CLINICAL ASSISTANT PROFESSOR	Human Development & Family Studies	M.S.	Wheelock College	2007
			A.S.	New Hampshire Technical Instit	
			B.S.	University of New Hampshire	
<b>Raymond, Kristin L</b>	LECTURER	English	B.A.	Saint Michael'S College	2006
			M.A.	Saint Michael'S College	2007
<b>Reagan, Emilie N*</b>	ASSISTANT PROFESSOR	Education	B.S.	Georgetown University	2003
			M.S.	Saint Joseph's University	2005
			Ph.D.	Boston College	2011
<b>Reardon, Lawrence C*</b>	ASSOCIATE PROFESSOR	Political Science	B.A.	Johns Hopkins University	1979
			M.I.A.	Columbia University in the City of New York	1983
			M.Phil.	Columbia University in the City of New York	1986
			Ph.D.	Columbia University in the City of New York	1991
<b>Rebellion, Cesar J*</b>	PROFESSOR	Sociology	B.A.	Rice University	1996
			M.A.	Emory University	1999
			Ph.D.	Emory University	2002

<b>Rehan, Sandra M*</b>	ASSISTANT PROFESSOR	Biological Sciences	B.S.	Brock University	2007
			Ph.D.	Brock University	2011
<b>Reichard, Amanda</b>	RESEARCH ASSISTANT PROFESSOR	Institute on Disability	B.A.	Davidson College	1993
			M.S.	Harvard University	1996
			Ph.D.	University of Kansas	2001
<b>Reilly, Ruth A*</b>	CLINICAL ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Florida State University	1965
			M.O.E.	University of New Hampshire	1989
			Ph.D.	University of New Hampshire	1998
<b>Reinhold, Vernon *</b>	RESEARCH PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of New Hampshire	1959
			M.S.	University of New Hampshire	1961
			Ph.D.	University of Vermont	1965
<b>Remar, Daniel A G*</b>	ASSISTANT PROFESSOR	Hospitality Management	Ph.D.	University of South Carolina	2015
<b>Resch, John P</b>	PROFESSOR	Humanities	B.A.	Denison University	1962
			M.A.	Ohio State University	1965
			Ph.D.	Ohio State University	1969
<b>Reynolds, Edward J</b>	LECTURER	Communication	B.A.	Australian National University	2000
			M.A.	Australian National University	2009
			Ph.D.	University of Queensland, Bris	2013
<b>Reynolds, Samantha C</b>	LECTURER	UNHM Degree Programs	B.A.	Winthrop University	2007
			B.S.	Winthrop University	2007
			Ph.D.	Dartmouth College	2012
<b>Rhiel, Mary E</b>	INTERIM SENIOR VICE PROVOST	Provost Office	B.S.	University of Wisconsin - River Falls	1971
			B.S.	University of Wisconsin - River Falls	1971
			M.A.	University of Wisconsin - Madison	1978

			M.A.	University of Wisconsin - Madison	1978
			Ph.D.	University of Wisconsin - Madison	1988
			Ph.D.	University of Wisconsin - Madison	1988
<b>Richards, Harry J*</b>	DEAN	Graduate School Administration	B.A.	State University of New York at Potsdam	1968
			M.S.	University at Albany	1969
			Ph.D.	Florida State University	1978
<b>Richman, David M</b>	PROFESSOR	Theatre & Dance	B.A.	Harvard University	1972
			Ph.D.	Stanford University	1979
<b>Rigg, Sarah H</b>	LECTURER	Biological Sciences	B.S.	University of New Hampshire	1998
<b>Rioux, James M</b>	LECTURER	English	B.A.	University of New Hampshire	1992
			M.F.A.	Georgia State University	1997
<b>Ripley, David K*</b>	PROFESSOR	Music	B.A.	Harvard University	1970
			M.M.	The New England Conservatory of Music	1977
<b>Rivard, David A*</b>	PROFESSOR	English	B.A.	University of Massachusetts - Dartmouth	1975
			M.F.A.	University of Arizona	1982
			M.F.A.	University of Massachusetts - Dartmouth	1983
<b>Robb, Judith A*</b>	ASSOCIATE PROFESSOR	Education	A.B.	Connecticut College	1967
			M.A.	University of South Florida	1969
			Ed.D.	University of Rochester	1982
<b>Roberts, Alexandra</b>	ASSISTANT PROFESSOR	UNHL FP IP Center	B.A.	Dartmouth College	2002
			A.B.	Stanford University	2003
			J.D.	Yale University	2008
<b>Robertson, Robert A*</b>	ASSOCIATE PROFESSOR	Natural Resources & The Environment	B.A.	Western Illinois University	1981
				Oregon State	

			M.A.	University	1984
			Ph.D.	University of Illinois at Urbana-Champaign	1990
<b>Rodgers, Melissa S</b>	CLINICAL ASSISTANT PROFESSOR	Kinesiology	B.S.	Pennsylvania State University	2003
			M.Ed.	University of Alabama	2006
<b>Rodriguez, Julia E*</b>	ASSOCIATE PROFESSOR	History	B.A.	The New School	1989
			M.A.	The New School	1992
			M.Phil.	Columbia University in the City of New York	1995
			Ph.D.	Columbia University in the City of New York	2000
<b>Rodriguez, Lindsey M*</b>	ASSISTANT PROFESSOR	Psychology	B.S.	University of Florida	2008
			M.A.	University of Houston	2010
			Ph.D.	University of Houston	2014
<b>Ross, Robert S*</b>	ASSISTANT PROFESSOR	Psychology	B.A.	Fairleigh Dickinson University	1997
			M.A.	Boston University	1999
			Ph.D.	Boston University	2006
<b>Ross, William E</b>	PROFESSOR	Special Collections	B.A.	East Carolina University	1977
			M.A.	University of Maryland	1980
			M.L.S.	University of Maryland	1980
			Ph.D.	American University	1992
<b>Rossi, Maria I</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	Univ De Costa Rica, San Jose	1976
			M.A.	University of New Hampshire	2007
<b>Roth, George L</b>	LECTURER	Management	B.S.	University of New Hampshire	1979
			M.B.A.	University of New Hampshire	1980
			Ph.D.	Massachusetts Institute of Technology	1993
		Natural			

<b>Rowe, Rebecca J*</b>	ASSISTANT PROFESSOR	Resources & The Environment	B.A.	Bowdoin College	1997
			Ph.D.	University of Chicago	2006
<b>Ruane, Nicole J</b>	LECTURER	Classics, Humanities & Ital Studies	B.A.	Hamilton College	1992
			M.A.	Union Theological Seminary	1995
			Ph.D.	Union Theological Seminary	2005
<b>Rubini, Loris *</b>	ASSISTANT PROFESSOR	Economics	Ph.D.	Arizona State University	2010
<b>Rucinski, Andrzej *</b>	PROFESSOR	Electrical & Computer Eng Dept	M.S.	Odessa College	1973
			Ph.D.	Gdansk University of Technology, Poland	1982
			B.S.	Xi'an Jiaotong University, China	2002
<b>Ruml, Wheeler *</b>	ASSOCIATE PROFESSOR	Computer Science	A.S./B.S.	Harvard University	1993
			Ph.D.	Harvard University	2002
<b>Rush, Lee Pozzi</b>	CLINICAL ASSISTANT PROFESSOR	Social Work	B.S.W.	Syracuse University	1980
			M.S.W.	Boston College	1982
<b>Ryan, James M*</b>	PROFESSOR	Physics	B.S.	University of California - Riverside	1970
			M.S.	University of California - San Diego	1974
			Ph.D.	University of California - Riverside	1978
<b>Ryan, Joelle R</b>	LECTURER	Women's Studies Program	B.A.	University of New Hampshire	1996
			M.A.	University of Northern Iowa	2000
			M.A.	University of New Hampshire	2002
			Ph.D.	Bowling Green State University	2009
<b>Rzhanov, Yuri *</b>	RESEARCH PROFESSOR	Center for Coastal & Ocean Mapping	M.S.	Novosibirsk State University,	1978
			Ph.D.	Academy of Science of Russia,	1983

<b>Sabin, Mihaela C*</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.S.	University of Bucharest, Hungary	1984
			M.S.	University of Bucharest, Hungary	1984
			M.S.T.	University of New Hampshire	2003
			Ph.D.	University of New Hampshire	2003
<b>Sable, Janet R*</b>	PROFESSOR	Recreation Management & Policy	B.A.	University of Michigan	1975
			M.S.	Northeastern University	1981
			Ed.D.	Boston University	1989
<b>Safford, Thomas G*</b>	ASSOCIATE PROFESSOR	Sociology	B.A.	University of North Carolina at Chapel Hill	1989
			M.A.	Stanford University	1995
			Ph.D.	Cornell University	2004
<b>Saglam, Aziz I</b>	LECTURER	Economics	B.S.	Middle East Tech Univ	1996
			M.A.	Bilkent University	1996
			M.A.	University of Pittsburgh	1998
			Ph.D.	West Virginia University	2006
<b>Salisbury, Joseph E*</b>	RESEARCH ASSOCIATE PROFESSOR	Ocean Process Analysis Lab	B.A.	University of Southern Maine	1980
			M.S.	University of Southern Maine	1990
			Ph.D.	University of New Hampshire	2003
<b>Salvio, Paula M*</b>	PROFESSOR	Education	B.A.	Fordham University	1981
			M.A.	Wesleyan University	1983
			Ph.D.	University of Rochester	1989
<b>Salyer, Lucy E*</b>	ASSOCIATE PROFESSOR	History	B.A.	University of California - San Diego	1979
			M.A.	University of California - Berkeley	1983
			Ph.D.	University of California - Berkeley	1989



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			Ph.D.	University of Pittsburgh	1995
<b>Samuels, Joanne G*</b>	ASSOCIATE PROFESSOR	Nursing	B.S.N.	Northeastern University	1978
			M.S.	Boston University	1984
			Ph.D.	University of Massachusetts - Amherst	2007
<b>Sandstrom, Anna K</b>	PRINCIPAL LECTURER	Languages, Literatures, & Cultures	B.A.	Colby College	1985
			M.A.	University of Massachusetts - Amherst	1992
<b>Sansom, Dana M</b>	ASSOCIATE PROFESSOR	Thompson School of Applied Science	A.A.	University of New Hampshire	1977
			B.S.	University of New Hampshire	1983
			M.Ed.	University of New Hampshire	1985
<b>Scala, Dante J*</b>	ASSOCIATE PROFESSOR	Political Science	B.A.	Villanova University	1990
			M.A.	University of Chicago	1993
			Ph.D.	University of Chicago	2000
<b>Schefer, Donna L</b>	LECTURER	Communications Disorders	B.S.	Trenton State College	1984
			M.Ed.	Boston University	1991
<b>Scherr, Albert E</b>	PROFESSOR	UNHL JD Instruction	B.A.	Yale University	1976
			J.D.	Vermont Law School, So Royalto	1981
<b>Schmidt, Torsten *</b>	ASSOCIATE PROFESSOR	Economics	M.A.	University of Florida	1984
			Ph.D.	University of Florida	1990
<b>Schram, Thomas H*</b>	ASSOCIATE PROFESSOR	Education	B.A.	Dartmouth College	1978
			B.A.	University of Wyoming	1982
			M.Ed.	University of Oregon	1987
			Ph.D.	University of Oregon	1990
<b>Schuh, Mary Clare*</b>	RESEARCH ASSISTANT PROFESSOR	Institute on Disability	B.A.	State University of New York at Geneseo	1984
			M.A.	Syracuse University	1987

			M.F.A.	University of New Hampshire	1987
			Ph.D.	University of New Hampshire	2002
<b>Schwadron, Nathan A*</b>	PROFESSOR	Physics - Joint Positions	B.A.	Oberlin College	1990
			Ph.D.	University of Michigan	1997
<b>Sciabarrasi, Michael R</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Food and Agriculture	B.S.	University of Massachusetts - Lowell	1976
			M.S.	Virginia Polytechnic Institute and State University	1978
<b>Scogland, Elissa</b>	LECTURER	English	B.A.	Bentley College	1992
			M.Ed.	Harvard University	1993
<b>Seal, Samantha L</b>	ASSISTANT PROFESSOR	English	B.A.	Washington University - St Louis	2006
			M.A.	Yale University	2010
			M.Phil.	Yale University	2010
			Ph.D.	Yale University	2012
<b>Seaman, Jayson O*</b>	ASSOCIATE PROFESSOR	Kinesiology	B.S.	New England College	1994
			M.S.	University of New Hampshire	1999
			Ph.D.	University of New Hampshire	2006
<b>Sedory, Daniel R</b>	CLINICAL ASSOCIATE PROFESSOR	Kinesiology	B.S.	University of Pittsburgh	1982
			M.S.	University of Arizona	1984
<b>Seeley, William P</b>	LECTURER	Philosophy	Ph.D.	Columbia University in the City of New York	1988
			M.F.A.	Columbia University in the City of New York	1992
			Ph.D.	City University of New York	2006
<b>Seichepine, Daniel R</b>	LECTURER	Psychology	B.A.	California State University, C	2002
			M.A.	Boston University	2005
			Ph.D.	Boston University	2011
			Post-doctor	Boston University	2013

<b>Seitz, William Rudolf*</b>	PROFESSOR	Chemistry	A.B.	Princeton University	1965
			Ph.D.	Massachusetts Institute of Technology	1970
<b>Sell, Nancy L</b>	SENIOR LECTURER	English	B.A.	Michigan State University	1983
			M.A.	Eastern Michigan Univ	1990
<b>Semenova, Oksana V</b>	SENIOR LECTURER	English	B.A.	Kramatorsk Inst Econ to Humani	1997
			M.A.	University of New Hampshire	2005
			M.Ed.	University of New Hampshire	2012
<b>Senier, Siobhan *</b>	ASSOCIATE PROFESSOR	English	A.B.	Bowdoin College	1987
			M.A.	University of Illinois at Urbana-Champaign	1992
			Ph.D.	University of Illinois at Urbana-Champaign	1997
<b>Shannon, Patrick *</b>	ASSOCIATE PROFESSOR	Social Work	B.A.	State University of New York at Buffalo	1990
			M.S.W.	State University of New York at Buffalo	1993
			Ph.D.	University of Virginia	2000
<b>Sharkey, Judith A*</b>	ASSOCIATE PROFESSOR	Education	B.A.	Franklin Pierce College	1984
			M.A.T.	School for International Training	1990
			Ph.D.	Pennsylvania State University	2000
<b>Sharp, Dayle B*</b>	CLINICAL ASSOCIATE PROFESSOR	Nursing	DNP	El Paso Univ of Texas	2014
<b>Sharp, Erin H*</b>	ASSOCIATE PROFESSOR	Human Development & Family Studies	B.S.	Virginia Commonwealth University	1999
			M.S.	Pennsylvania State University	2003
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<b>Sharpe, Sheree T*</b>	ASSISTANT PROFESSOR	Mathematics & Statistics	B.A.	Wesleyan College	2004
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<b>Shea, Christine M*</b>	PROFESSOR	Decisions Sciences	B.A.	Wilfrid Laurier University, Canada	1980
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			Ph.D.	University of Western Ontario, Canada	1995
<b>Shen, Junhao *</b>	PROFESSOR	Mathematics & Statistics	B.S.	Nanjing University, China	1993
			M.S.	Nanjing University, China	1996
			Ph.D.	University of Pennsylvania	2004
<b>Sheriff, Robin E</b>	ASSOCIATE PROFESSOR	Anthropology	B.A.	Bard College	1984
			Ph.D.	City University of New York	1997
<b>Sherman, Sarah W*</b>	PROFESSOR	English	B.A.	Marlboro College	1972
			Ph.D.	Brown University	1983
<b>Shetty, Sandhya *</b>	ASSOCIATE PROFESSOR	English	B.A.	University of Poona, India	1977
			M.A.	University of Poona, India	1979
			M.A.	University of Rochester	1982
			Ph.D.	University of Rochester	1987
<b>Shiklomanov, Alexander I*</b>	RESEARCH ASSISTANT PROFESSOR	Earth Systems Research Center	B.S.	Hydzometeozological University	1981
			M.S.	Hydzometeozological University	1983
			Ph.D.	Hydzometeozological University	1996
<b>Shore, Barry *</b>	PROFESSOR	Decisions Sciences	B.S.	Tufts University	1960
			M.B.A.	University of Massachusetts - Amherst	1963
			Ph.D.	University of Wisconsin	1968
<b>Shore, Samuel D*</b>	PROFESSOR	Mathematics & Statistics	B.S.	Juniata College	1959
			M.A.	Pennsylvania State University	1961
				Pennsylvania State	

			Ph.D.	University	1964
<b>Short, Frederick T*</b>	RESEARCH PROFESSOR	Natural Resources & The Environment	B.A.	Plymouth State University	1972
			M.S.	University of Rhode Island	1976
<b>Short, Kevin M*</b>	PROFESSOR	Mathematics & Statistics	B.A.	University of Rochester	1985
			B.S.	University of Rochester	1985
			Ph.D.	Imperial College London, United Kingdom	1988
<b>Shubov, Marianna A*</b>	PROFESSOR	Mathematics & Statistics	M.S.	Saint Petersburg State University, Russia	1972
			Ph.D.	Saint Petersburg State University, Russia	1985
<b>Sideman, Rebecca G*</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Food and Agriculture	B.A.	Dartmouth College	1994
			Ph.D.	Cornell University	1999
<b>Sidor, Inga F*</b>	CLINICAL ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	Reed College	1992
			D.V.M.	Tufts University	1999
			M.S.	University of Connecticut	2004
<b>Siggelakis, Susan J*</b>	ASSOCIATE PROFESSOR	Political Science	B.A.	Rutgers University	1979
			M.A.	Johns Hopkins University	1983
			Ph.D.	Johns Hopkins University	1988
<b>Silva Pimentel, Diane H*</b>	ASSISTANT PROFESSOR	Education	Sc.B.	Brown University	1993
			M.S.T.	Boston College	1995
			Ph.D.	Boston College	2012
<b>Silverman, Daniel S</b>	LECTURER	Decisions Sciences	B.A.	State University of New York	1994
			M.B.A.	University of New Hampshire	2007
<b>Simonton, Deborah L</b>	CLINICAL ASSISTANT PROFESSOR	Nursing	B.S.	University of New Hampshire	1983
			M.S.	University of New Hampshire	1998

<b>Simos, Evangelos O*</b>	PROFESSOR	Economics	B.S.	National and Kapodistrian University of Athens, Greece	1972
			M.A.	Northern Illinois University	1974
			Ph.D.	Northern Illinois University	1977
<b>Slifer, Karl J*</b>	ASSOCIATE PROFESSOR	Physics	B.S.	Temple University	1995
			Ph.D.	Temple University	2004
<b>Slomba, Elizabeth A</b>	PROFESSOR	Special Collections	B.A.	Mount Holyoke College	1991
			M.A.	University of Virginia	1993
			M.L.S.	University of Maryland	1998
<b>Smick-Attisano, Regina A</b>	DIRECTOR	Thompson School of Applied Science	B.S.	University of Maryland	1982
			M.S.	University of Maryland	1984
			Ed.D.	Virginia Polytechnic Institute and State University	1988
<b>Smith, Andrew E*</b>	DIRECTOR	Dean's Office - Liberal Arts	B.A.	University of Cincinnati	1983
			M.A.	University of Cincinnati	1987
			Ph.D.	University of Cincinnati	1997
<b>Smith, Charles W*</b>	RESEARCH PROFESSOR	Space Science Center	B.S.	University of Maryland	1977
			Ph.D.	College of William and Mary	1979
			M.S.	College of William and Mary	1981
<b>Smith, Cheryl A*</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Food and Agriculture	B.A.	Plymouth State University	1978
			M.S.	University of Rhode Island	1983
			Ph.D.	University of New Hampshire	1992
<b>Smith, Kevin F</b>	LECTURER	English	B.S.	Unity College	1998
			M.Ed.	Boston University	2011
	RESEARCH ASSOCIATE				

<b>Smith, Kristin E*</b>	PROFESSOR	Carsey School	B.A.	University of Vermont	1989
			M.P.H.	Tulane University	1993
			Ph.D.	University of Maryland	2006
<b>Smith, Laura A</b>	LECTURER	English	B.A.	Grove City College	1992
			M.S.T.	University of New Hampshire	2001
			Ph.D.	University of New Hampshire	2007
<b>Smith, Nicholas J*</b>	PROFESSOR	Philosophy	B.A.	Vassar College	1994
			J.D.	State University of New York at Buffalo	1997
			Ph.D.	Vanderbilt University	2002
<b>Smith, Richard G*</b>	ASSISTANT PROFESSOR	Natural Resources & The Environment	B.S.	University of New Mexico	1996
			Ph.D.	Michigan State University	2005
<b>Smith, Robert Scott</b>	PROFESSOR	Classics, Humanities & Ital Studies	B.A.	Mary Wash Coll (Univ Va)	1993
			A.M.	University of Illinois at Urbana-Champaign	1996
			Ph.D.	University of Illinois at Urbana-Champaign	2000
<b>Smith, Sarah Shea</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Community and Economic Development	B.S.F.	University of New Hampshire	1978
			M.O.E.	University of New Hampshire	1989
<b>Smith, Subrena E</b>	ASSISTANT PROFESSOR	Philosophy	B.A.	University of London, United Kingdom	2005
			M.A.	Cornell University	2011
			Ph.D.	Cornell University	2013
<b>Smith, Wayne J</b>	SENIOR LECTURER	Electrical & Computer Eng Dept	B.S.	University of New Hampshire	1986
			M.S.	University of New Hampshire	1998
			Ph.D.	University of New Hampshire	2005
	CLINICAL ASSISTANT			University of New	

<b>Sobel, Kelsey</b>	PROFESSOR	Social Work	M.S.W.	Hampshire	2007
<b>Soha, Michael L</b>	LECTURER	Communication	B.A.	University of New Hampshire	2008
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<b>Sohl, Jeffrey E*</b>	PROFESSOR	Decisions Sciences	B.A.	Villanova University	1972
			M.A.	University of Maryland	1974
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<b>Sokol, Jason C*</b>	ASSOCIATE PROFESSOR	History	B.A.	Oberlin College	1999
			M.A.	University of California - Berkeley	2001
			Ph.D.	University of California - Berkeley	2006
<b>Solomon, Alvin Maingi</b>	LECTURER	Geography	B.Ed.	Egerton University, Kenya	2007
			M.A.	Ohio University	2010
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<b>Solomon, Hadley J*</b>	ASSISTANT PROFESSOR	Education	B.S.	Bowling Green State University	2006
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<b>Solvignon Slifer, Patricia *</b>	ASSISTANT PROFESSOR	Physics	D.E.U.G.	Université Blaise Pascal, France	1996
			Licence	Université Blaise Pascal, France	1997
			Maitrise	Université Blaise Pascal, France	1998
			DEA	Université Blaise Pascal, France	1999
			Ph.D.	Temple University	2006
<b>Song, Edward *</b>	ASSISTANT PROFESSOR	Electrical & Computer Eng Dept	B.S.	Queen'S University (Ca)	2004
			M.S.	University of Alberta, Canada	2007
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<b>Sonnenmeier, Rae M*</b>	CLINICAL ASSOCIATE PROFESSOR	Communications Disorders	B.S.Ed.	State University of New York at Buffalo	1980



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<b>Sova McCabe, Margaret E</b>	ASSOCIATE DEAN	UNHL JD Instruction	B.A.	Bard College	1992
			B.A.	Bard College	1992
			J.D.	University of Maine	1995
			J.D.	University of Maine	1995
<b>Sower, Stacia *</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	University of Utah	1973
			M.S.	Oregon State University	1978
			Ph.D.	Oregon State University	1980
<b>Sowers, Jeannie *</b>	ASSOCIATE PROFESSOR	Political Science	B.A.	Harvard University	1989
			M.A.	Princeton University	1996
			Ph.D.	Princeton University	2003
<b>Sparrow, John E</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.S.	State University of New York at Oswego	1983
			M.A.	University of New Hampshire	1986
			Ph.D.	University of New Hampshire	1990
<b>Sparrow, Sophie M</b>	PROFESSOR	UNHL JD Instruction	B.A.	Harvard University	1982
			J.D.	Harvard Law School	1986
<b>Spence, Harlan *</b>	DIRECTOR	EOS Administration	B.A.	Boston University	1983
			M.S.	University of California	1985
			Ph.D.	University of California	1989
<b>St. Jean, Adam T</b>	LECTURER	Chemical Engineering	B.S.	Northeastern University	2004
			C.A.G.S.	University of Massachusetts - Amherst	2011
			Ph.D.	University of Massachusetts - Amherst	2012
<b>Stampono, Mary D</b>	ASSOCIATE PROFESSOR	Geography	B.A.	Albion College	1998

			M.S.	University of Delaware	2002
			Ph.D.	University of Delaware	2009
<b>Stewart, Elizabeth A</b>	CLINICAL ASSOCIATE PROFESSOR	Occupational Therapy	B.S.	University of New Hampshire	1988
			M.H.A.	New England College	2005
<b>Stibler, Robert J*</b>	PROFESSOR	Music	B.S.	Susquehanna University	1970
			M.M.	Catholic University of America	1973
			D.F.A.	Catholic University of America	1979
			D.M.A.	Catholic University of America	1979
<b>Stine, William W*</b>	ASSOCIATE PROFESSOR	Psychology	B.S.	Georgia Institute of Technology	1977
			M.S.	Georgia Institute of Technology	1983
			Ph.D.	Georgia Institute of Technology	1983
<b>Stracuzzi, Nena F</b>	LECTURER	Sociology	B.A.	University of California - Irvine	1996
			M.A.	University of New Hampshire	1998
			Ph.D.	University of New Hampshire	2005
<b>Straussfogel, Debra L</b>	SENIOR LECTURER	Natural Resources & The Environment	B.S.	Pennsylvania State University	1979
			M.S.	Pennsylvania State University	1983
			Ph.D.	Pennsylvania State University	1987
<b>Sukhu, Anupama *</b>	ASSISTANT PROFESSOR	Hospitality Management	Ph.D.	Ohio State University	2015
<b>Sullivan, Elise Robinson*</b>	CLINICAL ASSISTANT PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	University of Miami	1992
			Ph.D.	University of Maryland	1999
<b>Sullivan, Mary Jane</b>	CLINICAL ASSISTANT PROFESSOR	Communications Disorders	B.A.	George Washington University	1982
				George Washington	

			M.A.	University	1984
			D	Mesa College	2003
<b>Sundar, Vidyalakshmi *</b>	ASSISTANT PROFESSOR	Occupational Therapy	B.S.	The Tamil Nada Dr M.G.R Medical University, India	1979
			Ph.D.	University at Buffalo, State University of New York	2007
<b>Swack, Michael E*</b>	RESEARCH PROFESSOR	Carsey School	B.S.	University of Wisconsin	1975
			M.S.	Harvard University	1979
			Ph.D.	Columbia University in the City of New York	1990
<b>Swartz, Erik E*</b>	PROFESSOR	Kinesiology	B.S.	Saint Bonaventure University	1995
			M.A.	Western Michigan University	1996
			Ph.D.	University of Toledo	2000
<b>Swift, M Robinson*</b>	PROFESSOR	Mechanical Engineering	B.S.	University of New Hampshire	1971
			Ph.D.	University of New Hampshire	1974
<b>Talay, Melike Billur*</b>	ASSOCIATE PROFESSOR	Marketing	B.A.	University of Jordan, Amman	2002
			M.B.A.	University of Jordan, Amman	2004
			Ph.D.	Michigan State University	2009
<b>Talpin, Emilie V</b>	LECTURER	Languages, Literatures, & Cultures	M.S.	Univ of Burgundy in Dijon	2004
			M.S.	Miami University	2008
<b>Tarr, Matthew D</b>	ASSOCIATE STATE SPECIALIST/PROFESSOR	Natural Resources	B.S.	University of New Hampshire	1996
			M.S.	University of New Hampshire	1999
			A.A.S.	University of New Hampshire	2002
<b>Tavares, Theodore S</b>	ASSISTANT PROFESSOR	Engineering Technology Program	S.B.	Massachusetts Institute of Technology	1984
			S.M.	Massachusetts Institute of	1986

				Technology	
			Ph.D.	Massachusetts Institute of Technology	1991
<b>Taylor, James Thomas*</b>	PROFESSOR	Natural Resources & The Environment	B.S.	University of Tennessee	1966
			M.S.	University of Tennessee	1968
			Ph.D.	Oregon State University	1976
<b>Taylor, Rosemary A*</b>	ASSISTANT PROFESSOR	Nursing	B.F.A.	New York University	1988
			B.S.N.	Northeastern University	1998
			Ph.D.	Northeastern University	2013
<b>Tenczar, Anthony</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.A.	University of Massachusetts - Amherst	1978
			M.F.A.	University of Texas	1996
<b>Teng, Xiaowei *</b>	ASSOCIATE PROFESSOR	Chemical Engineering	B.S.	East China University of Science and Technology	2001
			M.S.	East China University of Science and Technology	2001
			Ph.D.	University of Rochester	2006
<b>Terry, Joseph L</b>	LECTURER	Communication	B.S.	University of Illinois at Urbana-Champaign	2000
			M.A.	University of Georgia	2004
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<b>Theimer, Sarah H</b>	ASSISTANT PROFESSOR	Library Administration			
<b>Thein, May-Win L*</b>	ASSOCIATE PROFESSOR	Mechanical Engineering	B.S.	Lehigh University	1991
			M.S.	Lehigh University	1992
			Ph.D.	Oklahoma State University	1999
<b>Thomas, William K*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	University of Redlands	1981
				Simon Fraser	

			M.S.	University, Canada	1984
			Ph.D.	Simon Fraser University, Canada	1988
<b>Thompson, Winston C*</b>	ASSISTANT PROFESSOR	Education	B.A.	University of Florida	2004
			M.A.	Columbia University in the City of New York	2005
			Ed.M.	Columbia University in the City of New York	2006
			Ph.D.	Columbia University in the City of New York	2011
<b>Thomsen, Linda Jean</b>	SENIOR LECTURER	Languages, Literatures, & Cultures	B.A.	University of Connecticut	1975
			M.A.	University of New Hampshire	1988
<b>Thurston, Filip JM</b>	LECTURER	Thompson School of Applied Science	B.A.	York College	2009
			M.Ed.	Plymouth State University	2011
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			M.S.	University of Windsor, Canada	1979
			Ph.D.	University of Wisconsin	1987
<b>Tischer, Robert W</b>	LECTURER	Economics	B.A.	University of Colorado at Boulder	1986
			J.D.	Rutgers University	1994
			M.A.	University of Colorado at Boulder	2008
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<b>Tobin, Carolyn L*</b>	ASSISTANT PROFESSOR	Nursing	M.A.	University Leicester, United Kingdom	1995
			Ph.D.	Trinity College - Conn	2010
<b>Tomellini, Sterling A*</b>	PROFESSOR	Chemistry	B.S.	University of Rhode Island	1979
			Ph.D.	Rutgers University	1985

<b>Torbert, Roy B*</b>	PROFESSOR	Physics	B.A.	Princeton University	1971
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<b>Tornick, Jan K</b>	LECTURER	Psychology	B.S.	Ramapo College Nj	2003
			M.S.	University of New Hampshire	2007
			M.A.	University of New Hampshire	2009
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<b>Towne, Benjamin M</b>	CLINICAL ASSISTANT PROFESSOR	Kinesiology	B.S.	Lyndon State College	1999
			M.A.	Western Michigan University	2001
<b>Townson, David H*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.S.	Michigan State University	1983
			M.S.	University of Wisconsin	1988
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<b>Trauntvein, Nathan E*</b>	ASSISTANT PROFESSOR	Recreation Management & Policy	B.S.	Utah State University	2003
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<b>Triplett, Timm A*</b>	ASSOCIATE PROFESSOR	Philosophy	B.A.	Antioch College	1972
			M.A.	University of Massachusetts - Amherst	1980
			Ph.D.	University of Massachusetts - Amherst	1982
<b>Trolley-Hanson, Alexa R</b>	CLINICAL ASSISTANT PROFESSOR	Occupational Therapy	B.S.	University of New Hampshire	2003
			M.S.	University of New Hampshire	2004
<b>Troy, William F</b>	SENIOR LECTURER	UNHM Degree Programs	B.A.	University of Massachusetts - Amherst	1976
<b>Trubowitz, Rachel J*</b>	PROFESSOR	English	M.B.A.	Cornell University	1983
			B.A.	Barnard College Columbia University	1976

			M.A.	in the City of New York	1977
			M.Phil.	Columbia University in the City of New York	1980
			Ph.D.	Columbia University in the City of New York	1985
<b>Trumbell, Jill M*</b>	ASSISTANT PROFESSOR	Human Development & Family Studies	Ph.D.	Purdue University	2014
<b>Trzaskoma, Stephen Michael</b>	PROFESSOR	Classics, Humanities & Ital Studies	A.B.	Stanford University	1991
			A.M.	University of Illinois at Urbana-Champaign	1993
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<b>Tsang, Paul C*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	A.B.	Cornell University	1978
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<b>Tsavalas, John G*</b>	ASSOCIATE PROFESSOR	Material Science Program	B.S.	University of Virginia	1996
			M.S.	Georgia Institute of Technology	1998
			Ph.D.	Georgia Institute of Technology	2001
<b>Tsukrov, Igor I*</b>	PROFESSOR	Mechanical Engineering	B/M	University of Northern Colorado	1986
			M.S.	Tufts University	1993
			Ph.D.	Tufts University	1996
<b>Tucker, Anita R*</b>	ASSOCIATE PROFESSOR	Social Work	B.A.	Dartmouth College	1992
			M.S.W.	University of Michigan	1997
			Ph.D.	Boston College	2006
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			M.S.	Pennsylvania State University	1995
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			M.A.	University of Virginia	1987
			Ph.D.	University of Virginia	1992
<b>Turner, Heather A*</b>	PROFESSOR	Sociology	B.A.	University of Western Ontario, Canada	1985
			Ph.D.	University of California - San Francisco	1990
<b>Turnquist, Bruce D</b>	LECTURER	Education	B.A.	University of New Hampshire	1972
			M.Ed.	University of New Hampshire	1984
<b>Tutko, Holly A</b>	CLINICAL ASSISTANT PROFESSOR	Inst for Health Policy & Practic	B.S.	University of Massachusetts - Amherst	1991
			M.S.	Dartmouth College	1998
<b>Upham, David Michael</b>	LECTURER	Music	B.A.	Luther College	1992
			M.M.	University of Northern Colorado	1995
			D.M.A.	University of Washington	2007
<b>Upham, Elsa M</b>	LECTURER	English	B.A.	Academy of Montpellier, France	1992
			M.A.	Paul Valery University, France	1996
			M.A.	University of British Columbia	1999
<b>Urquhart, Peter W*</b>	ASSOCIATE PROFESSOR	Music	A.B.	Princeton University	1974
			M.M.	Rider University	1978
			M.A.	Smith College	1982
			Ph.D.	Harvard University	1988
<b>Vagts, Peggy A*</b>	PROFESSOR	Music	B.A.	Morningside College	1976
			M.M.	University of Wisconsin - Madison	1978
<b>Valdez, Charli G</b>	LECTURER	English	A.B.	Cornell University	1992
			A.M.	Brown University	1999
			Ph.D.	University of Houston	2004
<b>Van Zandt, Cynthia J*</b>	ASSOCIATE PROFESSOR	History	B.A.	University of Virginia	1984
			M.A.	University of Connecticut	1991
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			M.S.	University of Massachusetts - Amherst	1988
			Ph.D.	University of New Hampshire	2005
<b>VanderEls, Stephanie M</b>	LECTURER	Thompson School of Applied Science	M.Ed.	University of New Hampshire	2002
<b>Vanderveer, Stacy D*</b>	PROFESSOR	Political Science	B.A.	University of Illinois	1990
			M.A.	University of Maryland	1994
			Ph.D.	University of Maryland	1997
<b>Vangundy, Karen T*</b>	ASSOCIATE PROFESSOR	Sociology	B.S.	Virginia Polytechnic Institute and State University	1994
			M.A.	University of Cincinnati	1998
			Ph.D.	University of Miami	2001
<b>Vannette, Charles M</b>	ASSISTANT PROFESSOR	Languages, Literatures, & Cultures	B.A.	University of Arizona	2001
			M.A.	Ohio State University	2005
			Ph.D.	Ohio State University	2011
<b>Vannozzi, Anthony R</b>	ASSISTANT PROFESSOR	Thompson School of Applied Science	B.S.	University of Maine	1984
			M.S.	University of Maine	2006
<b>Varki, Elizabeth *</b>	ASSOCIATE PROFESSOR	Computer Science	B.S.	University of Delhi, India	1985
			M.A.	University of Delhi, India	1988
			M.S.	Villanova University	1992
			Ph.D.	Vanderbilt University	1997
<b>Varlikli, Hulya F</b>	LECTURER	English	B.S.	Nazareth College	2004
			M.S.	Nazareth College	2006
<b>Varner, Ruth K*</b>	ASSOCIATE PROFESSOR	Earth Sciences - Joint Positions	B.A.	Hartwick College	1991
			M.S.	University of New Hampshire	1993
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			Ph.D.	Drexel University	2010
<b>Vasquez, Bernard J*</b>	RESEARCH PROFESSOR	Space Science Center	B.S.	Rensselaer Polytechnic Institute	1987
			Ph.D.	University of Maryland	1992
<b>Vasudevan, Palligarnai T*</b>	INTERIM PROVOST & VP-ACAD AFFAIR	Provost Office	B.S.E.T.	University of Madras, India	1974
			B.S.E.T.	University of Madras, India	1974
			M.S.	State University of New York at Buffalo	1984
			M.S.	State University of New York at Buffalo	1984
			Ph.D.	Clarkson University	1988
			Ph.D.	Clarkson University	1988
<b>Vellucci Leaver, Sherry L</b>	PROFESSOR	Library Administration	B.A.	Rutgers University	1972
			M.S.	Drexel University	1983
			D.L.S.	Columbia University in the City of New York	1995
			Ph.D.	Columbia University in the City of New York	1995
<b>Verrot, Trevor M</b>	LECTURER	Art and Art History	B.A.	University of Michigan	2006
			M.A.	Yale University	2007
			M.Phil.	Yale University	2010
<b>Vigil, Ryan H</b>	LECTURER	Music	B.M.	Manhattan School of Music, New	2000
			M.A.	Tufts University	2004
			M.M.A.	Yale University	2006
			D.M.A.	Yale University	2010
<b>Vincenzi, Marco</b>	LECTURER	Economics	M.S.	Carnegie Mellon University	2010
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<b>Violette, Catherine A*</b>	FULL EXTENSION STATE SPECIALIST/PROFESSOR	Food and Agriculture	B.S.	University of Maine	1974
			B.S.	University of Maine	1975

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			Ph.D.	Pennsylvania State University	2002
<b>Vorenberg, Amy</b>	LAW PROFESSOR	UNHL Legal Skills	B.A.	Hamilton College	1979
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<b>Vroman, Kerryellen G*</b>	ASSOCIATE PROFESSOR	Occupational Therapy	B.A.	Massey University, New Zealand	1990
			M.S.	McMaster University, Canada	1992
			Ph.D.	Massey University, New Zealand	2006
<b>Vroman, Neil B*</b>	ASSOCIATE DEAN	Dean's Office - Health & Human Svcs	B.S.	Colgate University	1975
			Certificate	New York University	1976
			Ph.D.	Pennsylvania State University	1982
<b>Wake, Cameron P*</b>	RESEARCH PROFESSOR	Earth Systems Research Center	B.S.	University of Ottawa	1984
			M.A.	Wilfrid Laurier University, Canada	1987
			Ph.D.	University of New Hampshire	1987
			M.A.	Wilfrid Laurier University, Canada	1993
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<b>Walker, Charles W*</b>	PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	Miami University	1969
			M.S.	Cornell University	1973
			Ph.D.	Cornell University	1976
<b>Wallace, Mary S</b>	LECTURER	Dean's Office - Liberal Arts	B.A.	Mount Holyoke College	2000
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<b>Wallace, Michael</b>	LECTURER	Communications Disorders	B.A.	Gallaudet University	1976
			M.A.	New York University	1981
<b>Walsh, Susan A</b>	ASSOCIATE PROFESSOR	Humanities	B.A.	Kenyon College	1979

			M.A.	Duke University	1980
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<b>Walsh, Wendy A*</b>	RESEARCH ASSOCIATE PROFESSOR	Family Research Lab	B.A.	Bates College	1989
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<b>Wang, Haiying *</b>	ASSISTANT PROFESSOR	Mathematics & Statistics	B.E.	Beihang University, China	2003
			M.S.	Chinese Academy of Sciences, China	2009
			Ph.D.	University of Missouri - Columbia	2013
<b>Wang, Jing *</b>	ASSOCIATE PROFESSOR	Decisions Sciences	B.A.	Nankai University, China	1994
			M.A.	Bowling Green State University	2001
			M.B.A.	Kent State University	2003
			Ph.D.	Kent State University	2007
<b>Wang, Yige</b>	LECTURER	Languages, Literatures, & Cultures	B.A.	Zhejiang University, China	1983
			M.A.	University of New Hampshire	1989
			M.A.	University of New Hampshire	1992
<b>Ward, Larry G*</b>	RESEARCH ASSOCIATE PROFESSOR	Center for Coastal & Ocean Mapping	B.A.	University of New Hampshire	1972
			M.S.	University of South Carolina	1974
			Ph.D.	University of South Carolina	1978
<b>Ware, Colin *</b>	PROFESSOR	Computer Science - Joint Positions	B.S.	University of Durham, United Kingdom	1972
			M.A.	Dalhousie University, Canada	1973
			Ph.D.	University of Toronto, Canada	1980
<b>Warkentin, Jennifer B</b>	CLINICAL ASSISTANT PROFESSOR	Psychology	B.S.	Georgia Southern University	2000
			M.S.	Ohio University	2003

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<b>Warner, Rebecca M*</b>	PROFESSOR	Psychology	B.A.	Carnegie Mellon University	1973
			Ph.D.	Harvard University	1978
<b>Watson, Deborah E</b>	ASSOCIATE PROFESSOR	Reference	B.A.	University of New Hampshire	1963
			M.A.	University of New Hampshire	1967
			M.S.	Simmons College	1972
<b>Watson, Winsor H*</b>	PROFESSOR	Biological Sciences	B.A.	Wesleyan University	1972
			Ph.D.	University of Massachusetts - Amherst	1978
<b>Watters, David H*</b>	PROFESSOR	English	A.B.	Dartmouth College	1972
			Ph.D.	Brown University	1978
<b>Watts, Alison W*</b>	RESEARCH ASSISTANT PROFESSOR	Environmental Research Group	B.A.	Mount Holyoke College	1984
			M.S.	University of Arizona	1992
			Ph.D.	University of New Hampshire	2006
<b>Weber, Thomas C*</b>	ASSISTANT PROFESSOR	Mechanical Engineering	B.S.	University of Rhode Island	1997
			M.S.	University of Rhode Island	2000
			Ph.D.	Pennsylvania State University	2006
<b>Webster, Nathan S</b>	LECTURER	English	B.A.	University of New Hampshire	1995
			M.F.A.	University of New Hampshire	2009
<b>Weiner, James L*</b>	ASSOCIATE PROFESSOR	Computer Science	B.S.	University of Massachusetts - Amherst	1973
			M.S.	University of Wisconsin	1975
			Ph.D.	University of California - Los Angeles	1979
<b>Weintraub, Scott E*</b>	ASSISTANT PROFESSOR	Languages, Literatures, & Cultures	A.B.	Dartmouth College	2001
			Ph.D.	Emory University	2006
				University of New	

<b>Wells, Melissa *</b>	ASSOCIATE PROFESSOR	Social Work	B.A.	Hampshire	1991
			M.S.W.	University of Minnesota	1995
			Ph.D.	University of New Hampshire	2003
<b>Westervelt, Charlene A</b>	CLINICAL INSTRUCTOR	Education	B.A.	University of New Hampshire	1980
			M.A.	University of New Mexico	1997
<b>Wharton-McDonald, Ruth M*</b>	ASSOCIATE PROFESSOR	Education	A.B.	Brown University	1985
			Ed.M.	Harvard University	1989
			Ph.D.	University at Albany	1996
<b>Whistler, Cheryl A*</b>	ASSOCIATE PROFESSOR	Molecular, Cellular, & Biomedical	B.A.	University of California - San Diego	1991
			Ph.D.	Oregon State University	2000
<b>White, Barbara Prudhomme*</b>	ASSOCIATE PROFESSOR	Occupational Therapy	B.S.	University of Minnesota	1978
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<b>White, Christopher M*</b>	ASSOCIATE PROFESSOR	Mechanical Engineering	B.S.	State University of New York	1994
			M.S.	State University of New York	1996
			Ph.D.	Yale University	2001
<b>White, Melinda M</b>	LECTURER	English	B.S.	Utah State University	2005
			M.S.	Utah State University	2007
			Ph.D.	Virginia Commonwealth University	2012
<b>Whitehead, Tamsin A</b>	LECTURER	Women's Studies Program	B.A.	University of London, United Kingdom	1978
			M.F.A.	Vermont College of Fine Arts	2005
<b>Whittier, Duane H</b>	PROFESSOR	Philosophy	B.A.	University of New Hampshire	1950
			M.A.	University of Illinois at Urbana-Champaign	1952
			Ph.D.	University of Illinois at Urbana-Champaign	1961

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			Ph.D.	Pennsylvania State University	1980
<b>Wilburn, Reginald A*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of the District of Columbia	1999
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<b>Wilcox, John M</b>	CLINICAL ASSISTANT PROFESSOR	Occupational Therapy	B.S.	Syracuse University	1999
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			D	Rocky MT Univ of Health Prof	2010
<b>Wilder, Allison *</b>	ASSOCIATE PROFESSOR	Recreation Management & Policy	B.S.	Ithaca College	1984
			M.S.	State University of New York at Cortland	1992
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<b>Wiley, Mark R</b>	ASSOCIATE STATE SPECIALIST/PROFESSOR	Youth and Family	B.A.	Dartmouth College	1975
			M.S.	University of New Hampshire	1980
<b>Williams, Ann J*</b>	ASSOCIATE PROFESSOR	English	B.A.	University of New Hampshire	1980
			M.A.	University of New Hampshire	1990
			M.F.A.	University of Iowa	1997
<b>Williams, Donald M</b>	LECTURER	Art and Art History	B.F.A.	University of New Hampshire	1977
<b>Williams, Leah D</b>	SENIOR LECTURER	English	B.A.	Indiana University - Bloomington	1997
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<b>Willkomm, Therese *</b>	CLINICAL ASSOCIATE PROFESSOR	Occupational Therapy	B.S.	University of Wisconsin	1982
			M.S.	Drake University	1984
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<b>Winans, Daniel R</b>	LECTURER	Hospitality Management	B.S.	University of New Hampshire	1993
			A.O.S.	Culinary Institute of America	1999
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<b>Winans, Katharine A</b>	LECTURER	Chemistry	B.A.	Williams College	1989
			M.A.	University of Houston	1995
			Ph.D.	University of California - Berkeley	2001
<b>Withers, Sara A</b>	LECTURER	Anthropology	B.A.	Bowdoin College	1999
			B.A.	Brandeis University	2002
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<b>Witt, Charlotte E</b>	PROFESSOR	Philosophy	B.A.	Swarthmore College	1975
			M.A.	Georgetown University	1978
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<b>Wollheim, Wilfred M*</b>	ASSISTANT PROFESSOR	Natural Resources & The Environment	B.S.	Cornell University	1989
			M.S.	University of Wyoming	1994
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<b>Wolper, Ethel S*</b>	ASSOCIATE PROFESSOR	History	B.A.	University of Chicago	1982
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<b>Wood, Craig H*</b>	ASSOCIATE PROFESSOR	Decisions Sciences	A.B.	Stanford University	1972
			M.B.A.	University of Chicago	1974
			Ph.D.	Ohio State University	1991
<b>Wood, Deanna D</b>	ASSOCIATE PROFESSOR	Reference	B.A.	Reed College	1969
			M.A.	University of Denver	1972
			M.P.A.	University of New Hampshire	1995



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			M.F.A.	Rochester Institute of Technology	2000
<b>Woodward, Robert S*</b>	PROFESSOR	Health Management - Joint Positions	B.S.	Haverford College	1965
			Ph.D.	Washington University - St Louis	1972
<b>Woodward, William R*</b>	PROFESSOR	Psychology	B.A.	Harvard University	1967
			M.A.	Princeton University	1969
			M.A.	Yale University	1973
			Ph.D.	Yale University	1975
<b>Wosnik, Martin M*</b>	ASSOCIATE PROFESSOR	Mechanical Engineering	B.S.	Technical University of Darmstadt, Germany	1992
			M.S.	State University of New York at Buffalo	1994
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<b>Wraith, Jon M*</b>	DEAN	Dean's Office - LS & A	A.A.	Butte Community College	1981
			B.S.	Humboldt State Univ	1984
			M.S.	Utah State University	1986
			Ph.D.	Utah State University	1989
<b>Wright, Peter S</b>	PROFESSOR	UNHL Clinic	B.A.	Pennsylvania State University	1976
			J.D.	Franklin Pierce Law Center	1980
<b>Wright, Steven C*</b>	PROFESSOR	Kinesiology	B.S.	St. Lawrence University	1979
			M.Ed.	Boston University	1980
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<b>Wu, Kang *</b>	ASSISTANT PROFESSOR	Chemical Engineering	B.S.	Tianjin University, China	2003
			M.S.	University of Illinois at Urbana-Champaign	2008
			Ph.D.	University of Illinois at Urbana-Champaign	2010
<b>Xiao, Jingfeng *</b>	RESEARCH ASSOCIATE PROFESSOR	Earth Systems Research Center	B.S.	Lanzhou University, China	1997

			M.S.	Beijing University, China	2000
			Ph.D.	University of North Carolina at Chapel Hill	2006
<b>Xie, Wenjuan *</b>	ASSOCIATE PROFESSOR	Accounting and Finance	B.B.A.	Peking University, China	2000
			M.A.	Peking University, China	2002
			Ph.D.	University of Wisconsin - Madison	2008
<b>Xu, Le *</b>	ASSOCIATE PROFESSOR	Accounting and Finance	B.S.	Beijing University, China	1999
			Ph.D.	University of Massachusetts - Amherst	2003
<b>Yalcinkaya, Goksel *</b>	ASSOCIATE PROFESSOR	Marketing	B.S.	Aegen University, Turkey	1993
			M.B.A.	Suffolk University	1998
			M.S.	Northeastern University	2007
			Ph.D.	Michigan State University	2007
<b>Yarensky, Peter</b>	PRINCIPAL LECTURER	Psychology	B.A.	Univ of Hartford	1972
			M.A.	University of New Hampshire	1974
			Ph.D.	University of New Hampshire	1983
<b>Yi, Nan *</b>	ASSISTANT PROFESSOR	Chemical Engineering	B.S.	Quigdao Univ Quigdao, China	2000
			M.S.	Fudan University, China	2005
			Ph.D.	Tufts University	2012
<b>Yoon, Se Young *</b>	ASSISTANT PROFESSOR	Electrical & Computer Eng Dept	B.S.	Washington University - St Louis	2005
			M.S.	Washington University - St Louis	2005
			Ph.D.	University of Virginia	2011
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			M.S.	University of New Hampshire	1991
				Tapei National	

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			M.F.A.	University of Texas	2010
<b>Yu, Qiaoyan *</b>	ASSISTANT PROFESSOR	Electrical & Computer Eng Dept	B.S.	Xidian University, China	2002
			B.S.	Zhejiang University, China	2004
			M.S.	Zhejiang University, China	2005
			M.S.	University of Rochester	2007
			Ph.D.	University of Rochester	2011
<b>Zagar, Lawrence E</b>	LECTURER	Mechanical Engineering	B.S.	Louisiana State University	1981
			M.S.	Louisiana State University	1983
			Ph.D.	Louisiana State University	1986
<b>Zago, Susan D</b>	ASSISTANT PROFESSOR	UNHL Library	B.A.	Westfield State College	1991
			M.L.I.S.	Simmons College	1995
			J.D.	Western New England Coll	2001
<b>Zang, Jiadong *</b>	ASSISTANT PROFESSOR	Physics	B.S.	Fudan University, China	2007
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<b>Zang, Richard A</b>	ASSOCIATE PROFESSOR	Natural & Social Sciences	B.Tech.	State University of New York at Binghamton	1978
			M.A.	State University of New York at Binghamton	1980
			Ed.D.	Rutgers University	1994
<b>Zercher, Charles Kent*</b>	ASSOCIATE DEAN	Dean's Office - CEPS	B.A.	Messiah College	1981
			M.S.	State University of New York at Buffalo	1984
			Ph.D.	Notre Dame College	1989
<b>Zhang, Jichun *</b>	RESEARCH ASSISTANT PROFESSOR	Space Science Center	B.S.	Hebei Normal University, China	1994
			M.S.	Peking University,	2001

			Ph.D.	China University of Michigan	2006
<b>Zhang, Yitang *</b>	PROFESSOR	Mathematics & Statistics	B.S.	Peking University, China	1982
			M.S.	Peking University, China	1984
			Ph.D.	Purdue University	1991
<b>Zickell, Carol A</b>	LECTURER	English	B.S.	Worcester State College	1970
			M.S.	University at Albany	1974
<b>Zielinski, Mark D</b>	LECTURER	Music	M.M.	Indiana University	1998
			B.M.Ed.	Indiana University	1999
<b>Ziervogel, Kai *</b>	RESEARCH ASSISTANT PROFESSOR	Ocean Process Analysis Lab	Ph.D.	University of Rostock, Germany	2004
			M.S.	University of Rostock, Germany	2005
<b>Zimmerman, Dawn R</b>	CLINICAL ASSISTANT PROFESSOR	Communications Disorders	B.A.	Baldwin-Wallace College	1994
			M.S.P.	University of South Carolina	1998

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**Graduate School**

## Introduction

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### Graduate School ▼

» <http://www.gradschool.unh.edu>

*Dean:* Harry J. Richards

### Introduction ▼

The Graduate School offers a wide range of programs leading to the master's degree, one program leading to education specialist (Ed.S.), and a number of programs leading to the Ph.D. degree. Graduate programs have been developed systematically to achieve academic excellence by careful utilization of institutional resources and regional opportunities. A highly qualified graduate faculty supervises programs and establishes the requirements for admission and degrees, which are administered by the dean of the Graduate School. The Graduate School extends its programs to central and southern New Hampshire through the UNH Graduate School Manchester Campus, offering a number of part-time professional master's programs.

### Admissions ▼

Persons holding a baccalaureate degree from an accredited college or university and wishing to take graduate-level courses at the University of New Hampshire as part of a graduate degree program must apply for admission to the Graduate School. Admission to the Graduate School is both limited and competitive and is based solely upon academic qualifications and potential.

Applications for admission and the Graduate Catalog, containing detailed descriptions of graduate programs, may be obtained online at the Graduate School website,

[www.gradschool.unh.edu](http://www.gradschool.unh.edu).

#### ***Early Admission/Dual Credit-University of New Hampshire Seniors***

#### ***Five-year Bachelor's/Master's Degrees (early admission)***

Qualified senior students at the University of New Hampshire may be admitted to the Graduate School provided they have followed normal application procedures; they must have been

admitted for the semester in which they wish to enroll in courses for graduate credit. A 3.20 cumulative grade point average is normally required to be considered for early admission. Such seniors are normally admitted prior to the start of their last undergraduate semester. Seniors who have been admitted under early admission may register for *a maximum of 12 credits* of graduate-level courses prior to completing their bachelor's degree. Such courses may, upon recommendation of the department and approval of the Graduate School, count toward both a bachelor's and master's degree.

Upon admission and prior to the beginning of the semester, students must meet with the Graduate School academic counselor to complete and approve dual credit forms.

## **Financial Assistance ▼**

Graduate assistantships are available in most departments. These involve part-time work in connection with the University's instructional or research activities. University awards, such as tuition scholarships, are also available to qualified students. Assistantships and scholarships are awarded on the basis of academic qualifications.

Financial assistance in the form of college work study and loans may be available through the Financial Aid Office.

## **UNH Graduate School Manchester Campus ▼**

The UNH Graduate School Manchester Campus offers a wide range of post-baccalaureate programs for professionals in business, education, social services, health care, government, and related fields. All graduate programs supported by the center are directed by UNH faculty and are administered by the UNH Graduate School. Currently, master's degree or other post-baccalaureate courses and programs are offered at UNH Manchester in business administration, counseling, educational administration, teacher education, public administration, public health, social work, management of technology, and software systems engineering.

### ***Professional Development and Training***

Professional Development and Training, part of the UNH Graduate School Manchester Campus, serves individuals, businesses, and organizations in New Hampshire and surrounding regions by offering a wide range of professional development opportunities throughout the year, including one-day seminars, special institutes and conferences, and short-term Certificate Programs.

Programs are designed to assist professionals in developing new or advanced knowledge and

skills in a variety of fields. Instruction provides a balance of theory and practical skills that participants can immediately apply to the workplace.

Offerings focus on pertinent topics in business, management and supervision, professional coaching, human resources, computers, CAD, teaching and school administration, health and human services, engineering, manufacturing, surveying, soil science, town and state planning, fundraising and grant writing, and more.

Training is offered on the Durham campus, the UNH Manchester campus, and at the UNH training facility at Pease International Tradeport in Portsmouth.

From time to time, institutes and conferences are held to address current topics of concern at an in-depth level.

Professional Development and Training also offers customized training services—helping companies assess their training needs, and then designing and delivering customized training to meet these needs.

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### Continuing Education and Summer Session

#### Introduction Programs of Study

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» <http://www.learn.unh.edu/>

### Introduction ▼

Continuing Education provides public access to higher education for individuals not formally admitted to a UNH degree program. Taking courses as a non-degree student is an excellent way to prepare for matriculation into a degree program, help advance or change careers, or study a topic of interest.

### Non-Degree Student Status ▼

**Undergraduate** Undergraduate courses (numbered 200-799) are open to individuals with a high school diploma, GED, or home-schooled secondary education equivalency. Individuals may register for a maximum of 11 credits per semester.

**Graduate** Graduate courses (numbered 800-999) are open to individuals with a baccalaureate degree from an accredited college or university. Individuals may register for a maximum of 8 credits per semester.

### Full-Time Special Student Status ▼

**Undergraduate** Non-degree students who wish to register for 12 or more credits in a single semester must receive formal permission from UNH Undergraduate Admissions. Special tuition and fee rules apply. Visit <http://admissions.unh.edu/additional-resources/contact-us-2> for more information.

**Graduate** Non-degree students who wish to register for 9 or more credits in a single semester must receive permission from the University Advising and Career Center. Students approved for this special status must pay full-time graduate tuition and fees at the time of registration.



Visit <http://unh.edu/uacc/academicadvis.html> for more information.

## Pre-Admission Program ▼

The Pre-Admission Program allows students an opportunity to strengthen their academic credentials in preparation for admission to a baccalaureate program by completing course work that satisfies both general education and introductory level major requirements. Students complete two semesters in the program, register for up to 12 credits per semester, and then transfer to a baccalaureate program upon successful completion of the outlined criteria. Visit <http://admissions.unh.edu/apply/non-traditional-students/how-to-apply/pre-admission-program/> for details.

## CATS Program ▼

The CATS (Challenging Academically Talented Students) Program is open to highly motivated and academically strong high school juniors and seniors who want to enrich their academic experience with a college-level course. Students may choose from freshman-level courses (400-500 numbered courses). For an application and more information, please visit <http://admissions.unh.edu/academics/high-school-students>.

## Prerequisites ▼

Individuals are responsible for meeting all course prerequisites before registering for classes. Visit [www.learn2.unh.edu/courses/prerequisites.html](http://www.learn2.unh.edu/courses/prerequisites.html) for undergraduate and graduate course descriptions and prerequisite information.

## Academic Standards and Expectations ▼

A cumulative grade-point average of 2.00 (C grade) is the minimum acceptable level for undergraduate work and 2.67 (B- grade) for graduate work at the University. The records of non-degree students are examined periodically and academically deficient students may be warned or excluded from registering. All non-degree students are expected to become familiar with and adhere to the current UNH *Student Rights, Rules and Responsibilities* available online at <http://www.unh.edu/student/rights>.

## Student Resources ▼

Non-degree students are encouraged to take advantage of the wide range of resources available on campus. Visit [www.learn2.unh.edu/resources/](http://www.learn2.unh.edu/resources/) for a complete list of student services and campus resources.

## Professional Development and Training ▼

Professional Development and Training, an affiliate office of the Graduate School, serves individuals, businesses, and organizations by offering a wide range of non-credit professional development opportunities throughout the year. Programs are designed to assist professionals in developing new or advanced knowledge and skills in a variety of fields. Training is offered in Durham, Manchester, and Portsmouth. For more information, visit [www.learn.unh.edu](http://www.learn.unh.edu).

## Summer Session ▼

Summer Session provides a wide range of credit and non-credit courses, institutes, and programs in a variety of term lengths from May to August. From youth-enrichment programs to advanced-level institutes, Summer Session provides educational opportunities for learners of all ages. On-campus housing is available for students enrolled in summer credit courses. Please note summer credit courses are held to the same academic standards as regular term courses but are typically offered at an accelerated pace. For more information, please visit [www.learn2.unh.edu](http://www.learn2.unh.edu).

## January Term ▼

January Term is a three-week learning opportunity held during winter break. Online, on-campus, and study-away credit courses are available in a variety of academic disciplines at both the undergraduate and graduate levels. Because of the intensive course of study, students may register for only one course during January Term. For more information, visit <http://unh.edu/januaryterm/>.





### College of Engineering and Physical Sciences

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### College of Engineering and Physical Sciences ▼

» <http://www.ceps.unh.edu>

*Dean:* Samuel B Mukasa

*Associate Dean:* Robert M. Henry

### Introduction ▼

The College of Engineering and Physical Sciences (CEPS) provides an opportunity for students to achieve educational objectives appropriate to their interests in engineering, computer science, information technology, mathematics, the physical sciences, and the teaching of mathematics and physical sciences. The college offers an education in each of its primary disciplines leading to the bachelor of science, as well as bachelor of art degrees with majors in mathematics and each of the three physical sciences. All programs include an opportunity for study in the arts, humanities, and social sciences.

The key to an undergraduate program in the college is flexibility, with a strong emphasis on personal and individualized education. In addition to specific programs, a wide range of options within several majors are available. Special programs can be developed to meet the specific interests of individual students.

### Degree Requirement

MATH 425 and 426 (Calculus I and II) or the equivalent in transfer credits or advanced placement approved by the Department of Mathematics and Statistics are required by all departments of the college. The exception is the Information Technology major which only requires Math 425 (Calculus I). The prerequisites for calculus are three years of college-preparatory mathematics, including a half-year of trigonometry. Before students can register for MATH 425, they are required to take the Mathematics Placement Test or to have taken MATH 418 (or its equivalent) and received a grade of C or better.

### Mathematics Placement

First-year students arrive with a wide range of mathematical skills based upon their high school preparation. The college wants students to have a solid mathematics foundation so that they

will enjoy an enriched first-semester experience. A student's mathematics development will be assessed as part of the June orientation program. Based upon the Mathematics Placement Test, students are enrolled in the mathematics class that will allow them to continue that development. The initial mathematics entry course is Analysis and Applications of Functions (MATH 418). However, a student is placed into Math 425 (Calculus I) if he or she demonstrated a certain level of proficiency in Algebra and pre-Calculus through the Mathematics Placement Test. Students with AP credit for Calculus I and/or Calculus II may elect to accept those credits and continue with a math course at the next level.

### **Accreditation**

The baccalaureate-level programs in chemical, civil, computer, electrical, environmental, and mechanical engineering are accredited by the Engineering Accreditation Commission of **ABET**, Inc. The baccalaureate-level program in computer science and bioinformatics are accredited by the Computing Accreditation Commission of ABET, Inc. ABET contact information: 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700. The Department of Chemistry's undergraduate bachelor of science program is approved by the American Chemical Society.

### **Tech Courses**

The following courses are designed for students of the college and other majors within the University. These courses are offered through and administered by the Dean's Office.

TECH 400, Introduction to CEPS Programs, 1 cr.

TECH 444, Symmetry in Nature, The Arts, and Daily Life, 4 cr.

TECH 564, Fundamentals of CAD, 3 cr.

TECH 583, Technology: Cultural Aspects, 4 cr.

TECH 583H, Honors/Technology: Cultural Aspects, 4 cr.

TECH 601, Fundamentals Examination Review Course, 1 cr.

TECH 685, Budapest Program, 20 cr.

TECH 696, Independent Study, 1 to 4 cr.

TECH 797, Undergraduate Ocean Research Project, 2 cr.

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### Bachelor of Arts ▼

Programs leading to a bachelor of arts degree are offered in the departments of chemistry, earth sciences, mathematics, and physics. These programs provide a broad liberal education along with a major in one of these fields. See [University Academic Requirements](#) for requirements for the bachelor of arts degree.

#### Chemistry

#### Earth Science Teaching

#### Earth Sciences

#### Oceanography

#### Mathematics

#### Physics

### Bachelor of Science ▼

The programs leading to the bachelor of science degree, offered in each of the departments of the college, emphasize students' preparation for a professional career and continuing or graduate education.

The degree requirements for the bachelor of science include the University Academic Requirements and the specific departmental requirements for graduation. A minimum grade-point average of 2.0 must be achieved. Graduation credit requirements established by the departments range from 128 to 134. There are entrance requirements in some programs, and it is not possible to guarantee all change-of-major requests.

#### Chemical Engineering\*

Bioengineering  
Energy  
Environmental Engineering

**Chemistry\***

**Civil Engineering\***

**Computer Engineering\***

**Computer Science\***

Bioinformatics

**Electrical Engineering\***

**Environmental Engineering\*†**

Industrial Process  
Municipal Process

**Environmental Sciences\***

Ecosystems  
Hydrology  
Soil and Watershed Management

**Geology\***

**Information Technology**

**Mathematics\***

**Mathematics Education\***

Elementary  
Middle/Junior High  
Secondary

**Mathematics, Interdisciplinary**

Computer Science  
Economics  
Electrical Science  
Physics  
Statistics

**Mechanical Engineering\***

**Physics\***

Astronomy



Chemical Physics  
Materials Science

\*Designated degree (the name of the specialization is on the diploma, e.g., B.S. in chemistry).

†Multidisciplinary; i.e., offered in collaboration with two departments.

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#### Interdisciplinary Programs ▼

#### Majors

##### *Bachelor of Science in Environmental Engineering*

The environmental engineering program consists of two emphases: industrial processes (IP) and municipal processes (MP).

##### *Bachelor of Science in Environmental Sciences*

The environmental sciences program is offered jointly with the College of Life Sciences and Agriculture (COLSA) and consists of three options: hydrology, soil and watershed management, and ecosystems.

#### Minors

Interdisciplinary minors enable students to obtain experience in a specialized area and to retain identification with their major professional area. The college's interdisciplinary minors are:

Applied Mathematics

Environmental Engineering

Geology

Information Technology

Materials Science

Mathematics

Mechanical Engineering

Ocean Engineering

Oceanography

Physics

Statistics

For requirements regarding minors, see [University Academic Requirements](#).

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### College of Engineering and Physical Sciences

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- Combined Programs of Study

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» <http://www.ceps.unh.edu>

### Independent Study and Projects ▼

All departments within the college offer independent study opportunities and projects. The content of these courses varies and is based upon current scientific and technological needs in addition to the interests of the student and faculty involved.

Permission of the faculty member and/or department chairperson is required. One should review the course descriptions for the independent study and project courses for specific requirements. Students interested in working with a faculty member on a project or independent study should discuss this with the faculty member and their academic adviser prior to registering for the course.

#### ***Research Opportunities***

The talents and expertise of the faculty in all departments are reflected in the number of ongoing research projects. Undergraduates are included in many of these research projects with the intent that they will discover and foster their creative talents. When involved with a funded research project, students may have an opportunity to receive pay while learning about the research area.

The college has world-class laboratories and computer facilities in many areas. A few of these are: coastal and ocean mapping, space science, environmental engineering and science, fluid dynamics, wind turbulence, information systems, materials science, nanotechnology, sustainability, and medical imaging. These and other ongoing research areas within the college are described on the college's website: [www.ceps.unh.edu/research](http://www.ceps.unh.edu/research).

Students have the opportunity to acquire applied experience by working with faculty members who undertake sponsored professional projects in technical and managerial areas for business, industry, and for federal, state, and local governments.

### ***Special Provisions***

The requirement of a given topic/course prescribed to meet the requirements of major curriculum may be waived by the faculty of a student's department. This rule offers students the opportunity to develop a somewhat individualized plan of study with intellectual incentives and opportunities in addition to those found in a regular curriculum. The student's petition must be approved by his/her major adviser and the dean of the college. This power usually will be delegated by the faculty to the dean or to a committee. (Senate Rule 05.21(s): Waiver of Requirements in a Prescribed Curriculum.)

A student with senior status and a grade point average of 3.2 may petition to take a graduate course for undergraduate credit. In addition, upon the recommendation of the department chairperson, a superior student may be allowed to count credits from up to two 800-level courses toward both a bachelor's degree and a master's degree, provided that the student has been admitted to the master's program.

## **Study Abroad Programs ▼**

### ***Hungary***

The College of Engineering and Physical Sciences provides its students with the opportunity to spend a semester at the Budapest University of Technology and Economics (BME) in Budapest, Hungary. Most CEPS majors choosing to study abroad spend the fall semester of their junior year at BME. Electrical & Computer Engineering students spend the spring semester of their junior year at BME. Courses at BME are taught in English and receive prior approval for degree credit. Students studying in Budapest maintain their status as full-time UNH students, pay UNH tuition, and maintain their expected graduation date. For more information, visit the program's Web site at [www.ceps.unh.edu/academics/budapest/](http://www.ceps.unh.edu/academics/budapest/).

### ***Scotland, Heriot-Watt University Exchange Program***

College of Engineering and Physical Sciences students are eligible to participate in a spring semester exchange with Heriot-Watt University in Edinburgh, Scotland. The current program is designed for civil and environmental engineering majors. For more information, contact Ray Cook at (603) 862-1411 or the Center for International Education, Hood House.

## **Preparing for Teaching ▼**

Students interested in mathematics education (elementary, middle/junior high, or secondary), Earth science teaching, chemistry or physics teaching should refer to the appropriate department for a description of the program requirements.

## Combined Programs of Study ▼

In addition to pursuing a single major, students may combine programs of study as follows:

*Minors:* See [University Academic Requirements](#); see also [Degrees and Major Programs of Study](#) and [Departmental Programs of Study](#).

*Second majors:* See [University Academic Requirements](#).

*Interdisciplinary majors:* Many departments in the college offer programs that combine a major with another field of interest. See the descriptions that follow.

*Dual-degree programs:* See [University Academic Requirements](#).

*Student-designed majors:* See [Special University Programs](#).

*Other combined and interdisciplinary opportunities:* See [Special University Programs](#).

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» <http://www.ceps.unh.edu>

### Chemical Engineering (CHE) ▼

» <http://www.unh.edu/chemical-engineering/>

» [Click to view course offerings](#)

*Chairperson:* Palligarnai T. Vasudevan

*Professor:* Dale P. Barkey, Russell T. Carr, Ihab H. Farag, Palligarnai T. Vasudevan

*Associate Professor:* Nivedita R. Gupta

*Assistant Professor:* Jillian Goldfarb, Qing Song, Xiaowei Teng

The Department of Chemical Engineering currently offers the undergraduate degree program in chemical engineering with options in bioengineering, energy, and environmental engineering. In addition, the College of Engineering and Physical Sciences offers an **interdisciplinary B.S. program in environmental engineering** with the participation of the chemical engineering and civil engineering departments.

The B.S. program in chemical engineering is accredited by the Engineering Accreditation Commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

Chemical engineering is concerned with the analysis and design of processes that deal with the transfer and transformation of energy and material.

The practice of chemical engineering includes the conception, development, design, and application of physicochemical processes and their products; the development, design, construction, operation, control, and management of plants for these processes; and activities relating to public service, education, and research.

The curriculum prepares students for productive careers in industry or government and provides a foundation for graduate studies. The college's program emphasizes chemical

engineering fundamentals while offering opportunities for focused study in energy-, environmental-, or bioengineering.

Traditional employment areas in the chemical process industries include industrial chemicals, petroleum and petrochemicals, plastics, pharmaceuticals, metals, textiles, and food. Chemical engineers are also working in increasing numbers in the areas of energy engineering, pollution abatement, and biochemical and biomedical engineering; in addition, they are employed by many government laboratories and agencies as well as private industries and institutions.

### ***Mission***

The department strives to prepare our students for productive careers in industry or government as well as to provide a foundation for graduate studies. Our program emphasizes chemical engineering fundamentals while offering opportunities for focused study in energy-, environmental- or bio- engineering.

### ***Program Educational Objectives***

The chemical engineering program seeks to provide an environment that enables students to pursue their goals in an innovative program with a diversity of offerings that is rigorous and challenging.

**The program has the following major educational objectives with the expectation that our alumni will have successful careers in the many diverse areas of the chemical engineering profession. Within a few years of obtaining a bachelor's degree in chemical engineering, we expect our graduates to have the following attributes.**

**Depth.** To be effective in applying chemical engineering principles in engineering practice or for advanced study in chemical engineering.

**Breadth.** To have a productive career in the many diverse fields of chemical engineering such as bioengineering, energy and the environment, or in the pursuit of graduate education in disciplines such as chemical engineering, medicine, law or business.

**Professionalism.** To function effectively in the complex modern work environment with the ability to assume professional leadership roles.

### **Bachelor of Science in Chemical Engineering**

Chemical engineering is concerned with the analysis and design of processes that deal with the transfer and transformation of energy and material.

The practice of chemical engineering includes the conception, development, design, and application of physicochemical processes and their products; the development, design, construction, operation, control, and management of plants for these processes; and activities



relating to public service, education, and research.

The curriculum prepares students for productive careers in industry or government and provides a foundation for graduate studies. The program emphasizes chemical engineering fundamentals while offering opportunities for focused study in energy-, environmental-, or bioengineering.

Traditional employment areas in the chemical process industries include industrial chemicals, petroleum and petrochemicals, plastics, pharmaceuticals, metals, textiles, and food. Chemical engineers also are working in increasing numbers in the areas of energy engineering, pollution abatement, and biochemical and biomedical engineering; in addition, they are employed by many government laboratories and agencies as well as private industries and institutions.

Graduates from the program have the ability to apply knowledge of mathematics, science, and engineering to identify, formulate, and solve chemical engineering problems as well as to design and conduct experiments safely and analyze and interpret data. They are prepared to pursue advanced studies in chemical engineering. Program graduates gain a sense of professional and ethical responsibility with the ability to apply environmental, safety, economic, and ethical criteria in the design of engineering processes. They learn to function in individual and group working environments, and learn skills in written and oral communication and the effective use of computers for engineering practice, including information search in the library and on the Internet. They also understand the need for lifelong learning and the significance of societal and global issues relevant to chemical engineering.

A minimum of 129 credits is required for graduation with the degree of bachelor of science in chemical engineering. There are ten electives in the chemical engineering curriculum. Six of these are for the Discovery Program requirements. The remaining four electives should consist of three chemical engineering electives and one additional technical elective.

Students are required to obtain a minimum 2.0 grade-point average in CHE 501-502 and in overall standing at the end of the sophomore year in order to continue in the major. Study Abroad (Exchange) Chemical engineering students are required to have a cumulative GPA of 3.0 or better in math, physics, chemistry and CHE courses at the end of the semester prior to their exchange semester.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
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ENGL	401	First-Year Writing	4	-
MATH	425-426	Calculus I and II	4	4
PHYS	407	General Physics I	-	4
CHEM	405	General Chemistry	4	-
CHE	400	CHE Lectures	-	1
Discovery Program Electives (3)			4	8
Total			16	17

1. PHYS 407 OR CHEM 405 satisfies the Discovery Physical Science (with lab) category. Chemical engineering students can not take CHEM 401, CHEM 402 or CHEM 409 towards degree requirements.
2. MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.
3. ENGL 401 satisfies the Discovery Foundation Writing Skills category.
4. CHE students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in the CHE curriculum.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CHEM	683-684	Physical Chemistry I and II	3	3
CHEM	685-686	Physical Chemistry Laboratory	2	2
MATH	527	Differential Equations with Linear Algebra	4	-
PHYS	408	General Physics II	4	-
CHE	501-502	Introduction to Chemical Engineering I and II	3	3
CHE	603	Applied Mathematics for Chemical Engineers	-	4
Discovery Program Elective (1)			-	4
Total			16	16

CHE 502 satisfies the Discovery Inquiry requirement.

### Junior Year

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Abbreviation	Course Number	Title	Fall	Spring
CHEM	651-652	Organic Chemistry	3	3
CHEM	653	Organic Chemistry Laboratory	2	-
CHE	601	Fluid Mechanics and Unit Operations	3	-
CHE	602	Heat Transfer and Unit Operations	-	3
CHE	604	Chemical Engineering Thermodynamics	3	-
CHE	612	Chemical Engineering Laboratory I	-	3
CHE	614	Separation Processes	-	3
CHE Elective			4	-
Discovery Program Elective (1)			-	4
Total			15	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CHE	703	Mass Transfer and Stagewise Operations	3	-
CHE	707	Chemical Engineering Kinetics	3	-
CHE	708	Chemical Engineering Design	-	4
CHE	713	Chemical Engineering Laboratory II	3	-
CHE	752	Process Dynamics and Control	-	4
CHE Electives (2)			4	4
Technical Elective (1)			-	4
Discovery Program Elective (1)			4	-
Total			17	16

1. CHE 708 satisfies the Discovery Capstone Experience/Course
2. MATH 740 (Design of Experiments) or MATH 644 (Statistics for Engineers and Scientists) are the recommended Technical Electives.

**Bioengineering Option**

Under this option, the required courses deal with the application of basic biological sciences and chemical engineering principles to the design and operation of large-scale bioprocesses for the production of high-value medicinal products, food and beverage, pharmaceutical, biomedical, genetic engineering products, and health care products. The elective courses permit the student to study topics of special interest in more depth or gain a broader perspective in bioengineering or some closely related subjects such as biochemistry or biotechnology experience in manufacturing or research. Three courses are required, and a minimum of two additional courses of at least three credits each should be selected from the electives list. Students interested in the bioengineering option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

**Required Courses**

Abbreviation	Course Number	Title	Credits
CHE	761	Biochemical Engineering	4
CHE	762	Biomedical Engineering	4
CHE	651	Biomanufacturing	4
Total			12

**Elective Courses**

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
BMCB	750	Physical Biochemistry	3
BMCB	751	Principles in Biochemistry	4
BMCB	752	Principles in Biochemistry	4
MATH	740	Design of Experiments I	4
Total			6-8

**Energy Option**

This option covers the major areas of current interest in the energy field. The required courses

provide students with a general background knowledge of fossil fuels, nuclear power, solar energy, and other alternative energy resources. The elective courses will permit the student to study topics of special interest in more depth or gain a broader perspective on energy and some closely related subjects. Three courses are required, and a minimum of two additional courses of at least three credits each should be selected from the electives list. Students interested in the energy option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

#### Required Courses

Abbreviation	Course Number	Title	Credits
CHE	705	Natural and Synthetic Fossil Fuels	4
CHE	712	Introduction to Nuclear Engineering	4
CHE	761	Biochemical Engineering	4
Total			12

#### Elective Courses

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
ENE	772	Physicochemical Processes for Water/Air Quality	4
MATH	740	Design of Experiments I	4
ME	705	Thermal Systems Analysis and Design	4
		Special Topics on Energy*	3-4
Total			6-8

\* This requires approval of the department - check with adviser. Courses offered in the past include Renewable Electrical Power, Renewable Energy and Peak Oil.

#### ***Environmental Engineering Option***

The chemical engineering program, with its substantial requirements in chemistry, fluid dynamics, heat transfer, mass transfer, unit operations, and reaction kinetics, provides students with a unique preparation to deal with many aspects of environmental pollution problems. The option gives students a special focus on the application of chemical engineering principles and processes to the solution of problems relating to air pollution, water pollution, and the disposal

of solid and hazardous waste. Three required courses must be selected, plus two electives from the electives list. Each course must carry a minimum of three credits. Students interested in the environmental engineering option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

#### Required Courses

Abbreviation	Course Number	Title	Credits
ENE	709	Fundamentals of Air Pollution and Its Control	4
ENE	772	Physicochemical Processes for Water/Air	4
ENE	742	Solid and Hazardous Waste Engineering	3
Total			11

#### Elective Courses

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
CHE	744	Corrosion	4
ENE	746	Bioenvironmental Engineering Design	3
ENE	749	Water Chemistry	4
MATH	740	Design of Experiments I	4
Total			6-8

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## Chemistry (CHEM) ▼

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*Professor:* Christopher F. Bauer, Arthur Greenberg, Richard P. Johnson, Howard R. Mayne, Glen P. Miller, W. Rudolf Seitz, Sterling A. Tomellini, Gary R. Weisman, Edward H. Wong, Charles K. Zercher

*Associate Professor:* Roy Paul Planalp

*Assistant Professor:* Erik Berda, Margaret E. Greenslade, Gonghu Li, Samuel Pazicni

“Chemistry is everywhere. From agriculture to health care, chemistry extends life and improves its quality. From disposable diapers to space suits, chemistry provides new materials for clothing, shelter, and recreation. From computer chips to fiber optics, chemistry is the foundation of today’s high technology.” (American Chemical Society)

A study in chemistry is the pathway to multiple options. These options include careers in education, law, forensics, medicine, biotechnology, environmental protection, technical sales, pharmaceutical research, semiconductors, and industrial chemical production. The potential is limitless. Students interested in pursuing chemistry as an undergraduate degree have two options available to them, which are based on their career plans. These are the bachelor of science degree (B.S.) and a bachelor of arts degree (B.A.). Since the required chemistry courses in each degree program are the same the first year, it is easy to change from one program to another. A chemistry faculty adviser is assigned to a student once she/he enters the program. The adviser will work with the student throughout their chemistry major program to choose courses to meet requirements for their major and overall.

### **First Year Student Requirements:**

In general, a first-year student should register for the following courses, and this applies to both programs (B.A. and B.S.):

- **Semester I:** Freshman Seminar, Chemistry 400; General Chemistry with lab, Chemistry 403; Calculus I, Mathematics 425;
- **Semester II:** General Chemistry with lab, Chemistry 404; Calculus II, Mathematics 426; Freshman English, English 401W.
  - Math 425 satisfies the Discovery Foundation Quantitative Reasoning category and fulfills a Chemistry major science requirement.
  - ENGL 401 satisfies the Discovery Foundation Writing Skills category and is 1 of the 4 required writing intensive courses

### **Chemistry Major Requirements:**

1. Satisfy the Discovery Program requirements.
2. For specific chemistry major course requirements, see the Baccalaureate Degree Required Chemistry Courses table.

3. Chemistry majors cannot use CHEM 403, CHEM 404 and CHEM 405 to satisfy discovery program requirements.

### **Capstone Experience:**

A capstone experience is required for all chemistry majors during their senior year. The B.S. major offers CHEM 699, Senior Thesis, as the capstone experience.

Senior thesis is a year-long project involving literature research, developing scientific writing skills and obtaining lab experience using a variety of techniques and equipment. Senior thesis research is focused on an area of specialty in either analytical, inorganic, organic and physical areas of chemistry. Students must interview with a faculty member before choosing to register for CHEM 699. The interview process enables the student to explore areas of interest and the faculty adviser to determine a potential project. The senior thesis experience immerses the student into the lab environment: working with peers, graduate students, and a research adviser. This creates a community to facilitate discussion, questions, and new ideas for projects.

Completing a senior thesis in chemistry provides valuable field experience for careers in chemistry or closely related fields. Students combine their research with another course, CHEM 698 - Senior Seminar - to develop posters exhibiting their research. These are presented at the UNH Undergraduate Research Conference. This is in addition to creating a written bound thesis. Copies of students theses are displayed in the chemistry library and the adviser's personal library and students retain personal copies. Choosing to complete a senior thesis also enables students' B.S. degree to be ACS certified.

The B.A. major offers CHEM 698, Senior Seminar, as the capstone experience. Students work with the faculty member teaching the seminar to prepare a presentation based upon a research project or subject-driven professional engagement. The ability to integrate detailed subject matter and communicate this to the broader community, both scientific and general society, is encouraged. This exercise enhances the student's writing ability, aids in the development of broader communication skills, and enables the student to obtain valuable research experience.

B.A. majors have the additional research opportunity by taking CHEM 696, Independent study. This course can be taken prior to or parallel to the capstone course to enhance their program of study.

### **Bachelor of Arts in Chemistry**

This curriculum offers students the opportunity to combine the chemistry major with other interests; for example, preprofessional programs, education, and business.



**Requirements**

1. Satisfy the Discovery Program requirements
2. For specific course requirements, see the BA section in the Baccalaureate Degree Required Chemistry Courses table.

- Math 425 satisfies the Discovery Foundation Quantitative Reasoning category and fulfills a Chemistry major science requirement.

**Baccalaureate Degree Required Chemistry Courses**

Course Number	Title	BS	BA
400	Freshman Seminar	x	x
403, 404	General Chemistry	x	x
517, 518	Quantitative Analysis	x	x
547 & 549	Organic Chemistry I	x	x
548 & 550	Organic Chemistry II	x	x
574	Introduction to Inorganic Chemistry	x	x
683 & 685	Physical Chemistry I	x	x
684 & 686	Physical Chemistry II	x	x
762 & 763	Instrumental Methods of Chemical Analysis	x	x
698	Seminar	x	x
699	Thesis	x	
755 & 756	Advanced Organic Chemistry	x	
774 & 775	Advanced Inorganic Chemistry	x	
776	Physical Chemistry III	x	
708	Spectroscopic Investigations of Organic Molecules		

**Other Requirements:**

All majors: MATH 425-426, Calculus I and II. Math 425 satisfies the Discovery Foundation Quantitative Reasoning Category

B.S. degree: PHYS 407-408, General Physics I and II; BCHM 658 or 751, Biochemistry; one chemistry-related course. † Check course listings to see which meet a physical science discovery criteria or a biological science course criteria as a part of the Discovery Program.

B.A. degree, chemistry major: PHYS 407, General Physics I, or PHYS 401-402, Introduction to Physics I and II; two other CHEM courses, except 698, or two approved chemistry-related courses.†

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† Suggested courses: MATH 527, 528; PHYS 505; EE 620; BCHM 658, 751.

### **Bachelor of Science in Chemistry**

This curriculum prepares students for careers requiring a thorough knowledge of chemistry and provides a strong foundation for careers in industry, professional schools (e.g., medical schools), and for graduate study in chemistry or in interdisciplinary areas. The curriculum requires a greater depth in chemistry and physics than do the other degree programs.

#### **Requirements:**

1. Satisfy the Discovery Program requirements.
2. For specific course requirements, see the BS section in the Baccalaureate Degree Required Chemistry Courses table.

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### **Civil Engineering (CIE) ▼**

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*Chairperson:* M. Robin Collins

*Professor:* Jean Benoit, M. Robin Collins, David L. Gress, Nancy E. Kinner, James P. Malley Jr.

*Associate Professor:* Thomas P. Ballestero, Erin S. Bell, Raymond A. Cook, Jo S. Daniel, Kevin H. Gardner, Charles H. Goodspeed, Robert M. Henry, Jennifer M. Jacobs

*Assistant Professor:* Tat S. Fu, Ricardo A. Medina

*Research Assistant Professor:* Jeffrey S. Melton, Robert M. Roseen, Alison W. Watts

*Lecturer:* Rebekah J. Gaudreau

Civil engineering involves the planning, design, and construction of public works: buildings, bridges, roads, dams, water transmission systems, water treatment systems, tunnels, and more. These facilities must provide efficient service, be cost-effective, and be compatible with the environment. Moreover, civil engineers work under a code of ethics in which their primary, overriding responsibility is to uphold the public's trust by working to plan, design, build, and restore safe, sustainable, and environmentally responsible public works.

Civil engineers work as private consultants and for government agencies in a wide variety of indoor and outdoor settings around the world. There is a strong and constant market for civil engineers due to the demands placed on the profession to construct, maintain, and repair the infrastructure.

As civil engineering is such a broad field, it is traditionally divided into several sub-disciplines. At the University of New Hampshire, five are offered: civil engineering materials, environmental engineering, geotechnical engineering, structural engineering, and water resources engineering. Civil engineering majors may choose the sub-discipline in which to focus their studies during their senior year. Additionally, the College of Engineering and Physical Sciences, through the Departments of Civil Engineering and Chemical Engineering, offers a B.S. in environmental engineering (ENE) which is a major for students who choose to specifically focus their attention solely in that area. (Students who are interested in environmental engineering but who also want a broader or more traditional civil engineering focus should pursue the civil engineering major and elect environmental engineering courses in their senior year.) Students may readily transfer between the civil engineering (CIE) and ENE programs within the first two semesters. Both the B.S. in civil engineering and the B.S. in environmental engineering provide a firm base in mathematics, science, and engineering and all majors are expected to develop excellent communication and computer skills. Graduates are prepared to enter the profession and to pursue advanced study. Because of the broad technical background attained, some graduates also successfully pursue further education in business, architecture, education, and law.

### ***Mission***

The mission of the Department of Civil Engineering is to pursue and disseminate knowledge through teaching, research, and public service. As part of its teaching mission, the department provides rigorous, yet flexible, undergraduate and graduate education for both traditional and nontraditional students through classical and creative instruction in the classroom, laboratory, and field. While preparing students for the profession, the department offers an education in civil engineering that includes working in multidisciplinary teams that critically analyze and formulate solutions to civil engineering problems and apply engineering principles that provide social, economic, and environmental benefits to the public. The department encourages in its

students a lifelong desire to keep abreast of new developments in the field and teaches them the skills necessary to continue learning. As part of its research mission, the department maintains a rigorous multidisciplinary program of scholarship advancing the state of the art in civil engineering. As part of its mission in public service, the department enhances the quality of life for people, especially in New England and specifically New Hampshire, by providing expert services, advancing and transferring knowledge and technology, and serving as a resource for information.

### ***Educational Objectives***

In accordance with its University, college, and department missions, the faculty of the Department of Civil Engineering has established clear objectives for students to help them become successful professionals after graduation. To assist graduates to become practicing civil engineers, the program helps students achieve a basic competence in math, science, and engineering principles; learn how to apply this knowledge to solve engineering problems; achieve a working knowledge in the basic civil engineering areas of structural engineering, geotechnical engineering, civil engineering materials, water resources, and environmental engineering; and extend their knowledge in one or more of these areas. As part of this process, students learn how to critically analyze and design equipment, structures, systems, or processes to meet current needs without compromising the ability of future generations to meet theirs; and to use current, and be able to independently learn new, engineering software. Engineers also need to be effective communicators. Engineering students learn how to communicate and defend ideas in technical documents such as calculation sets, reports and correspondence, how to speak before a group and convey information to technical and non-technical audiences, and how to create and effectively use graphics in support of a presentation or report. Students also learn how to work effectively as good team players who are able to work effectively as team members and team leaders and who can work on multi-disciplinary teams.

As part of finding engineering solutions civil engineering students learn how to be effective researchers who can gather and synthesize information and data to accomplish tasks. Students learn to locate, compile, and use existing information; design and perform experiments to gather new information; analyze information; and draw conclusions. Due to the nature of civil engineering efforts, which involve the public, public safety, and significant financing, it is imperative that graduates become good engineering citizens who are ethical and aware of the social, economic, and environmental impact of engineering solutions. Students develop an awareness of sustainable engineering and the interaction between engineering practice and social, economic, and environmental issues; ASCE Code of Ethics; an awareness of contemporary, global issues; their effect on public policy and their interaction with civil engineering practice; and the importance of broadening their education by being familiar with

topics outside of the math, science, and engineering areas including the basics of business and management. Civil engineers also are professionals who often are licensed, seek continuing education, participate in professional societies, and perform public service. Students are prepared to take the Fundamentals of Engineering examination, understand the need for lifelong learning, and are encouraged to join and be active in professional organizations such as ASCE, SWE, SWB, Tau Beta Pi, and the Order of the Engineer.

### **Bachelor of Science in Civil Engineering**

Matriculating students should have strong aptitudes in mathematics and science along with imagination, spatial and graphic abilities, communication skills, and creativity. Students then follow a four-year program that conforms to the guidelines of, and is accredited by, the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

The first two years of the program provide the necessary technical knowledge in mathematics, chemistry, and physics, while introducing and developing problem-solving techniques in seven courses tailored to civil engineering students. The junior year provides courses in each of the civil engineering sub-disciplines, providing students with skills in each and allowing students to determine which they wish to pursue further. The senior year is flexible, allowing students to choose where to focus attention by selecting from more than thirty elective courses in civil and environmental engineering.

The required curriculum includes eight writing-intensive courses, thereby not only satisfying but exceeding the University's writing requirement. (See [University Academic Requirements](#).)

#### *Electives*

Approximately one-third of the major's total credits and more than half of the senior-level courses are elected by the student. Of these, there are Discovery Program electives required by the University and other electives required by the department in order to satisfy departmental objectives and accreditation requirements.

1. The Discovery Program is described in [University Academic Requirements](#). Courses required by the civil engineering major fulfill requirements in Inquiry (CIE 402); Writing Skills (ENGL 401); Quantitative Reasoning (MATH 425); Physical Sciences (PHYS 407); Laboratory Coursework (PHYS 407); Environment, Technology, and Society (CIE 402); and a Senior Capstone Experience (CIE 784/788). Therefore, students select electives to satisfy Discovery requirements in Biological Science, Fine and Performing Arts, Humanities, Historical

Perspectives, World Cultures, and Social Science.

2. Civil engineering majors wishing to participate in exchange programs must achieve a cumulative grade-point average of 3.0 or better in all MATH, PHYS, CHEM, CIE, and ENE courses taken to date at the end of each of the second and third semesters prior to their exchange semester.

3. In the senior year, students take four courses specific to civil engineering sub-disciplines, and a senior technical elective. Students can use these electives to focus on a particular civil engineering area or can acquire a broader perspective by taking courses in a variety of areas. At least one of these four elective courses must qualify also as a civil engineering design elective, and no more than three courses may be taken in one sub-discipline. Lists of courses that fulfill these electives are available from the department.

*Additional program policies and requirements*

1. To transfer into the civil engineering major, a student must have the following:

- a. an overall grade point average of 2.33 or greater;
- b. an overall grade point average of 2.33 or greater for all CIE and ENE courses taken to-date;
- c. a grade point average of 2.33 in courses taken to-date of MATH 425, PHYS 407, CHEM 405 or CHEM 403, CIE 525 or ME 525, and CIE 526 or ME 526;
- d. a minimum grade of C+ in courses taken to-date of CIE 525 and CIE 526.

2. Students who are transferring into the civil engineering major may only transfer in the following:

- a. a maximum of 20 credits for CIE and ENE 600- and 700-level coursework,
- b. CIE and ENE 600- and 700-level courses in which the student has received a grade of C- or better.

3. To continue as a civil engineering major, a student must adhere to the following restrictions:

- a. a maximum of two CIE or ENE courses may be repeated (though each of these may be repeated more than once),
- b. a semester grade-point average lower than 2.0 may be earned for a maximum of two consecutive semesters,
- c. a cumulative grade-point average of less than 2.0 for CIE and ENE courses may be earned

for a maximum of any two semesters.

4. CIE and ENE 600- and 700-level courses are intended for CIE and ENE majors only. All others may enroll in these courses only with the permission of the instructor, but others may take no more than 20 credits of these courses.

5. To enter the required 600-level courses in the junior year, students must achieve the following:

- a. the completion of CIE 525, CIE 526, MATH 425, PHYS 407, and CHEM 405 or CHEM 403,
- b. an overall grade-point average of 2.0 or greater for these courses,
- c. a grade of C or better in each of CIE 525 and CIE 526.

6. To graduate with a bachelor of science in civil engineering, a student must achieve the following:

- a. 130 or more credits,
- b. credit for the civil engineering program's major and elective courses,
- c. satisfaction of the University's **Discovery Program requirements**,
- d. satisfaction of the University's **writing intensive course requirements**,
- e. a cumulative grade-point average of 2.0 or better for all courses,
- f. a cumulative grade-point average of 2.0 or better for all CIE and ENE courses.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	402	Intro. to Civil Engineering	4	-
ENGL	401	First-Year Writing	4	-
TECH	564	Fundamentals of CAD	3	-
Elective (2)		Discovery Program requirement*	4	4
CIE	505	Surveying and Mapping	-	4
MATH	425	Calculus I	-	4

PHYS	407	General Physics I	-	4
Total			15	16

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	525	Statics	3	-
ENGL	502	Technical Writing	4	-
MATH	426	Calculus II	4	-
PHYS	408	General Physics II	4	-
Elective (2)		Discovery Program requirement*	4	4
CHEM	405	General Chemistry	-	4
CIE	526	Strength of Materials	-	3
CIE	533	Project Engineering	-	3
MATH	644	Statistics for Engineers and Scientists	-	4
Total			19	18

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	622	Engineering Materials	4	-
CIE	642	Fluid Mechanics	4	-
ENE	520	Environmental Pollution and Protection	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
CIE	665	Soil Mechanics	-	4
CIE	681	Classical Structural Analysis	-	3
ENE	645	Fundamental Aspects of Environmental Engineering	-	4



Elective (1)		Discovery Program requirement*	-	4
Total			16	15

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	760	Foundation Design I	4	-
CIE	774	Reinforced Concrete Design	4	-
CIE	784	Intro. to Project Planning and Design***	1	-
Elective (1)		Discovery Program requirement*	4	
Elective (3)		Civil Engineering**	3	6
CIE or ENE	788	Project Planning and Design***	-	3
Elective (1)		Civil Engineering Design**	-	3
Elective (1)		Senior Technical Elective**	-	3
Total			16	15

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

\*\* Approved list available in the CIE office.

\*\*\* Satisfies capstone requirement for Discovery.

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## Computer Science (CS) ▼

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*Affiliate Professor:* Jason H. Moore

*Associate Professor:* Radim Bartos, Michel Charpentier, Robert D. Russell, Elizabeth Varki, James L. Weiner

*Affiliate Associate Professor:* Sylvia Weber Russell, Mihaela Sabin

*Assistant Professor:* Wheeler Ruml

*Affiliate Assistant Professor:* Michael S. Deutsch, Anthony J. Lapadula, Matthew Plumlee, Kurt Schwehr

*Instructor:* Michael Gildersleeve, Brian L. Johnson, Israel J. Yost

*Lecturer:* Mark L. Bochert, Ellen M. Hepp, Karl Shump

## **Computer Science**

Undergraduate students may choose from one of three degree options: The B.S. in computer science, which is designed for students interested in the design and implementation of software systems; the B.S. in computer science: bioinformatics option, which is designed for students who wish to apply computer science expertise in the life sciences; and the B.S. in information technology, which focuses on the application of existing computing technologies to the information needs of organizations and individual computer users.

### **Bachelor of Science in Computer Science**

Computer scientists are concerned with problem-solving in general, with particular emphasis on the design of computer-efficient solutions. This involves a detailed understanding of the nature of algorithms, the software implementation necessary to utilize algorithms on computers, and how algorithms can be combined in a structured manner to form highly complex systems.

#### **The broad objectives for B.S. in Computer Science graduates are:**

1. To be competent in formulating and solving computer science problems, including the development of complex software systems;
2. To understand computer science fundamentals along with supporting mathematics and science so they will be prepared for a wide range of jobs and the pursuit of advanced degrees;
3. To be able to function in the workplace with the necessary technical skills and with appropriate oral and written communication skills; and
4. To have a broad education that promotes professional advancement, lifelong personal development, and social responsibility.

The B.S. in computer science program is accredited by the Computing Accreditation Commission of ABET, 111 Market Place, suite 1050, Baltimore, MD 21202-4012, (410) 347-

7700.

The program is designed to prepare students for employment and/or graduate study. Most courses require heavy computer use, and the laboratories stress hands-on experience with building software systems.

Computer science majors must maintain an overall grade-point average of 2.0 or better in all required computer science, mathematics, and computer engineering courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as a CS major. In order to be able to take a CS or MATH course with prerequisites, the prerequisite course(s) must be passed with a grade of a C- or better.

Computer science majors should not take CS 401, CS 405, or CS 410.

If a student wishing to transfer into the computer science major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in computer science. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

The curriculum includes coursework in mathematics, computer engineering, science, English, and philosophy. The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
CS	415	Introduction to Computer Science I	4	
MATH	425	Calculus I	4	
	444	Inquiry	4	
		Discovery	4	
CS	416	Introduction to Computer Science II		4
MATH	426	Calculus II		4
ENGL	401	First-Year Writing		4

		Discovery Science*		4
		Total	17	16

\*Students are required to take four science courses. You must have at least one course in a biological science and at least one course in a physical science. Two courses must be a sequence and should be chosen from the following list: BIOL 411-412, CHEM 403-404, ESCI 401-402, ESCI 409-402, or PHYS 407-408. The other two courses must be chosen from the following two tables:

### Biological Science

Abbreviation	Course Number	Title
BIOL	411	Principles of Biology I
BIOL	412	Principles of Biology II
BIOL	413	Principles of Biology I (UNH Manchester Course)
BIOL	414	Principles of Biology II (UNH Manchester Course)
BMS	412	Biology of Animals
ECE	444	Bionics
MICR	501	Public Health Microbiology
PBIO	412	Introduction to Botany

### Physical Science

Abbreviation	Course Number	Title
CHEM	403	General Chemistry I
CHEM	404	General Chemistry II
CHEM	405	General Chemistry
ESCI	401	Principles of Geology
ESCI	402	Earth History
ESCI	409	Environmental Geology
ESCI	501	Introduction to Oceanography
NR	433	Wildlife Ecology
NR	504	Freshwater Resources
PHYS	407	General Physics I

PHYS	408	General Physics II
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**Sophomore Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	515	Data Structures	4	
MATH	531	Mathematical Proof	4	
		Discovery Science	4	
		Discovery	4	
CS	520	Assembly Language Programming and Machine Organization		4
CS	659	Introduction to the Theory of Computation		4
		Discovery Science		4
		Discovery		4
		Total	16	16

**Junior Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	620	Operating System Fundamentals	4	
CS	516	Introduction to Software Design and Development	4	
		Statistics Course*	4	
PHIL	424	Science, Technology and Society (Discovery ETS)	4	
CS	671	Programming Language Concepts and Features		4
		Computer Science Theory Course**		4
ECE	543	Introduction to Digital Systems		4
CS	595	Computer Science Seminar		2
ENGL	502	Technical Writing		4
		Total	16	18

\*The statistics requirement can be fulfilled by MATH 539, Introduction to Statistical Analysis, or MATH 644, Statistics for Engineers and Scientists.

\*\*The CS theory requirement can be fulfilled by CS 712, Compiler Design, CS 745 Formal

## Specification and Verification of Software Systems, or CS 758, Algorithms.

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	791	Senior Project I*	2	
CS		Writing Intensive Course	4	
ECE	562	Computer Organization	4	
		Discovery	4	
CS	792	Senior Project II*		2
CS	700-Level	Elective		4
CS	700-Level	Elective		4
		Discovery Science		4
		Free Elective		1
		Total	14	15

\*This is the senior capstone course.

**Bachelor of Science in Computer Science: Bioinformatics Option**

The bioinformatics field is an increasingly important sub-discipline in computer science. The demand for computer science graduates who can apply their knowledge in the life sciences is significant, and is expected to continue to grow. Students who choose this path are still computer science majors but have a concentration in the life sciences. The option has the same core as the B.S. program but requires appropriate coursework in chemistry, biology, biochemistry, and statistics.

Computer science: bioinformatics majors must maintain an overall grade-point average of 2.0 or better in all required computer science, mathematics, computer engineering, biology, and biochemistry courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as a computer science: bioinformatics major. In order to be able to take a CS or MATH course with prerequisites, the prerequisite course(s) must be passed with a grade of a C- or better.

Computer bioinformatics majors should not take CS 401, CS 405, or CS 410.

If a student wishing to transfer into the computer science: bioinformatics major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in computer science. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

**The broad objectives for B.S. in Computer Science: Bioinformatics graduates are:**

1. To be competent in formulating and solving computer science problems, including the development of non-trivial software systems;
2. To understand computer science fundamentals along with supporting mathematics and science so they will be prepared for a wide range of jobs in the biomedical industry and the pursuit of advanced degrees in both computer science and bioinformatics;
3. To be able to function in the workplace with the necessary technical skills and with appropriate oral and written communication skills; and
4. To have a broad education that promotes professional advancement, lifelong personal development, and social responsibility.

The B.S. in computer science: bioinformatics program is accredited by the Computing Accreditation Commission of ABET, 111 Market Place, suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

**First Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
CS	415	Introduction to Computer Science I	4	
MATH	425	Calculus I	4	
BIOL	411	Principles of Biology I	4	
	444	Discovery	4	

CS	416	Introduction to Computer Science II		4
MATH	426	Calculus II		4
BIOL	412	Principles of Biology II		4
ENGL	401	First-Year Writing		4
		Total	17	16

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CS	515	Data Structures	4	
MATH	531	Mathematical Proof	4	
CHEM	403	General Chemistry I	4	
		Discovery	4	
CS	520	Assembly Language Programming and Machine Organization		4
CS	659	Introduction to the Theory of Computation		4
CHEM	404	General Chemistry II		4
		Discovery		4
		Total	16	16

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
CS	620	Operating Systems Fundamentals	4	
		Statistics Course*	4	
CS	516	Introduction to Software Design and Development	4	
PHIL	424	Science, Technology and Society (Discovery ETS)	4	
CS	595	Computer Science Seminar	2	
CS	671	Programming Language Concepts and Features		4
		Computer Science Theory Course**		4
BIOL	604	Principles of Genetics		4
ENGL	502	Technical Writing		4
		Total	18	16



\*The Statistics requirement can be fulfilled by MATH 539, Introduction to Statistical Analysis, or MATH 644, Statistics for Engineers and Scientists.

\*\*The CS theory requirement can be fulfilled by CS 712, Compiler Design, CS 745 Formal Specification and Verification of Software Systems, or CS 758, Algorithms.

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CS	791	Senior Project I*	2	
BCHEM	711	Genomics and Bioinformatics	4	
	700-Level	Statistics Course**	4	
		Discovery	4	
CS	792	Senior Project II		2
CS		Writing Intensive Course***		4
CS	775	Database Systems		4
ECE	543	Introduction to Digital Systems		4
		Discovery		4
		Total	14	18

\*This is the senior capstone course.

\*\*This requirement can be fulfilled by the following courses: MATH 739, Applied Regression Analysis; MATH 742, Multivariate Statistical Methods; or MATH 755, Probability and Stochastic Processes with Applications.

\*\*\*This course must include a project that addresses bioinformatics issues.

### The Minor in Computer Science

The minor in computer science is designed for students in other majors who want to learn the fundamentals of designing and implementing computer software.

Credit toward the minor will be given only for courses passed with C- or better, and a 2.0 grade-point average must be maintained in courses for the minor. Courses taken on the pass/fail basis may not be used for the minor. Students should declare their intent to earn a minor as early as possible and no later than the end of the junior year. During the final term, an

application should be made to the dean of the student's major college to have the minor shown on the academic record. Students must consult with their major adviser and also the minor supervisor.

**Requirements:**

Abbreviation	Course Number	Title
CS	415	Introduction to Computer Science I
CS	416	Introduction to Computer Science II
CS	515	Data Structures

**Two additional courses chosen from:**

Abbreviation	Course Number	Title
CS	516	Introduction to Software Design and Development
CS	520	Assembly Language Programming and Machine Organization
CS	620	Operating System Fundamentals
*CS	659	Introduction to the Theory of Computation
CS	671	Programming Language Concepts and Features
		An approved CS 700-level course

\*CS 659 has mathematics prerequisites: MATH 425, MATH 426, and MATH 531.

**The Bachelor of Science in Information Technology**

Information technology is concerned primarily with the application of existing computing technologies to the information needs of organizations and individual computer users. Potential careers include network administrator, database developer, system administrator, and webmaster.

IT programs aim to provide graduates with the skills and knowledge to take on appropriate professional positions in information technology upon graduation and grow into leadership positions in the field. Specifically, within five years of graduation a student must be able to:

1. apply the full range of core IT concepts and techniques to fill the IT needs of an organization and be prepared to assume managerial and other advanced responsibilities,
2. confront new problems effectively and anticipate the changing directions of technology,

3. communicate effectively with diverse stakeholders as well as function appropriately in a team environment,
4. navigate within the complex relationships between IT and larger organizational goals, and
5. understand the pervasive and changing role of computing technology in global society, and participate responsibly as both IT professional and citizen.

The B.S. in information technology degree program was approved by the College of Engineering and Physical Sciences in May 2008 and the USNH Board of Trustees in fall 2008. The university welcomed its first IT class in fall 2009. Note: the B.S. in information technology degree program has not yet been accredited by the Accreditation Board for Engineering and Technology because ABET requires new programs to graduate students before they are eligible. The CS department will apply for accreditation when it graduates its first class in May 2012.

Information technology majors must maintain an overall grade-point average of 2.0 or better in all required information technology and computer science required courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as an IT major. All required IT courses offered by the CS department at the 400-600 level must be passed with a C- or better.

If a student wishing to transfer into the information technology major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in Information Technology. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

The IT major requires students to take the equivalent of 10 courses within the CS department that constitute the core coverage of the breadth of IT topics. In addition, students must choose a depth track, consisting of three courses that focus on a more specialized area within the IT field. The CS department currently offers a Web track and an Admin track. Students who choose the Web Track must take IT 604, Intermediate Web Development; IT 775, Database Technology; and IT 704, Advanced Web Topics. Students who opt for the Admin Track must take IT 609, Network/System Administration; IT 725, Network Technology; and IT 775, Database Technology.

The IT curriculum includes a number of courses outside of the CS department. Two courses in mathematics are required: Calculus I (MATH 425) and a statistics course (MATH 439). A two-semester lab science sequence is also required, as are a philosophy course (PHIL 424) and a technical writing course (ENGL 502).

In addition, by the end of their sophomore year, each student must choose a second discipline in a particular domain outside of IT to which the student's IT skills can be applied. Second disciplines (typically five courses) have been defined by the CS department in such areas as business administration, health management and policy, and justice studies. If a student is interested in an area that is not currently defined, the option of a student-designed second discipline is also available.

The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
MATH	425	Calculus I (Discovery)	4	
CS	403	Weaving the Web (Discovery ETS)	4	
CS	415	Introduction to Computer Science I	4	
		Discovery	4	
IT	506	Intermediate Applications Programming with Visual Basic (or CS 416 Introduction to Computer Science II)		4
IT	502	Intermediate Web Design*		4
ENGL	401	First-Year Writing (Discovery)		4
		Discovery		4
		Total	17	16

\*Meets Discovery Inquiry requirement.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
MATH	439	Statistical Discovery for Everyone	4	
IT	505	Database Programming	4	
		Discovery	4	
		Lab Science I & II (Discovery)*	4	4
IT	520	Computer Architecture		4
ENGL	502	Technical Writing		4

		Discovery		4
		Total	16	16

\* Students are required to take a 2 course lab sequence chosen from the following list: BIOL 411-412, CHEM 403-404, ESCI 401-402, ESCI 409-402, PHYS 401-402, or PHYS 407-408.

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
		Depth Track I	4	
PHIL	424	Science, Technology and Society	4	
		Second Discipline I	4	
		Discovery	4	
CS	600	Internship		1
CS	595	Computer Science Seminar		2
IT	666	Computer Security		4
		Second Discipline II		4
		Discovery		4
		Total	16	15

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
		Depth Track II	4	
		Second Discipline III	4	
		Second Discipline IV	4	
IT	705	Project Management	4	
IT	710	Senior Project*		4
		Second Discipline V		4
		Depth Track III		4
		Free Elective		4
		Total	16	16

\*Meets Discovery Capstone Experience requirement.

### Minor in Information Technology

The information technology (IT) minor is a way for students in non-technical majors to bridge the gap between a primarily non-technical education and a technical world. Graduates from a variety of fields are discovering that there is a great need to have computer competency in addition to the knowledge they gain in their major; the IT minor, which is tailored to grow students' understanding of computer and information technology applications, helps prepare students for the future.

Students who minor in IT must complete a minimum of 20 credits of IT courses. All students must take IT 520, Computer Architecture, as well as an introductory programming course. The other three courses may be chosen from the list below.

Credit toward the minor will be given only for courses passed with C- or better, and a 2.0 grade-point average must be maintained in courses for the minor. Courses taken on the pass/fail basis may not be used for the minor. Students should declare their intent to earn a minor as early as possible and no later than the end of the junior year. During the final term, an application should be made to the dean of the student's major college to have the minor shown on the academic record. Students must consult with their major adviser and also the minor supervisor.

#### Requirements:

Abbreviation	Course Number	Title
		1.
IT	520	Computer Architecture
		2. A programming course chosen from the following list:
CS	405	Introduction to Applications Programming with Visual Basic
CS	410	Introduction to Scientific Programming
CS	503	Introduction to Web Programming
		3. Three courses from the following list
CS	403	Weaving the Web: Creating Content for the World Wide Web
IT	502	Intermediate Web Design
IT	505	Database Programming
IT	506	Intermediate Applications Programming with Visual Basic

IT	604	Intermediate Web Development
IT	609	Network/System Administration
IT	666	Computer Security

## Earth Sciences (ESCI) ▼

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*Chairperson:* William C. Clyde

*Professor:* Larry A. Mayer, Samuel B Mukasa

*Research Professor:* Stephen E. Frolking

*Affiliate Professor:* Andrew Armstrong, Jim Gardner, Christopher E. Parrish, Peter J. Thompson

*Associate Professor:* Julia G. Bryce, William C. Clyde, J. Matthew Davis, Jo Laird, Joseph M. Licciardi, James M. Pringle

*Research Associate Professor:* Jack E. Dibb, Thomas C. Lippmann, Ruth K. Varner, Cameron P. Wake, Larry G. Ward

*Affiliate Associate Professor:* Mark A. Fahnestock, Douglas C. Vandemark

*Assistant Professor:* Margaret S. Boettcher, Rosemarie E. Came, Joel E. Johnson, Linda Kalnejais, Anne Lightbody

*Affiliate Assistant Professor:* Joseph Salisbury, Mary D. Stampone

The courses offered in the Department of Earth Sciences cover the broad spectrum of geosciences, with emphases on geology, hydrology, geochemistry, and oceanography. The curriculum encompasses a group of related studies concerned with an understanding of the Earth and its environment. Study of the processes that shape the continents and oceans, drive the hydrologic cycle and ocean circulation, and affect climate change and the evolution of life is based on a foundation of basic mathematics, physics, and chemistry.

The need for people trained in the Earth and environmental sciences has been increasing in response to society's growing concern with sound environmental and resource management. Issues of particular concern include the impact of global climate change; the management of water resources; the development of energy and mineral resources; the disposal of waste on land and in the atmosphere and oceans; and the assessment of environmental hazards. In addition, the demand for well-trained secondary school teachers of Earth sciences has been steadily increasing.

The Department of Earth Sciences offers five majors: B.S. geology, B.S. environmental

sciences (interdisciplinary with the College of Life Sciences and Agriculture), B.A. Earth sciences, B.A. Earth sciences/oceanography, and B.A. Earth science teaching. These programs prepare students for advanced study in the geosciences; for entry-level professional employment in public or private institutions concerned with environmental and resource management, including consulting firms, government agencies, energy- and resource-extraction firms, utilities, and nonprofit organizations; and for secondary-school teaching of Earth sciences.

The Department of Earth Sciences also offers a minor in geology, as well as an interdisciplinary minor in oceanography.

Descriptions and requirements for the majors and minors are arranged alphabetically.

### ***Bachelor of Arts in Earth Sciences***

The bachelor of arts in Earth sciences is offered through the Department of Earth Sciences. This program provides students an opportunity to obtain a broad education and a general background in the Earth sciences with a greater degree of freedom in choosing electives than in the bachelor of science programs. By careful choice of electives, students can prepare for graduate school, business, or industry.

#### **Requirements**

1. Satisfy the **Discovery Program requirements**. ESCI 401, 402, 405, 409, 420, 501 cannot be taken to fulfill Discovery Program requirements.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete a minimum of eight courses in the department (with a C- or better), including ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 512, Principles of Mineralogy; and five upper-level courses, two of which must be 700 or above.
4. Math requirements: 425, Calculus I, and 426, Calculus II.

It is strongly advised that students complete, as early as possible, a year each of college chemistry and physics.

### ***Bachelor of Arts in Earth Sciences, Oceanography Option***

The bachelor of arts in Earth sciences, oceanography option, is offered by the Department of Earth Sciences. This program provides students an opportunity to obtain a broad education and a general background in the Earth sciences, as well as the flexibility to choose electives in the area of oceanography. A clear, comprehensive understanding of the ocean environment



will prepare students for graduate school or for employment opportunities available on our coasts in ocean-related fields such as aquaculture, fishing, tourism, environmental protection, shipping, construction, government regulation, and education.

#### **Requirements**

1. Satisfy the **Discovery Program requirements**. ESCI 401, 402, 405, 409, 420, 501 cannot be taken to fulfill Discovery Program requirements.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete a minimum of eight courses in the department (with a C- or better) including ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History or ZOOL 503, Introduction to Marine Biology; ESCI 501, Introduction to Oceanography; ESCI 512, Principles of Mineralogy; and four upper-level ocean related courses, two of which must be 700 or above. Typically these would be chosen from ESCI 658, Earth, Ocean, and Atmosphere Dynamics; ESCI 750, Biological Oceanography; ESCI 752, Chemical Oceanography; ESCI 758, Physical Oceanography; and ESCI 759, Geological Oceanography.
4. Math requirements: 425, Calculus I, and 426, Calculus II.

It is strongly advised that students complete, as early as possible, a year each of college chemistry and physics.

#### ***Oceanography Minor***

See the **Special University Programs**, Interdisciplinary Programs, and **Marine Sciences** sections of the catalog.

#### ***Bachelor of Arts in Earth Science Teaching***

The bachelor of arts in Earth science teaching program is offered by the Department of Earth Sciences in coordination with the Department of Education. The program is specifically designed to prepare students to teach Earth sciences in secondary school. Upon graduation from this program, students are prepared to complete a masters degree in Education with an additional year of graduate study, which includes a year-long internship (EDUC 900/901). After completing this typically five-year program, students receive full teacher certification, which is recognized in most states.

#### **Requirements**

1. Satisfy the **Discovery Program requirements**.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete the following: ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 501, Introduction to Oceanography; GEOG 473,

The Weather; CHEM 403-404, General Chemistry; PHYS 401-402, Introduction to Physics I and II; PHYS 406, Introduction to Modern Astronomy; plus 12 approved elective credits from intermediate and/or advanced Earth sciences courses.

4. Math requirements: 425, Calculus I, and 426, Calculus II.

5. Satisfy the [secondary-school teacher education program](#).

### ***General Science Certification***

Students majoring in animal sciences, biochemistry, biology, Earth sciences, environmental conservation studies, environmental sciences, forestry, microbiology, plant biology, wildlife management, or zoology may seek certification to teach science at the middle, junior, or high school level.

For further information, contact the coordinator of teacher education in the [Department of Education](#).

### ***Bachelor of Science in Geology***

The bachelor of science in geology is offered through the Department of Earth Sciences. The program represents a strong concentration in the Earth sciences and is especially well suited for students who plan to continue their studies in graduate school. Beyond a central core of courses, there is sufficient flexibility in course selection so that students may, in consultation with their academic advisers, orient the program toward a particular facet of the Earth sciences (e.g., mineralogy-petrology, oceanography, hydrogeology, geophysics-structural geology, geomorphology-glacial geology, geochemistry, paleontology-stratigraphy). Students are encouraged to attend an off-campus field camp, for which scholarship funds may be available.

#### **Requirements**

1. Satisfy the [Discovery Program requirements](#) and the [bachelor of science degree requirements](#).

2. Satisfactorily complete MATH 425 and 426, CHEM 403-404 (or CHEM 405), PHYS 407-408, and PHYS 505 or ESCI 658. Some of these courses may also satisfy Discovery Program requirements.

3. Complete a minimum of 12 courses in Earth sciences, which should include ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 501, Introduction to Oceanography; ESCI 512, Principles of Mineralogy; ESCI 614, Optical Mineralogy and Petrography; ESCI 530, Geological Field Methods; ESCI 561, Landscape Evolution; ESCI 631, Structural Geology; ESCI 652, Paleontology; and three approved Earth sciences 700-level electives.

4. Complete four approved science/math electives. The following should be considered: one additional 700-level course in the Earth sciences; additional courses in mathematics, chemistry,

and physics; courses in computer science, engineering, and the biological sciences; and an off-campus field camp.

### ***Capstone Experience***

A capstone experience is required of all our undergraduate Earth sciences majors during their senior year. All capstone experiences at UNH must meet one or more of the following criteria:

1. The capstone synthesizes and applies disciplinary knowledge and skills.
2. The capstone fosters reflection on undergraduate learning and experience.
3. The capstone demonstrates emerging professional competencies.
4. The capstone applies, analyzes, and/or interprets research or data or artistic expression.
5. The capstone explores areas of interest based on the integration of prior learning.

Examples of Department of Earth Sciences capstone experiences include Senior Thesis (ESCI 799), UROP/SURF projects, environmental or geologic field camps, or Earth Sciences education and outreach activities. Additional experiences may qualify (e.g. ESCI 795/796 field courses, INCO 590, INCO 790, internships) if they are designed according to the above criteria.

Students should work closely with their advisers to define the most appropriate capstone experience for their Earth sciences degree option and all capstone experiences must be approved by the Department of Earth Sciences undergraduate coordinator. Presentation of projects or experiences developed for the capstone is encouraged at the annual UNH Undergraduate Research Conference or other appropriate venue.

### ***Geology Minor***

Any University student who is interested in Earth sciences may minor in geology. The minor consists of at least 18 semester hours, typically from five ESCI courses, each with a grade of C- or better, while maintaining a cumulative grade-point average of 2.0. A maximum of eight credits may be used for both major and minor credit. Courses include both introductory and more advanced courses. Specific course requirements are flexible to accommodate the student's interest in different facets of the geosciences. Interested students should see the Earth sciences undergraduate coordinator to complete an Intent to Minor form no later than their junior year.

### **Environmental Sciences**

[www.unh.edu/envsci/](http://www.unh.edu/envsci/)

The College of Engineering and Physical Sciences (CEPS) and the College of Life Science and Agriculture (COLSA) jointly offer a Bachelor of Science Degree in Environmental Sciences. Environmental sciences is an interdisciplinary field concerned with the interaction of biological, chemical, and physical processes that shape our natural environment. Students graduating with a degree in Environmental Sciences will have an understanding of these interacting processes, the ability to effectively communicate with both scientific and lay audiences,

competency in field methods appropriate for entry-level environmental science positions, competency in the use and application of Geographic Information Systems (GIS), a basic understanding of environmental policy, and the ability to contribute to multidisciplinary teams.

The University of New Hampshire is a recognized leader in environmental sciences research, and the environmental sciences program capitalizes on faculty expertise in this area. The program has 12 full-time faculty members, with major teaching and research emphases in the areas of biogeochemical cycling, environmental chemistry, ecosystem science, global change, hydrology, plant ecology, soil science, and water resource management.

Employment opportunities include: environmental consulting firms, educational facilities (e.g., science centers), environmental monitoring laboratories (e.g., water treatment plants; the Environmental Protection Agency), government agencies (e.g., the U.S. Geological Survey, Bureau of Land Management, Natural Resource Conservation Service), university and government research laboratories, and nongovernment environmental organizations. The environmental sciences program also constitutes an excellent preparation for graduate programs in several areas relating to the environment. Students should consult with their adviser early if their goals include further study.

#### **Requirements**

In addition to **Discovery Program and University Writing requirements**, all students will take Introduction to Environmental Science (NR 403) and Professional Perspectives in Natural Resources (NR 400), plus one other elective introductory environmental science course.

Foundation courses include two semesters of chemistry (CHEM 403, 404) and calculus (MATH 425, 426), one semester of geology (ESCI 401, 402, or 409), one semester of statistics (MATH 644 or BIOL 528), one semester of physics (PHYS 407) and one approved biology course.

Core courses include Techniques in Environmental Sciences (ESCI 534), Introduction to GIS (NR 658), Fate and Transport in the Environment (ESCI 654), Natural Resource and Environmental Policy (NR 602), and a capstone experience (NR 791) and an independent study or capstone course approved by the program coordinator.

Students must complete an additional eight courses in one of the following options:

#### **Hydrology**

PHYS 408, General Physics II

ESCI 561, Landscape Evolution

NR 501, Studio Soils, or ESCI 512, Principles of Mineralogy

ESCI 705, Principles of Hydrology

ESCI 710, Groundwater Hydrology

Two approved electives

### **Soil and Watershed Management**

PHYS 408, General Physics II, or NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 501, Studio Soils

NR 703, Watershed Water Quality Management

NR 706, Soil Ecology, or NR 744, Biogeochemistry

Three approved electives

### **Ecosystems**

NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 730, Terrestrial Ecosystems

NR 765, Community Ecology

NR 751, Aquatic Ecosystems

Four approved electives

For a list of approved elective courses and for further information about the major, contact the program coordinator, Ruth K. Varner, 450 Morse Hall, (603) 862-0853; [ruth.varner@unh.edu](mailto:ruth.varner@unh.edu)

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## **Electrical and Computer Engineering (ECE) ▼**

» <http://www.ece.unh.edu/>

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*Professor:* Kent A. Chamberlin, L. Gordon Kraft, John R. LaCourse, W. Thomas Miller III, Andrzej Rucinski

*Affiliate Professor:* Charles H. Bianchi, William H. Lenharth, George Markowsky, Wolfgang Rehak

*Associate Professor:* Michael J. Carter, Allen D. Drake, Andrew L. Kun, Richard A. Messner

*Research Associate Professor:* Brian R. Calder

*Affiliate Associate Professor:* Raymond Barrett, Brad Gillespie, Barbara Kraft, Jipeng Li, Timothy Paek

*Assistant Professor:* Nicholas J. Kirsch, Qiaoyan Yu

*Instructor:* Francis C. Hludik Jr.

*Lecturer:* Christopher Bancroft, Wayne J. Smith

The Department of Electrical and Computer Engineering offers a B.S. in electrical engineering

and a B.S. in computer engineering. Both degree programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone (401) 347-7700.

Electrical engineers design, develop, and produce the electrical and electronic systems upon which modern society has come to depend: basic infrastructure, such as the electric power grid and fiber optic communication lines; public conveniences, such as mag lev transporters and LED signs; consumer products, such as iPods and MP3 players; personal communication devices, such as cell phones and BlackBerry© devices; military systems, such as rail guns and laser weapons; instruments that can image the ocean floor or analyze the Earth's atmosphere from satellites; and medical diagnostic machines like CAT and MRI scanners. Almost every facet of modern life is touched by the work of electrical engineers.

At UNH, the cornerstone of the electrical engineering program is the involvement of students in the solution of real-world problems. Students electing this major gain knowledge of advanced electronic circuit and system design through the use of computer-aided design tools, hardware circuit prototyping, and hands-on laboratory testing.

Computers have become embedded in virtually every engineering system. Computer engineering, traditionally a subset of electrical engineering, is a rapidly growing field that emphasizes the design, interfacing, hardware/software tradeoffs, and real-time applications of computers. Students who elect this major will gain a knowledge of both hardware and software concepts, and will learn to design, build, and test systems containing digital computers.

#### ECE Department Mission

The mission of the department is to foster and advance knowledge in electrical and computer engineering.

The mission involves:

- teaching courses in electrical and computer engineering and related fields at the bachelor's, master's, and doctoral levels;
- advancing knowledge through research and scholarship;
- serving the state and nation by making the department's intellectual resources available to industry and government agencies. The undergraduate EE and CE programs shall provide a firm foundation in electrical and computer engineering theory and practice, with a mix of laboratory and design experiences. The programs also shall foster teamwork and project management skills.

The graduate ECE program shall lead to the degrees of master of science in electrical

engineering and the doctor of philosophy in electrical and computer engineering. Research and scholarship are core components of the department's mission and they directly impact undergraduate and graduate education. Success in obtaining funds to procure equipment and support research efforts is therefore an essential objective for the department.

The department recognizes the need to conduct periodic reviews and adjustments to meet the current and projected needs of the state and nation according to its mission objectives. The current mission was approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in October 2001, and ratified by the ECE Industrial Advisory Board in April 2002. The mission was reaffirmed by the ECE Industrial Advisory Board in November 22, 2004 and on October 26, 2009.

*Electrical Engineering and Computer Engineering Program Educational Objectives*

The Department of Electrical and Computer Engineering has adopted a set of program educational objectives that consists of statements describing the expected accomplishments of graduates during the first several years following graduation from either program:

- graduates will function at a technically outstanding level in formulating and solving problems in their respective program area;
- graduates will produce competent written and oral reports, and provide project management and leadership;
- through a thorough grounding in engineering fundamentals, graduates will be prepared for a successful engineering career amid future technological changes;
- through a well-rounded education, graduates will be able to respond to changing career paths, to maintain an interest in lifelong learning, and to advance professionally;
- graduates will be creative and ethical when dealing with contemporary issues facing society in local, global, historical, social, economic, and political contexts in relation to electrical and computer engineering;
- graduates will be able to design, prototype, and test electrical and computer engineering designs using state-of-the-art test equipment in a laboratory environment.

The electrical and computer engineering educational program objectives were approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in November 2001, and ratified by the ECE Industrial Advisory Board in March 2002. The program educational objectives were reaffirmed by the ECE Industrial Advisory Board on November 22, 2004 and on October 26, 2009.

*Electrical Engineering and Computer Engineering Program Educational Outcomes*

The Department of Electrical and Computer Engineering has adopted a set of program educational outcomes that consists of statements describing what students are expected to know and are able to do by the time of graduation, the achievement of which indicates that the student is equipped to achieve the program objectives. The current electrical engineering

program educational outcomes and computer engineering program educational outcomes are:

- 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;
- an ability to function on multidisciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an ability to communicate effectively;
- an understanding of professional and ethical responsibility;
- the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- a recognition of the need for, and ability to engage in, lifelong learning;
- a knowledge of contemporary issues;
- an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

Electrical and computer program educational outcomes were approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in October 2001, and ratified by the ECE Industrial Advisory Board in March 2002. The program educational outcomes were reaffirmed by the ECE Industrial Advisory Board on November 22, 2004 and on October 26, 2009.

Students contemplating a decision between the electrical engineering and computer engineering degree programs should consider both the similarities and differences of the two programs. The two curricula require the same foundational courses in mathematics, physics, analog and digital electronic circuits, and a capstone senior design project. The computer engineering degree program requires additional fluency in software development and advanced computer system and hardware design. The electrical engineering degree program requires advanced study in analog and mixed-signal electronic circuit and system analysis and design. Discovery Program requirements are identical for both degree programs.

### **Electrical Engineering Program**

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements.

1. Any electrical engineering major whose cumulative grade-point average in ECE courses is less than 2.0 during any three semesters will not be allowed to continue as an electrical engineering major.



2. Electrical engineering majors must achieve a 2.0 grade-point average in ECE courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their advisers' assistance, should plan their programs based on the distribution of courses in the following chart.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	401	Perspectives in Electrical & Computer Engineering	4	-
MATH	425	Calculus I	4	-
CS	410	Introduction to Scientific Programming*	4	-
CHEM	405	General Chemistry	4	-
PHYS	407	Physics I	-	4
ENGL	401	First-Year Writing	-	4
MATH	426	Calculus II	-	4
		Discovery Program Category*	-	4
Total			16	16

\*Students who wish to preserve the option of transferring to the computer engineering major without incurring a delay in graduation should consult with their academic adviser before electing these courses. It is recommended that such students take CS 415, Introduction to Computer Science I, in the fall semester and CS 416, Introduction to Computer Science II, in the spring semester in place of the listed courses.

Students are restricted from taking CS 401 and CS 403.

Students are required to take either ECON 402 or EREC 411 to fulfill the Social Science Category of the Discovery Program.

Fulfilling the EE Program curriculum automatically meets Discovery Category, "Environment, Technology and Society."

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	541	Electrical Circuits	4	-
ECE	543	Introduction to Digital Systems	4	-
PHYS	408	Physics II	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
ECE	548	Electronic Design I	-	4
ECE	562	Computer Organization	-	4
ME	523	Introduction to Statics and Dynamics	-	3
		Discovery Program Category	-	4
Total			16	15

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	602	Engineering Analysis	4	-
ECE	617	Junior Lab I	4	-
ECE	633	Signals and Systems I	3	-
ECE	651	Electronic Design II	4	-
		Discovery Program Category	4	-
ECE	603	Electromagnetic Fields & Waves	-	4
ECE	618	Junior Laboratory II	-	4
ECE	634	Signals and Systems II	-	3
ECE	647	Random Processes and Signals in Engineering	-	3
ECE	694	Engineering Professional Principles		1
Total			19	15

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
		Professional Elective**	4	-
		Professional Elective**	4	-
		Discovery Program Category	4	-
		Discovery Program Category	4	-
ECE	791	Senior Project I*	2	-

		Professional Elective**	-	4
		Professional Elective**	-	4
		Discovery Program Category	-	4
ECE	792	Senior Project II*	-	2
Total			18	14

\*ECE 791 and 792 fulfills Discovery Program Capstone Experience.

\*\*Professional electives normally consist of 700-level ECE courses. Each course must carry at least three credits, and no more than one can be an independent study, special topics, or a project course. An alternative is a student-designed plan approved by the ECE undergraduate committee.

### Computer Engineering Program

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements:

1. Any computer engineering major whose cumulative grade-point average in ECE and CS courses is less than 2.0 during any three semesters will not be allowed to continue as a computer engineering major.
2. Computer engineering majors must achieve a 2.0 grade-point average in ECE and CS courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their advisers' assistance, should plan their programs based on the distribution of courses in the chart below.

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
		Perspectives in Electrical & Computer		

ECE	401	Engineering	4	-
MATH	425	Calculus I	4	-
CS	415	Intro to Computer Science I	4	-
		Discovery Program Category	4	-
ECE	543	Intro to Digital Systems	-	4
MATH	426	Calculus II	-	4
CS	416	Intro to Computer Science II	-	4
ENGL	401	First-Year Writing	-	4
Total			16	16

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	562	Computer Organization	4	-
PHYS	407	Physics I	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
CS	515	Data Structures	4	-
ECE	583	Design with Programmable Logic	-	4
PHYS	408	Physics II	-	4
CS	520	Assembly Language Programming	-	4
		Discovery Program Category	-	4
Total			16	16

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	541	Electrical Circuits	4	-
ECE	602	Engineering Analysis	4	-
ECE	633	Signals and Systems I	3	-
		Discovery Program Category	4	-
ECE	548	Electronic Design I	-	4
ECE	603	Electromagnetic Fields and Waves	-	4
ECE	647	Random Processes & Signals in Engineering	-	3
ECE	649	Embedded Microcomputer Based Design	-	4

ECE	694	Engineering Professional Principles		1
Total			15	16

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
ECE	714	Intro to Digital Signal Processing	4	-
		Professional Elective**	4	-
		Professional Elective**	4	-
		Discovery Program Category	4	-
ECE	791	Senior Project I*	2	-
ECE	734	Network Data Communications		4
		Professional Elective**	-	4
		Discovery Program Category	-	4
		Discovery Program Category	-	4
ECE	792	Senior Project II*	-	2
Total			18	18

\*ECE 791 and 792 fulfills Discovery Program Capstone Experience.

\*\* Three professional electives must be selected from the following categories of courses:

At least one from: ECE 711, ECE 715, ECE 717

No more than one from: ADMIN 640, DS 773, DS 774

Any of these: ECE 634, ECE 651, ECE 7XX, CS 620, CS 645, CS 659, CS 671, CS 7XX

Professional electives beyond those mentioned above must carry at least three credits and no more than one can be an independent study, special topic, or a project course. An alternative is a student-designed plan approved by the ECE undergraduate committee.

Students are required to take either ECON 402 or EREC 411 to fulfill the Social Science Category of the Discovery Program.

Students are restricted from taking CS 401 and CS 403.

Fulfilling the CE Program curriculum automatically meets Discovery Category, "Environment, Technology and Society."

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## Environmental Engineering (ENE) ▼

» <http://www.unh.edu/environmental-engineering/>

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*Professor:* Dale P. Barkey, Russell T. Carr, M. Robin Collins, Ihab H. Farag, Nancy E. Kinner, James P. Malley Jr. , Palligarnai T. Vasudevan

*Associate Professor:* Thomas P. Ballestero, Kevin H. Gardner, Nivedita R. Gupta, Jennifer M. Jacobs

*Assistant Professor:* Jillian Goldfarb

*Research Assistant Professor:* Jeffrey S. Melton, Robert M. Roseen, Alison W. Watts

The College of Engineering and Physical Sciences offers a bachelor of science degree in environmental engineering (ENE) and an interdisciplinary minor in environmental engineering.

The bachelor of science degree in environmental engineering is accredited by the engineering accreditation commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

### ***Mission***

The environmental engineering program offers an undergraduate degree in environmental engineering that prepares students for productive careers in the public and private sectors and for graduate studies. The program emphasizes fundamental principles in environmental engineering and design, built upon a strong base of chemistry, physics, mathematics, and engineering science. The program prepares students to work in multidisciplinary teams that analyze, formulate, and communicate sustainable solutions to complex environmental problems. The importance of developing sustainable solutions that provide economic, social, and environmental benefits to society is emphasized. The program instills in its students an appreciation for the responsibilities engineers have to society and teaches them the skills necessary to continue learning and improving their professional expertise throughout their careers.

The ENE degree program provides an opportunity for students to specialize in industrial or

municipal processes. The curriculum prepares students to plan and design systems to minimize the impact of human activity on the environment and protect human health.

### ***Educational Objectives***

ENE program graduates will have the skills, experience, and knowledge to pursue successful careers as environmental engineers. They also will have demonstrated the ability to identify information needs; locate information resources and/or design laboratory or field experiments to attain required information; and evaluate and synthesize data with sound engineering principles, methodologies, and the latest technology into creative, sustainable, safe, and economical engineering solutions to environmental engineering problems. The solutions they develop will minimize the impact of human activities on the environment and protect human health. Program graduates will have a foundation for advanced studies in environmental engineering and oral and written communication skills that will enable them to clearly explain engineering options and recommend solutions to stakeholders. ENE program graduates will have demonstrated in-depth knowledge within environmental engineering and an awareness of potential social, economic, political, and environmental impacts of engineering practices. They will have an appreciation for the contribution of environmental engineers to the benefit of society and the responsibilities of a professional environmental engineer. They will work as part of multidisciplinary teams to arrive at solutions to environmental engineering problems. ENE program graduates will be prepared to obtain professional engineering licensure; have the capacity to continue learning and improving their professional expertise and skills by participating in professional associations, conferences, workshops and courses; and understand the importance of continued professional development.

At the end of the sophomore year, students are required to have a minimum overall grade-point average of 2.0 and a grade-point average of 2.0 in all mathematics, physics, chemistry, and engineering courses to be permitted to enroll in junior-level courses. To qualify for graduation, an ENE major must: have satisfied the previously specified course requirements, have satisfied the University's Academic Requirements, have a minimum cumulative grade-point average of 2.0, and have a minimum grade-point average of 2.0 in engineering courses.

### **Bachelor of Science in Environmental Engineering-Industrial Processes (IP) Emphasis**

The industrial processes (IP) emphasis of environmental engineering is a process-based program that draws on the principles of chemistry, physics, mathematics, and engineering sciences. Due to the complex nature of many aspects of environmental pollution, a broad

understanding of the fundamentals of engineering and sciences forms the most desirable preparation for a career in the environmental field. The program is designed to provide training not only for end-of-pipe pollution control technologies, but also for expertise in process engineering and process design, essential for achieving the objectives of pollution curtailment and prevention. Such training is especially valuable in resolving industrial pollution problems. Career opportunities for environmental engineers with this background are found in industry, research institutes, government agencies, teaching, and consulting practice. Students may also enter graduate study at the M.S. or Ph.D. levels.

Engineering design is a critical aspect of the IP curriculum. In order to meet the objective of producing creative, problem-solving engineers, design concepts are introduced early in the curriculum and design experience is integrated into every engineering course. Students learn to seek optimal solutions to open-ended problems and function in design-based team projects. Design ability is finally demonstrated at the end of the capstone course (ENE 708), when self-directed teams develop a comprehensive design report for a full-scale engineering process based on a national process design competition problem.

Since 1993, the program faculty has administered a pollution prevention internship program with industries in New Hampshire, Maine, and Massachusetts, initially funded by U.S. EPA and NHDES. In the past 12 years, the program has served more than 40 facilities. Each year about 12 students have enrolled in the pollution prevention internship program, which provides hands-on industrial employment for 10 weeks during the summer assisting industry with projects in process modification, material substitution, chemical re-use, risk assessment, safety, and economic analysis. The program faculty also assisted NHDES in setting up instrumentation in the Seacoast region of New Hampshire to monitor the precursor of ozone formation.

The B.S. program requires a minimum of 128 credits for graduation and can be completed in four years. There are nine electives in the curriculum: six for the fulfillment of the University's Discovery Program requirements and the remaining three for technical electives to be chosen from the specified elective course list. ENE-IP students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in their ENE-IP curriculum. Due to the substantial overlap in course requirements for the environmental engineering IP and chemical engineering majors, students will be able to transfer between these two programs during the first three semesters without losing any course credits toward graduation.

### **Suggested Technical Electives**



Abbreviation	Course Number	Title	Credits
CHE	602	Heat Transfer and Unit Operations	3
CHE	614	Separation Processes	3
CHE	707	Chemical Engineering Kinetics	3
CHE	744	Corrosion	4
CIE	766	Introduction to Geo-Environmental Engineering	3
ENE	739	Industrial Wastewater Treatment	3
ENE	746	Bioenvironmental Engineering Design	4
ENE	747	Introduction to Marine Pollution	3
ESCI	409	Geology and the Environment	4
ESCI	561	Landscape Evolution	4
ESCI	705	Principles of Hydrology	4
ESCI	715	Global Atmospheric Chemistry	3

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CHEM	405	General Chemistry	4	-
MATH	425-426	Calculus I & II	4	4
PHYS	407	General Physics I	-	4
ENGL	401	First-Year Writing	4	-
ENE	400	Environmental Engineering Lectures I	1	-
ENE	401	Environmental Engineering Lectures II	-	1
Discovery Program Electives			4	8
Total			17	17

1. PHYS 407 OR CHEM 405 satisfies the Discovery Physical Science (with lab) category.
2. MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.
3. ENGL 401 satisfies the Discovery Foundation Writing Skills category.
4. ENE-IP students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in the ENE-IP curriculum.

**Sophomore Year**

Abbreviation	Course Number	Title	Fall	Spring
CHE	501-502	Introduction to Chemical Engineering I & II	3	3
CHEM	683-684	Physical Chemistry I & II	3	3
CHEM	685	Physical Chemistry Lab I	2	-
MATH	527	Differential Equations	4	-
PHYS	408	General Physics II	4	-
MATH	644	Statistics for Engineers and Scientists		4
Discovery Program Electives			-	4
Total			16	14

CHE 502 satisfies the Discovery Inquiry requirement.

**Junior Year**

Abbreviation	Course Number	Title	Fall	Spring
CHE	601	Fluid Mechanics and Unit Operations	3	-
CHE	604	Chemical Engineering Thermodynamics	3	-
ENE	612	Unit Operations Lab II	-	3
ENE	742	Solid and Hazardous Waste Engineering	3	-
ENE	756	Environmental Engineering Microbiology		4
CHEM	651-652	Organic Chemistry I & II	3	3
CHEM	653	Organic Chemistry Lab I	2	-
Discovery Program Electives			-	4
Technical Elective (1)				4
Total			14	18

- The intent is to have ENE 756 satisfy the Biological Science requirement of the Discovery Program. It will have a different course number.

**Senior Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
CHE	703	Mass Transfer and Stagewise Operations	3	-
ENE	708	Industrial Process Design	-	4
ENE	709	Fundamentals of Air Pollution and Control	4	-
ENE	713	Unit Operations Lab II	3	-
ENE	752	Process Dynamics and Control	-	4
ENE	772	Physicochemical Processes for Water/Air Quality	-	4
ESCI	710	Groundwater Hydrology	-	4
Technical Electives (2)			6-8	-
Total			16-18	16

ENE 708 satisfies the Discovery Capstone Experience/Course.

**Bachelor of Science in Environmental Engineering-Municipal Processes (MP) Emphasis**

Environmental engineers graduating from the municipal processes (MP) emphasis will plan, design, and construct public and private facilities to minimize the impact of human activity on the environment and to protect human health. For example, environmental engineers with a municipal processes perspective design and build drinking water treatment systems, municipal and industrial wastewater treatment plants, solid waste management facilities, contaminated ground water remediation systems, and hazardous waste remediation facilities. These facilities must meet regulatory requirements, be cost-effective to build and maintain, be safe to operate, and have minimal environmental impact.

In ENE 400 and 401, students are introduced to the full spectrum of environmental engineering projects that they will subsequently explore in design teams during their degree program. As part of these experiences, students visit and tour field sites, and interact with engineers who have been involved in the design and/or construction of the projects. Design is integrated

throughout the curriculum, and particularly emphasized in junior- and senior-level courses. As part of these projects, students analyze treatment alternatives, recommend a system that meets regulatory operational needs, and prepare an implementation schedule and project budget. Detailed design projects are performed in ENE 744 and 746. ENE 788 serves as a capstone design experience where students work on a multi-interdisciplinary environmental engineering projects, and apply skills learned in other courses while working with real-world clients.

The following schedule is a sample of a planned program for environmental engineering students completing the major within the municipal processes emphasis.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
ENE	400, 401	Environmental Engineering Lectures I, II	1	1
ENGL	401	First-Year Writing	4	-
MATH	425, 426	Calculus I, II	4	4
Discovery Electives*			4	4
CHEM	405	General Chemistry	4	-
PHYS	407	General Physics I	-	4
ENGL	502	Technical Writing		4
Total			17	17

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

### Second Year

	Course			

Abbreviation	Number	Title	Fall	Spring
ENE	520	Environmental Pollution and Protection	4	-
ENE	521	Environmental Engineering Seminar	-	1
CIE	525	Statics	3	-
MATH	527	Differential Equations with Linear Algebra	4	-
MATH	644	Statistics for Engineers and Scientists	-	4
CHEM	545	Organic Chemistry Lecture	3	-
CHEM	546	Organic Chemistry Laboratory	2	-
CIE	533	Project Engineering	-	3
TECH	564	Fundamentals of CAD	-	3
Discovery Elective*			-	4
Total			16	15

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

### Third Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	642	Fluid Mechanics	4	-
Technical Elective**			4	-
ENE	645	Fundamental Aspects of Environmental Engineering	-	4
ENE	756	Environmental Engineering Microbiology	-	4
ENE	742	Solid and Hazardous Waste Engineering	3	-

Engineering Lab Elective**			-	4
Hydraulics Elective**			-	3-4
Discovery Elective*			4	-
Total			15	15/16

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

\*\*Approved lists of technical, hydraulics, engineering laboratory, and ENE design and non-design electives are available from the ENE undergraduate coordinator, Nancy Kinner. Students must take a minimum of three 700-level ENE electives totaling at least 10 credits. One ENE elective course must be from the design category.

\*\*\*The intent is to have ENE 756 satisfy the Biological Science requirement of the Discovery Program

#### Fourth Year

Abbreviation	Course Number	Title	Fall	Spring
ENE	746	Bioenvironmental Engineering Design	4	-
Discovery Elective*			4	-
Environmental Engineering Elective**			3-4	6-8
ENE	744	Physicochemical Treatment Design	-	4
ENE	784	Intro to Project Planning & Design	1	-
ESCI	710	Groundwater Hydrology	-	4
ENE	788	Project Planning and Design	-	3
ENE	749	Water Chemistry	4	-

Total			16/17	17/19
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\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

\*\*Approved lists of technical, hydraulics, engineering laboratory, and ENE design and non-design electives are available from the ENE undergraduate coordinator, Nancy Kinner. Students must take a minimum of three 700-level ENE electives totaling at least 10 credits. One ENE elective course must be from the design category.

The municipal processes emphasis of the ENE program requires a minimum of 128 total credits for graduation.

### **Environmental Engineering Minor**

The environmental engineering minor is intended primarily for students in engineering and physical sciences, who are not in the chemical, civil, or environmental engineering degree programs. Students contemplating such a minor should plan on a strong background in the sciences and mathematics (including differential equations).

The minor provides a comprehensive introduction to major areas of interest in environmental protection—namely, air pollution and water pollution—through the three required courses. Further breadth in environmental engineering or depth in specific areas can be attained through the choice of appropriate elective courses.

The minor requires a minimum of five courses, as follows: 1) three required courses: ENE 645, Fundamental Aspects of Environmental Engineering; ENE 709, Fundamentals of Air Pollution and Its Control; and ENE 772, Physicochemical Processes for Water and Air Quality Control, or ENE 743, Environmental Sampling and Analysis; 2) a minimum of two elective ENE courses.

Choice of elective courses should be made in consultation with the minor area adviser, Nancy Kinner, civil engineering, or Niva Gupta, chemical engineering. Students normally start this program in the junior year and should declare their intention to enter the program as early as possible during the sophomore year. During the final semester, students must apply to the dean to have the minor appear on the transcript.

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## **Information Technology (IT) ▼**

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## **Integrated Applied Mathematics (IAM) ▼**

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## **International Affairs (dual major) ▼**

For program description, see [Special University Programs](#).

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## **Materials Science (MS) ▼**

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*Professor:* Olof E. Echt, Todd S. Gross, James E. Krzanowski, Thomas M. Laue, Igor I. Tsukrov

*Associate Professor:* Carmela C. Amato-Wierda, Brad Lee Kinsey, Glen P. Miller, Karsten Pohl

*Research Associate Professor:* Yvon G. Durant, Weihua (Marshall) Ming

*Assistant Professor:* Jian-Ming Tang

*Research Assistant Professor:* John G. Tsavalas

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## **Mathematics and Statistics (MATH) ▼**

» <http://www.math.unh.edu>

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*Professor:* Liming Ge, Karen J. Graham, Eric L. Grinberg, Donald W. Hadwin, Rita A.



Hibschweiler, A. Robb Jacoby, Ernst Linder, Dmitri A. Nikshych, Samuel D. Shore, Kevin M. Short, Marianna A. Shubov

*Associate Professor:* Maria Basterra, David V. Feldman, Edward K. Hinson, Linyuan Li, Sharon M. McCrone, Junhao Shen

*Assistant Professor:* Timothy P. Fukawa-Connelly, John F. Gibson, Brian W Gleason, Mark Lyon

*Instructor:* Philip J. Ramsey

*Lecturer:* Adam Boucher, Samuel L. Cook, Mehmet Orhon, Neil Portnoy, Yitang Zhang

The Department of Mathematics and Statistics offers a variety of programs. These programs provide flexibility through elective choices and are designed to maximize educational and employment opportunities. Each student must enroll in one specific program; however, changes between programs usually can be accommodated.

The first two years of all programs are similar. In the first year, students are expected to take Calculus I (MATH 425) and Calculus II (MATH 426) as well as an introductory scientific programming course (CS 410). A sophomore typically takes follow-up calculus courses in differential equations (MATH 527) and multidimensional calculus (MATH 528), an introductory statistics course (MATH 539), and a course in mathematical proof (MATH 531). The Senior Capstone Experience is fulfilled by a designated course in each of the degree programs; specific details are given in each program's course listing below.

In addition to its degree programs, the department has an active interest in the actuarial profession and is an examination center for the Society of Actuaries. Those interested in actuarial science should seek the advice of the coordinator of the actuarial program in the department.

For more information about the department's undergraduate programs, visit [www.math.unh.edu](http://www.math.unh.edu).

### ***Standards for Graduation***

To be certified for graduation with a degree from the Department of Mathematics and Statistics, a student must complete:

1. University Academic Requirements
2. All courses used to satisfy the requirements for the major program with a grade of C- or better and have an overall grade-point average of at least 2.0 in these courses.

Note that some Discovery Program requirements will be satisfied by required courses for the major program. In particular MATH 425 satisfies the Discovery Quantitative Reasoning

requirement; PHYS 406 (required for the Math Education Elementary Option) and 407 (required for the Mathematics BS) each satisfy the Discovery Physical Sciences requirement.

### ***Bachelor of Arts, Mathematics Major***

This program may offer a broader liberal arts program than the bachelor of science degree programs. By a careful selection of electives, students can shape this major into a preparation for graduate school, business, or industry.

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527\*, Differential Equations with Linear Algebra

MATH 528\*, Multidimensional Calculus

MATH 531, Mathematical Proof, or MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 761, Abstract Algebra

MATH 762, Linear Algebra

MATH 767, One-Dimensional Real Analysis

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be MATH 797\*\*, Senior Seminar, or MATH 799, Senior Thesis\*\*

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

#### **Other required courses**

CS 410, Introduction to Scientific Programming

#### **Foreign language requirement**

Foreign language requirement as defined by the University for the B.A. degree

### ***Bachelor of Science in Mathematics***

This program offers the strongest concentration in mathematics, requiring courses that are intended to prepare the student for graduate work in mathematics. Through a judicious choice of electives, students may design stronger pre-graduate programs, a program in applied mathematics, or slant the program toward a career in business or industry.

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527\*, Differential Equations with Linear Algebra

MATH 528\*, Multidimensional Calculus

MATH 531, Mathematical Proof, or MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 761, Abstract Algebra

MATH 762, Linear Algebra

MATH 767, One-Dimensional Real Analysis

MATH 784, Topology

MATH 788, Complex Analysis

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be MATH 797\*\*, Senior Seminar, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

### **Other required courses**

CS 410, Introduction to Scientific Programming

PHYS 407-408, General Physics I and II

### ***Bachelor of Science: Interdisciplinary Programs in Mathematics and Its Applications***

The programs in interdisciplinary mathematics prepare students for employment in areas of applied mathematics and statistics. Some of them can lead to graduate work in appropriate fields (e.g., physics, computer science, or economics). The major may consist of mathematics combined with:

- Computer science,
- Economics,
- Statistics,
- Electrical science, or
- Physics

Each program requires at least 10 mathematics courses along with at least six courses in the discipline of the option. Specific requirements for each option are given in the following listing.

### ***Computer Science Option***

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527, \* Differential Equations with Linear Algebra

MATH 528, \* Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 532, Discrete Mathematics  
MATH 539, Introduction to Statistical Analysis  
MATH 645,\* Linear Algebra for Applications  
MATH 753, Introduction to Numerical Methods I

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required CS courses**

CS 415, Introduction to Computer Science I  
CS 416, Introduction to Computer Science II  
CS 515, Data Structures  
CS 516, Introduction to Software Design and Development  
CS 658, Analysis of Algorithms  
CS 758, Algorithms  
One approved CS elective chosen in consultation with the academic adviser

***Economics Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 527,\* Differential Equations with Linear Algebra  
MATH 528,\* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645,\* Linear Algebra for Applications  
MATH 739, Applied Regression Analysis  
MATH 753, Introduction to Numerical Methods I  
MATH 755, Probability and Stochastic Processes with Applications

Two approved MATH courses at the 700-level chosen in consultation with the academic adviser, of which one must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

ECON 401, Principles of Economics (Macro)

ECON 402, Principles of Economics (Micro)

ECON 605, Intermediate Microeconomic Analysis

ECON 611, Intermediate Macroeconomic Analysis

ECON 726, Introduction to Econometrics

One approved ECON or DS course chosen in consultation with the academic adviser

***Electrical Science Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527,\* Differential Equations with Linear Algebra

MATH 528,\* Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 645,\* Linear Algebra for Applications

MATH 646, Introduction to Partial Differential Equations

MATH 647, Complex Analysis for Applications

MATH 753, Introduction to Numerical Methods I

One course chosen in consultation with the academic adviser from MATH 797\*\*, Senior Seminar, MATH 798\*\*, Senior Project, and MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

ECE 541, Electrical Circuits

ECE 548, Electronics Design I

ECE 603, Electromagnetic Fields and Waves I

ECE 633, Signals and Systems I

ECE 634, Signals and Systems II

ECE 757, Fundamentals of Communication Systems

***Physics Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II  
MATH 527, \* Differential Equations with Linear Algebra  
MATH 528, \* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645, \* Linear Algebra for Applications  
MATH 646, Introduction to Partial Differential Equations  
MATH 647, Complex Analysis for Applications  
MATH 753, Introduction to Numerical Methods I

Two approved MATH courses at the 700-level chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming  
PHYS 407, General Physics I  
PHYS 408, General Physics II  
PHYS 505-506, General Physics III  
PHYS 615, Classical Mechanics and Mathematical Physics I  
PHYS 616, Classical Mechanics and Mathematical Physics II  
PHYS 701, Introduction to Quantum Mechanics I  
PHYS 703, Electricity and Magnetism I

***Statistics Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 527, \* Differential Equations with Linear Algebra  
MATH 528, \* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645, \* Linear Algebra for Applications  
MATH 739, Applied Regression Analysis

MATH 755, Probability and Stochastic Processes with Applications

MATH 756, Principles of Statistical Inference

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

**Other required courses**

CS 410, Introduction to Scientific Programming

Three MATH courses chosen in consultation with the academic adviser from the following:

MATH 736, Statistical Methods for Research

MTH 737, Statistical Methods for Quality Improvement

MATH 740, Design of Experiments I

MATH 741, Survival Analysis

MATH 743, Time Series Analysis

MATH 744, Design of Experiments II

Three approved MATH electives, at least two of which are at the 700-level, chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

***Bachelor of Science in Mathematics Education***

This professional degree program prepares students for mathematics teaching at the elementary, middle/junior high, or secondary level. The program is coordinated with the education department's teacher certification programs. For the elementary option, full certification requires the five-year program. Students may complete the degree requirements for middle/junior high or secondary option with full teacher certification in either four or five years. Students electing the four-year option must plan for one semester of student teaching (EDUC 694) in their senior year and must consult with the departmental adviser in order to accommodate the scheduling of required MATH courses. The five-year program requires a year-long teaching internship in the fifth year that can be coupled with other graduate work leading to a master's degree. See [Education, College of Liberal Arts](#).

***Elementary School Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis  
MATH 545, Introduction to Linear Algebra and Mathematical Proof  
MATH 619, Historical Foundations of Mathematics  
MATH 621, Number Systems for Teachers  
MATH 622, Geometry for Teachers  
MATH 623, Topics in Mathematics for Teachers  
MATH 657, Geometry  
MATH 700, Introduction to Mathematics Education  
MATH 703, The Teaching of Mathematics, K-6  
MATH 797\*\*, Senior Seminar

\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming  
PHYS 406, Introduction to Modern Astronomy,  
EDUC 500, Exploring Teaching  
EDUC 700, Educational Structure and Change  
EDUC 701, Human Development and Learning: Educational Psychology  
EDUC 705, Alternative Perspectives on the Nature of Education  
EDUC 706, Introduction to Reading Instruction in the Elementary Schools

*Note:* EDUC 703F, EDUC 703M and EDUC 751 are requirements for certification that may be taken as an undergraduate.

***Middle/Junior High School Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 545, Introduction to Linear Algebra and Mathematical Proof  
MATH 619, Historical Foundations of Mathematics  
MATH 621, Number Systems for Teachers  
MATH 622, Geometry for Teachers  
MATH 623, Topics in Mathematics for Teachers  
MATH 657, Geometry  
MATH 700, Introduction to Mathematics Education  
MATH 708, Teaching of Mathematics, 5-8  
MATH 797\*\*, Senior Seminar  
One approved MATH course chosen in consultation with the academic adviser



\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

EDUC 500, Exploring Teaching

EDUC 700, Educational Structure and Change

EDUC 701, Human Development and Learning: Educational Psychology

EDUC 705, Alternative Perspectives on the Nature of Education

*Note:* EDUC 751A or EDUC 751B is a requirement for certification that may be taken as an undergraduate.

**Secondary School Option**

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527, Differential Equations with Linear Algebra

MATH 528, Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 619, Historical Foundations of Mathematics

MATH 624, Analysis for Secondary School Teachers

MATH 657, Geometry

MATH 700, Introduction to Mathematics Education

MATH 709, Teaching of Mathematics, 7-12

MATH 761, Abstract Algebra

MATH 797\*\*, Senior Seminar

\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

EDUC 500, Exploring Teaching

EDUC 700, Educational Structure and Change

EDUC 701, Human Development and Learning: Educational Psychology

EDUC 705, Alternative Perspectives on the Nature of Education

*Note:* EDUC 751A or EDUC 751B is a requirement for certification that may be taken as an

undergraduate.

### ***Minor in Mathematics***

The Department of Mathematics and Statistics offers three minor programs: mathematics, applied mathematics, and statistics. These programs, which are open to all students enrolled at the University, require a minimum of five MATH courses as detailed below. Students whose major program requires more than two courses required by the minor program must substitute additional courses from the list of optional courses to meet the five-course minimum.

#### ***Mathematics Minor***

Required (3): MATH 528\*, MATH 531 and either MATH 761 or MATH 767

Options (2): Two courses chosen from: MATH 527\*, 656, 657, 658, 761, 762, 764, 767, 776, 783, 784, 788

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

#### ***Applied Mathematics Minor***

Required (4): MATH 527\*, 528\*, 645\* (or 545), and 753

Options (1): One course chosen from: MATH 539, 644, 646, 647, 745, 746, 747, or 754

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

#### ***Statistics Minor***

Required (2): MATH 539 (or 644) and MATH 645 (or 545)

Options (3): Three courses chosen from: MATH 737, 740, 741, 742, 744, 755, 756

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## **Mechanical Engineering (ME) ▼**

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*Chairperson:* Todd S. Gross

*Professor:* Kenneth C. Baldwin, Barbaros Celikkol, Barry K. Fussell, Todd S. Gross, Robert Jerard, Joseph C. Klewicki, James E. Krzanowski, M. Robinson Swift, Igor I. Tsukrov

*Affiliate Professor:* Donald M. Esterling

*Associate Professor:* Gregory P. Chini, Diane L. Foster, Brad Lee Kinsey, John Philip McHugh,

May-Win L. Thein

*Assistant Professor:* Yannis Korkolis, Christopher M. White, Martin M. Wosnik

*Affiliate Assistant Professor:* Timothy Upton

The Mechanical Engineering Program at UNH is accredited by the Engineering Accreditation Commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

### ***Mission***

In support of the University and college missions, the Department of Mechanical Engineering is dedicated to educating the highest quality engineering professionals and leaders. Graduates will be prepared to creatively solve engineering problems through the use of analysis, computation, and experimentation. Students completing the program should be well-informed citizens who have the ability to grow intellectually and are able to solve new, challenging problems with self-confidence. It is the department's intent to maintain a general and flexible curriculum that prepares students for both industrial practice and graduate education.

### ***Educational Objectives***

The goal of the UNH mechanical engineering program is to produce graduates who are good professionals and good citizens who 1) skillfully apply the fundamental principles of mathematics, science, and engineering; 2) solve engineering problems by integrating strong design, analysis, and experimental abilities with excellent communication skills; 3) successfully contribute to their respective corporate, government, or academic organizations; 4) demonstrate continuous growth by assuming positions of leadership in their profession, or by becoming successful entrepreneurs; by successfully completing advanced degrees and professional education; 5) are broadly educated citizens of society with an understanding of the impact of engineering solutions in a global/societal context; and 6) demonstrate a high level of personal and social integrity through their ethical behavior and service to their peers, employers, communities, the nation, and the world.

Mechanical engineering is a challenging profession encompassing research, design, development, and production of aerospace vehicles, underwater vessels, instrumentation and control systems, nuclear and conventional power plants, and consumer and industrial products in general. The profession also makes contributions through more fundamental studies of material behavior, the mechanics of solids and fluids, and energy transformation. Additional information can be found at the mechanical engineering website, [www.unh.edu/mechanical-engineering](http://www.unh.edu/mechanical-engineering).

## The Program

The program begins with courses in physics, mathematics, chemistry, and computer-aided design. The department has a four-semester mechanics thread, a four-semester thread in the thermal/fluid sciences, and a three-semester thread in systems and controls. Modern experimental methods are taught in a two-semester course starting in the junior year. The two-semester senior design project requires students to utilize the skills they have learned in their courses and to learn how to function in an engineering team. The five technical electives offered in the program give the students the opportunity to focus on advanced technical areas of their choice.

With their advisers' assistance, students should plan a program, based on the following distribution of courses, that totals not less than 128 credits. The outline that follows is typical only in format. Within the constraints of satisfying all the requirements and having all the necessary prerequisites, schedules may vary because of scheduling needs or student preference. Some mechanical engineering elective courses may not be offered every year.

The mechanical engineering program curriculum requires five technical elective courses of at least three credits each. These may be selected from 600-700 level courses in the College of Engineering and Physical Sciences, except for one course that may be selected from one of the following 400-500 level courses: ME 442, ME 542, ENE 520, ESCI 501, and ECE 543.

Two technical electives can be used for studying a focused area such as a foreign language, professional program, or minor, with department approval. These five technical elective courses should be selected in consultation with a departmental adviser to lead to a balanced program that addresses chosen areas of interest.

Students must satisfy the University's Discovery Program requirements. The following features are unique to students in the mechanical engineering program:

- All students are required to take an Inquiry course or an Inquiry Attribute course during their first two years. This can be satisfied with ME 441. Students who are exempted from ME 441 due to prior CAD experience must select an Inquiry 444 course or a course with an Inquiry Attribute.
- The Discovery Environment, Technology, and Society category requirement is met upon receiving a BS degree in Mechanical Engineering.
- The Discovery Social Science category must be satisfied with either ECON 402 or EREC 411.
- The Discovery senior capstone experience is satisfied with either ME 755 and 756 or

## TECH 797.

Some programs may require additional elective courses to reach the minimum of 128 credits required for graduation. Other programs may exceed 128 credits to include all the required courses.

In order to graduate in the mechanical engineering major, students must have at least a 2.0 grade-point average in all engineering and science courses, including required technical electives, normally taken as department requirements after the start of the junior year.

Predictor courses: To enter the junior-year courses in the mechanical engineering major, students must achieve a minimum grade-point average of 2.0 with no grade below C- in the following courses: PHYS 407, MATH 426, ME 525, ME 526, and ME 503.

**First Year**

Abbreviation	Course Number	Title	Fall	Spring
MATH	425	Calculus I	4	-
*CHEM	405	General Chemistry	4	-
ME	441	Engineering Graphics	4	-
Discovery Program Elective			4	-
MATH	426	Calculus II	-	4
PHYS	407	General Physics I	-	4
Discovery Program Elective			-	4
English	401		-	4
Total			16	16

\*CHEM 403 and CHEM 404, General Chemistry, may be substituted for CHEM 405.

PHYS 407 or CHEM 405 satisfies the Discovery Physical Science (with lab) category.

MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.

ENGL 401 satisfies the Discovery Foundation Writing Skills category.

ME 441 satisfies the Discovery Inquiry requirement.

**Sophomore Year**

Abbreviation	Course Number	Title	Fall	Spring
**MATH	527	Differential Equations	-	4
**MATH	528	Multidimensional Calculus	4	-
ME	525	Mechanics I	3	-
ME	503	Thermodynamics	-	3
ME	561	Introduction to Materials Science	-	4
PHYS	408	General Physics II	4	-
Technical Elective			3-4	-
ME	526	Mechanics II	-	3
Discovery Program Elective			4	
Total			18-19	14

\*\*MATH 525 and 526, Linearity, may be substituted for MATH 527 and 528, and a technical elective course.

**Junior Year**

Abbreviation	Course Number	Title	Fall	Spring
Discovery Program Elective			4	-
ME	608	Fluid Dynamics	3	-
ME	627	Mechanics III	3	-
ME	643	Elements of Design		3
ECE	537	Introduction to Electrical Engineering	4	-
ME	603	Heat Transfer	-	3
ME	646	Experimental Measurement & Data Analysis	-	4
ME	670	Systems Modeling, Simulation, & Control	-	4
CS	410	Intro to Scientific Programming	4	
Total			18	14

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
ME	705	Thermal System Analysis and Design	4	-
***ME	755	Senior Design Project I	2	-
ME	747	Experimental Measurement & Modeling	4	-
Discovery Program Elective			4	-
Technical Elective			3-4	-
ME	756	Senior Design Project II	-	2
Technical Elective			-	3-4
Technical Elective			-	3-4
Discovery Program Elective			-	4
Technical Elective				3-4
Total			17-18	15-18

\*\*\*TECH 797, Undergraduate Ocean Research Project, may be substituted for ME 755 and ME 756. These courses satisfy the Discovery Senior Capstone Experience category.

**Mechanical Engineering Minor**

The minor, administered by the Department of Mechanical Engineering, is open to all students of the University and offers a broad introduction to mechanical engineering.

Students must complete a minimum of six courses as follows: ME 441, ME 525, ME 526, ME 627, ME 503, and ME 608. Electrical and Computer Engineering majors should take the following courses: ME 441, ME 523, ME 526, ME 503, ME 608, and ME 561. Interested students should contact the mechanical engineering chair, Todd Gross, (603) 862-2445.

**Materials Science Minor**

The minor, administered by the Department of Mechanical Engineering, is open to all students

of the University and offers a broad introduction to materials science.

Students must complete at least 18 credits and a minimum of five courses as follows: ME 561 (required); ME 760 (required); and ME 730 (required); and two additional courses from the following: 731, 744, 761, 762, 763, and 795 (materials).

By mid-semester of their junior year, interested students should consult the minor supervisor, James E. Krzanowski, Department of Mechanical Engineering, (603) 862-2315.

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## Physics (PHYS) ▼

» <http://www.physics.unh.edu/>

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*Chairperson:* Eberhard Möbius

*Professor:* L. Christian Balling, Amitava Bhattacharjee, John R. Calarco, Olof E. Echt, F. William Hersman, Martin A. Lee, Eberhard Möbius, James M. Ryan, Harlan E. Spence, Roy B. Torbert

*Research Professor:* Charles J. Farrugia, Terry Forbes, Philip A. Isenberg, Nelson Maynard, Charles W. Smith III

*Associate Professor:* Silas Robert Beane III, Per Berglund, Benjamin D. Chandran, James Connell, Maurik Holtrop, Lynn M. Kistler, Dawn C. Meredith, Karsten Pohl, Joachim Raeder, Nathan A. Schwadron

*Research Associate Professor:* Antoinette B. Galvin, Harald A. Kucharek, Marc R. Lessard, Clifford Lopate, Bernard J. Vasquez

*Assistant Professor:* Kai Germaschewski, Karl Silber, Jian-Ming Tang

*Research Assistant Professor:* Li-Jen Chen, Fatemeh Ebrahimi, David Mattingly, Mark L. McConnell

Physics is concerned with the properties of matter and the laws that describe its behavior. It is an exact science based on precise measurement, and its objective is the kind of understanding that leads to the formulation of mathematical relationships between measured quantities. As a fundamental science, its discoveries and laws are basic to understanding in nearly all areas of science and technology. Advances in such diverse fields as medical instrumentation, solid state



electronics, and space research have relied heavily on the application of basic physical laws and principles.

Students interested in the study of physics at the University of New Hampshire will find a strong interaction between research and academic programs. Undergraduates have participated in research studies ranging from nuclear scattering experiments at major particle accelerators to astrophysical studies of the solar system using space probes. These experiences have proven beneficial to engineering and physics students alike. The department is located in DeMeritt Hall (completed in 2008) and Morse Hall. Both buildings are equipped with state-of-the-art research facilities and laboratories. DeMeritt Hall also houses the physics library, classrooms, and a number of open and comfortable meeting areas, which provide an inviting atmosphere for study, interaction, and collaboration.

The suggested programs that follow are indicative of the flexibility available to students, whether they are preparing for graduate work in physics or astronomy, industrial opportunities, governmental research, secondary-level teaching, or a general education that might utilize the fundamental knowledge of physics.

Several undergraduate degree programs are offered through the department of physics. The B.S. degree is designed for students who wish to work as professional physicists or engineers; the interdisciplinary options in chemical physics, materials science, and astronomy allow students to combine physics with other disciplines. The B.A. degree is designed for students who want a strong background in physics but also want a broad liberal arts education. A minor in physics allows a student to combine an interest in physics with another major.

Physics-related degrees are also offered in other departments. For those students with strong interests in both math and physics, the **Department of Mathematics** offers a B.S. interdisciplinary option in physics.

Interested students are encouraged to contact the department for further information. More detailed information is also on the physics department web page at [www.physics.unh.edu](http://www.physics.unh.edu).

### ***Minor in Physics***

The minor in physics consists of five courses in physics. All students must take PHYS 407, 408, and 505, including labs. Two other physics courses at the 500 level or above must be chosen in consultation with the student's physics minor adviser.

### **Physics Major, Bachelor of Arts**

This degree provides an opportunity for a broad and liberal arts education, which in some cases may be sufficient for graduate work. A judicious choice of electives may also prepare

students for interdisciplinary programs that require proficiency in a restricted area of physics.

### Requirements

1. Satisfy the University Discovery Program requirements. Note that no physics course can satisfy these requirement for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.
2. Satisfy bachelor of arts degree requirements.
3. PHYS 400, 407-408, 505, 506, 508, 605, 615, 616, 701, 703, 705. Note that MATH 425, 426, and MATH 525, 526 or MATH 527, 528 are prerequisites for some of the courses.
4. A capstone experience is required of all physics majors during their senior year. The Physics Department encourages students to write a senior thesis (PHYS 799) for their capstone experience. Other options include independent study research projects (PHYS795 or INCO 590) or a special project as part of senior lab (PHYS 705). All capstone experiences must be approved by the undergraduate committee.

In the following table, “electives” include Discovery courses, writing intensive courses, language courses required for the B.A., and free choice electives.

### Suggested Curriculum for B.A. in Physics

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	400	Freshman Seminar	1	-
PHYS	407-408	General Physics I and II	4	4
MATH	425, 426	Calculus I and II (Group 2)	4	4
ENGL	401	First-Year Writing	-	4
Elective			8	4
Total			17	16

#### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	505-506	General Physics III and Lab	4	-
PHYS	615	Classical Mechanics and Mathematical Physics I	-	4
MATH	525	Linearity I		

or MATH	527	Differential Equations	6 or 4	-
MATH	526	Linearity II		
or MATH	528	Multidimensional Calculus	-	6 or 4
Elective			8	8
Total			16 or 18	16 or 18

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	605	Experimental Physics I	5	-
PHYS	508	Thermodynamics and Statistical Mechanics	-	4
PHYS	616	Classical Mechanics and Mathematical Physics II	4	-
PHYS	701	Introduction to Quantum Mechanics I	-	4
Electives			8	8
Total			17	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	705	Experimental Physics II	-	4
PHYS	703	Electricity and Magnetism I	-	4
Elective			16	8
Total			16	16

## Bachelor of Science in Physics

The bachelor of science degree in physics prepares students for professional work as physicists. The required courses are those typically necessary for admission to graduate study in physics or astronomy. The interdisciplinary options require fewer physics courses combined with a concentration in another area (chemistry or materials science). The astronomy option emphasizes courses that help prepare a student for advanced studies in astronomy.

### Requirements

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirement for a physics major. The rationale behind this is that a course in

physics does not broaden the education of a physics major.

2. Satisfy bachelor of science university requirements.
3. Minimum physics requirements: 400, 407-408, 505, 506, 508, 605, 615-616, 701, 702, 703, 704, 705; two physics electives selected from the 700-level physics courses.
4. Chemistry: 403-404 or 405
5. Math: 425-426, and 525-526 or 527-528
6. Computer Science: CS 410
7. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.
8. A capstone experience is required of all physics majors during their senior year. The Physics Department encourages students to write a senior thesis (PHYS 799) for their capstone experience. Other options include independent study research projects (PHYS795 or INCO 590) or a special project as part of senior lab (PHYS 705). All capstone experiences must be approved by the undergraduate committee.

#### Physics electives

In the following table, "electives" include Discovery courses, writing intensive courses, physics electives, and free choice electives. Note that physics electives can only be taken in the junior or senior year because of prerequisites, and are in general offered every other year.

#### Suggested Curriculum for B.S. in Physics

##### First Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	400	Freshman Seminar	1	-
PHYS	407-408	General Physics I and II	4	4
MATH	425, 426	Calculus I and II (Group 2)	4	4
CHEM	403-404	General Chemistry (Group 3)	4	4
ENGL	401	Freshman English	-	4
Elective			4	-
Total			17	16

##### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
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PHYS	505-506	General Physics III and Lab	4	-
PHYS	508	Thermodynamics and Statistical Mechanics	-	4
PHYS	615	Classical Mechanics and Mathematical Physics I	-	4
MATH	525	Linearity I		
or MATH	527	Differential Equations	6 or 4	-
MATH	526	Linearity II		
or MATH	528	Multidimensional Calculus	-	6 or 4
CS	410	Introduction to Scientific Programming	4	-
Elective			4	4
Total			16 or 18	16 or 18

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	605	Experimental Physics I	5	-
PHYS	616	Classical Mechanics and Mathematical Physics II	4	-
PHYS	701	Introduction to Quantum Mechanics I	-	4
PHYS	703	Electricity and Magnetism I	-	4
Electives			8	8
Total			17	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	702	Quantum Mechanics II	4	-
PHYS	704	Electricity and Magnetism II	4	-
PHYS	705	Experimental Physics II	-	4
Elective			8	12
Total			16	16

### Chemical Physics Option, Bachelor of Science in Physics

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy

these requirements for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.

2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 407-408, 505-506, 508, 605, 615, 616, 701, 702, 703, 705
4. Chemistry: CHEM 403, 404, 683-686, 762, 763, 776
5. Mathematics: MATH 425-426, 525-526 or 527-528
6. Computer Science: CS 410
7. Electives in Option: Two courses selected from CHEM 547/9, MATH 646, PHYS 718, PHYS 795
8. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

#### **Materials Science Option, Bachelor of Science in Physics**

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirements for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.
2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 407-408, 505-506, 508, 605, 615-616, 701, 703, 705, 795 (4 credit hours), 799 (4 credit hours).
4. Mechanical Engineering: 561, 730, 760
5. Math: 425-426, 525-526, or 527-528
6. Computer Science: CS 410
7. Electives in Option: Three courses selected from MATH 646, ME 731, 761, 762, 763, 795, PHYS 718
8. Chemistry: 403-404 or 405
9. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

#### **Astronomy Option, Bachelor of Science in Physics**

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirements for a physics major. The rationale behind this is that a course in

physics does not broaden the education of a physics major.

2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 406, 407-408, 505, 506, 508, 605, 615-616, 701, 702, 703, 704, 705, 710, 795 (4 credit hours), 799 (4 credit hours).
4. Chemistry: CHEM 403-404 or CHEM 405
5. Math: MATH 425-426 and 525-526 or 527-528 Computer Science: CS 410
6. Electives in option: Choose one course from PHYS 708, PHYS 712, PHYS 720, PHYS 764, PHYS 791
7. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

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## Technology (TECH) ▼

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### College of Engineering and Physical Sciences ▼

» <http://www.ceps.unh.edu>

*Dean:* Samuel B Mukasa

*Associate Dean:* Robert M. Henry

### Introduction ▼

The College of Engineering and Physical Sciences (CEPS) provides an opportunity for students to achieve educational objectives appropriate to their interests in engineering, computer science, information technology, mathematics, the physical sciences, and the teaching of mathematics and physical sciences. The college offers an education in each of its primary disciplines leading to the bachelor of science, as well as bachelor of art degrees with majors in mathematics and each of the three physical sciences. All programs include an opportunity for study in the arts, humanities, and social sciences.

The key to an undergraduate program in the college is flexibility, with a strong emphasis on personal and individualized education. In addition to specific programs, a wide range of options within several majors are available. Special programs can be developed to meet the specific interests of individual students.

### Degree Requirement

MATH 425 and 426 (Calculus I and II) or the equivalent in transfer credits or advanced placement approved by the Department of Mathematics and Statistics are required by all departments of the college. The exception is the Information Technology major which only requires Math 425 (Calculus I). The prerequisites for calculus are three years of college-preparatory mathematics, including a half-year of trigonometry. Before students can register for MATH 425, they are required to take the Mathematics Placement Test or to have taken MATH 418 (or its equivalent) and received a grade of C or better.

### Mathematics Placement

First-year students arrive with a wide range of mathematical skills based upon their high school preparation. The college wants students to have a solid mathematics foundation so that they



will enjoy an enriched first-semester experience. A student's mathematics development will be assessed as part of the June orientation program. Based upon the Mathematics Placement Test, students are enrolled in the mathematics class that will allow them to continue that development. The initial mathematics entry course is Analysis and Applications of Functions (MATH 418). However, a student is placed into Math 425 (Calculus I) if he or she demonstrated a certain level of proficiency in Algebra and pre-Calculus through the Mathematics Placement Test. Students with AP credit for Calculus I and/or Calculus II may elect to accept those credits and continue with a math course at the next level.

### **Accreditation**

The baccalaureate-level programs in chemical, civil, computer, electrical, environmental, and mechanical engineering are accredited by the Engineering Accreditation Commission of **ABET**, Inc. The baccalaureate-level program in computer science and bioinformatics are accredited by the Computing Accreditation Commission of ABET, Inc. ABET contact information: 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700. The Department of Chemistry's undergraduate bachelor of science program is approved by the American Chemical Society.

### **Tech Courses**

The following courses are designed for students of the college and other majors within the University. These courses are offered through and administered by the Dean's Office.

TECH 400, Introduction to CEPS Programs, 1 cr.

TECH 444, Symmetry in Nature, The Arts, and Daily Life, 4 cr.

TECH 564, Fundamentals of CAD, 3 cr.

TECH 583, Technology: Cultural Aspects, 4 cr.

TECH 583H, Honors/Technology: Cultural Aspects, 4 cr.

TECH 601, Fundamentals Examination Review Course, 1 cr.

TECH 685, Budapest Program, 20 cr.

TECH 696, Independent Study, 1 to 4 cr.

TECH 797, Undergraduate Ocean Research Project, 2 cr.

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### Bachelor of Arts ▼

Programs leading to a bachelor of arts degree are offered in the departments of chemistry, earth sciences, mathematics, and physics. These programs provide a broad liberal education along with a major in one of these fields. See [University Academic Requirements](#) for requirements for the bachelor of arts degree.

#### Chemistry

#### Earth Science Teaching

#### Earth Sciences

#### Oceanography

#### Mathematics

#### Physics

### Bachelor of Science ▼

The programs leading to the bachelor of science degree, offered in each of the departments of the college, emphasize students' preparation for a professional career and continuing or graduate education.

The degree requirements for the bachelor of science include the University Academic Requirements and the specific departmental requirements for graduation. A minimum grade-point average of 2.0 must be achieved. Graduation credit requirements established by the departments range from 128 to 134. There are entrance requirements in some programs, and it is not possible to guarantee all change-of-major requests.

#### Chemical Engineering\*

Bioengineering  
Energy  
Environmental Engineering

**Chemistry\***

**Civil Engineering\***

**Computer Engineering\***

**Computer Science\***

Bioinformatics

**Electrical Engineering\***

**Environmental Engineering\*†**

Industrial Process  
Municipal Process

**Environmental Sciences\***

Ecosystems  
Hydrology  
Soil and Watershed Management

**Geology\***

**Information Technology**

**Mathematics\***

**Mathematics Education\***

Elementary  
Middle/Junior High  
Secondary

**Mathematics, Interdisciplinary**

Computer Science  
Economics  
Electrical Science  
Physics  
Statistics

**Mechanical Engineering\***

**Physics\***

Astronomy

Chemical Physics  
Materials Science

\*Designated degree (the name of the specialization is on the diploma, e.g., B.S. in chemistry).

†Multidisciplinary; i.e., offered in collaboration with two departments.

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#### Majors

##### *Bachelor of Science in Environmental Engineering*

The environmental engineering program consists of two emphases: industrial processes (IP) and municipal processes (MP).

##### *Bachelor of Science in Environmental Sciences*

The environmental sciences program is offered jointly with the College of Life Sciences and Agriculture (COLSA) and consists of three options: hydrology, soil and watershed management, and ecosystems.

#### Minors

Interdisciplinary minors enable students to obtain experience in a specialized area and to retain identification with their major professional area. The college's interdisciplinary minors are:

Applied Mathematics

Environmental Engineering

Geology

Information Technology

Materials Science

Mathematics

Mechanical Engineering

Ocean Engineering

Oceanography

Physics

Statistics

For requirements regarding minors, see [University Academic Requirements](#).

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### Independent Study and Projects ▼

All departments within the college offer independent study opportunities and projects. The content of these courses varies and is based upon current scientific and technological needs in addition to the interests of the student and faculty involved.

Permission of the faculty member and/or department chairperson is required. One should review the course descriptions for the independent study and project courses for specific requirements. Students interested in working with a faculty member on a project or independent study should discuss this with the faculty member and their academic adviser prior to registering for the course.

#### ***Research Opportunities***

The talents and expertise of the faculty in all departments are reflected in the number of ongoing research projects. Undergraduates are included in many of these research projects with the intent that they will discover and foster their creative talents. When involved with a funded research project, students may have an opportunity to receive pay while learning about the research area.

The college has world-class laboratories and computer facilities in many areas. A few of these are: coastal and ocean mapping, space science, environmental engineering and science, fluid dynamics, wind turbulence, information systems, materials science, nanotechnology, sustainability, and medical imaging. These and other ongoing research areas within the college are described on the college's website: [www.ceps.unh.edu/research](http://www.ceps.unh.edu/research).

Students have the opportunity to acquire applied experience by working with faculty members who undertake sponsored professional projects in technical and managerial areas for business, industry, and for federal, state, and local governments.



### ***Special Provisions***

The requirement of a given topic/course prescribed to meet the requirements of major curriculum may be waived by the faculty of a student's department. This rule offers students the opportunity to develop a somewhat individualized plan of study with intellectual incentives and opportunities in addition to those found in a regular curriculum. The student's petition must be approved by his/her major adviser and the dean of the college. This power usually will be delegated by the faculty to the dean or to a committee. (Senate Rule 05.21(s): Waiver of Requirements in a Prescribed Curriculum.)

A student with senior status and a grade point average of 3.2 may petition to take a graduate course for undergraduate credit. In addition, upon the recommendation of the department chairperson, a superior student may be allowed to count credits from up to two 800-level courses toward both a bachelor's degree and a master's degree, provided that the student has been admitted to the master's program.

## **Study Abroad Programs ▼**

### ***Hungary***

The College of Engineering and Physical Sciences provides its students with the opportunity to spend a semester at the Budapest University of Technology and Economics (BME) in Budapest, Hungary. Most CEPS majors choosing to study abroad spend the fall semester of their junior year at BME. Electrical & Computer Engineering students spend the spring semester of their junior year at BME. Courses at BME are taught in English and receive prior approval for degree credit. Students studying in Budapest maintain their status as full-time UNH students, pay UNH tuition, and maintain their expected graduation date. For more information, visit the program's Web site at [www.ceps.unh.edu/academics/budapest/](http://www.ceps.unh.edu/academics/budapest/).

### ***Scotland, Heriot-Watt University Exchange Program***

College of Engineering and Physical Sciences students are eligible to participate in a spring semester exchange with Heriot-Watt University in Edinburgh, Scotland. The current program is designed for civil and environmental engineering majors. For more information, contact Ray Cook at (603) 862-1411 or the Center for International Education, Hood House.

## **Preparing for Teaching ▼**

Students interested in mathematics education (elementary, middle/junior high, or secondary), Earth science teaching, chemistry or physics teaching should refer to the appropriate department for a description of the program requirements.

## Combined Programs of Study ▼

In addition to pursuing a single major, students may combine programs of study as follows:

*Minors:* See [University Academic Requirements](#); see also [Degrees and Major Programs of Study](#) and [Departmental Programs of Study](#).

*Second majors:* See [University Academic Requirements](#).

*Interdisciplinary majors:* Many departments in the college offer programs that combine a major with another field of interest. See the descriptions that follow.

*Dual-degree programs:* See [University Academic Requirements](#).

*Student-designed majors:* See [Special University Programs](#).

*Other combined and interdisciplinary opportunities:* See [Special University Programs](#).

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### College of Engineering and Physical Sciences ▼

» <http://www.ceps.unh.edu>

### Chemical Engineering (CHE) ▼

» <http://www.unh.edu/chemical-engineering/>

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*Chairperson:* Palligarnai T. Vasudevan

*Professor:* Dale P. Barkey, Russell T. Carr, Ihab H. Farag, Palligarnai T. Vasudevan

*Associate Professor:* Nivedita R. Gupta

*Assistant Professor:* Jillian Goldfarb, Qing Song, Xiaowei Teng

The Department of Chemical Engineering currently offers the undergraduate degree program in chemical engineering with options in bioengineering, energy, and environmental engineering. In addition, the College of Engineering and Physical Sciences offers an **interdisciplinary B.S.**

**program in environmental engineering** with the participation of the chemical engineering and civil engineering departments.

The B.S. program in chemical engineering is accredited by the Engineering Accreditation Commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

Chemical engineering is concerned with the analysis and design of processes that deal with the transfer and transformation of energy and material.

The practice of chemical engineering includes the conception, development, design, and application of physicochemical processes and their products; the development, design, construction, operation, control, and management of plants for these processes; and activities relating to public service, education, and research.

The curriculum prepares students for productive careers in industry or government and provides a foundation for graduate studies. The college's program emphasizes chemical

engineering fundamentals while offering opportunities for focused study in energy-, environmental-, or bioengineering.

Traditional employment areas in the chemical process industries include industrial chemicals, petroleum and petrochemicals, plastics, pharmaceuticals, metals, textiles, and food. Chemical engineers are also working in increasing numbers in the areas of energy engineering, pollution abatement, and biochemical and biomedical engineering; in addition, they are employed by many government laboratories and agencies as well as private industries and institutions.

### ***Mission***

The department strives to prepare our students for productive careers in industry or government as well as to provide a foundation for graduate studies. Our program emphasizes chemical engineering fundamentals while offering opportunities for focused study in energy-, environmental- or bio- engineering.

### ***Program Educational Objectives***

The chemical engineering program seeks to provide an environment that enables students to pursue their goals in an innovative program with a diversity of offerings that is rigorous and challenging.

**The program has the following major educational objectives with the expectation that our alumni will have successful careers in the many diverse areas of the chemical engineering profession. Within a few years of obtaining a bachelor's degree in chemical engineering, we expect our graduates to have the following attributes.**

**Depth.** To be effective in applying chemical engineering principles in engineering practice or for advanced study in chemical engineering.

**Breadth.** To have a productive career in the many diverse fields of chemical engineering such as bioengineering, energy and the environment, or in the pursuit of graduate education in disciplines such as chemical engineering, medicine, law or business.

**Professionalism.** To function effectively in the complex modern work environment with the ability to assume professional leadership roles.

### **Bachelor of Science in Chemical Engineering**

Chemical engineering is concerned with the analysis and design of processes that deal with the transfer and transformation of energy and material.

The practice of chemical engineering includes the conception, development, design, and application of physicochemical processes and their products; the development, design, construction, operation, control, and management of plants for these processes; and activities

relating to public service, education, and research.

The curriculum prepares students for productive careers in industry or government and provides a foundation for graduate studies. The program emphasizes chemical engineering fundamentals while offering opportunities for focused study in energy-, environmental-, or bioengineering.

Traditional employment areas in the chemical process industries include industrial chemicals, petroleum and petrochemicals, plastics, pharmaceuticals, metals, textiles, and food. Chemical engineers also are working in increasing numbers in the areas of energy engineering, pollution abatement, and biochemical and biomedical engineering; in addition, they are employed by many government laboratories and agencies as well as private industries and institutions.

Graduates from the program have the ability to apply knowledge of mathematics, science, and engineering to identify, formulate, and solve chemical engineering problems as well as to design and conduct experiments safely and analyze and interpret data. They are prepared to pursue advanced studies in chemical engineering. Program graduates gain a sense of professional and ethical responsibility with the ability to apply environmental, safety, economic, and ethical criteria in the design of engineering processes. They learn to function in individual and group working environments, and learn skills in written and oral communication and the effective use of computers for engineering practice, including information search in the library and on the Internet. They also understand the need for lifelong learning and the significance of societal and global issues relevant to chemical engineering.

A minimum of 129 credits is required for graduation with the degree of bachelor of science in chemical engineering. There are ten electives in the chemical engineering curriculum. Six of these are for the Discovery Program requirements. The remaining four electives should consist of three chemical engineering electives and one additional technical elective.

Students are required to obtain a minimum 2.0 grade-point average in CHE 501-502 and in overall standing at the end of the sophomore year in order to continue in the major. Study Abroad (Exchange) Chemical engineering students are required to have a cumulative GPA of 3.0 or better in math, physics, chemistry and CHE courses at the end of the semester prior to their exchange semester.

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
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ENGL	401	First-Year Writing	4	-
MATH	425-426	Calculus I and II	4	4
PHYS	407	General Physics I	-	4
CHEM	405	General Chemistry	4	-
CHE	400	CHE Lectures	-	1
Discovery Program Electives (3)			4	8
Total			16	17

1. PHYS 407 OR CHEM 405 satisfies the Discovery Physical Science (with lab) category. Chemical engineering students can not take CHEM 401, CHEM 402 or CHEM 409 towards degree requirements.
2. MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.
3. ENGL 401 satisfies the Discovery Foundation Writing Skills category.
4. CHE students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in the CHE curriculum.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CHEM	683-684	Physical Chemistry I and II	3	3
CHEM	685-686	Physical Chemistry Laboratory	2	2
MATH	527	Differential Equations with Linear Algebra	4	-
PHYS	408	General Physics II	4	-
CHE	501-502	Introduction to Chemical Engineering I and II	3	3
CHE	603	Applied Mathematics for Chemical Engineers	-	4
Discovery Program Elective (1)			-	4
Total			16	16

CHE 502 satisfies the Discovery Inquiry requirement.

### Junior Year

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Abbreviation	Course Number	Title	Fall	Spring
CHEM	651-652	Organic Chemistry	3	3
CHEM	653	Organic Chemistry Laboratory	2	-
CHE	601	Fluid Mechanics and Unit Operations	3	-
CHE	602	Heat Transfer and Unit Operations	-	3
CHE	604	Chemical Engineering Thermodynamics	3	-
CHE	612	Chemical Engineering Laboratory I	-	3
CHE	614	Separation Processes	-	3
CHE Elective			4	-
Discovery Program Elective (1)			-	4
Total			15	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CHE	703	Mass Transfer and Stagewise Operations	3	-
CHE	707	Chemical Engineering Kinetics	3	-
CHE	708	Chemical Engineering Design	-	4
CHE	713	Chemical Engineering Laboratory II	3	-
CHE	752	Process Dynamics and Control	-	4
CHE Electives (2)			4	4
Technical Elective (1)			-	4
Discovery Program Elective (1)			4	-
Total			17	16

1. CHE 708 satisfies the Discovery Capstone Experience/Course
2. MATH 740 (Design of Experiments) or MATH 644 (Statistics for Engineers and Scientists) are the recommended Technical Electives.

**Bioengineering Option**

Under this option, the required courses deal with the application of basic biological sciences and chemical engineering principles to the design and operation of large-scale bioprocesses for the production of high-value medicinal products, food and beverage, pharmaceutical, biomedical, genetic engineering products, and health care products. The elective courses permit the student to study topics of special interest in more depth or gain a broader perspective in bioengineering or some closely related subjects such as biochemistry or biotechnology experience in manufacturing or research. Three courses are required, and a minimum of two additional courses of at least three credits each should be selected from the electives list. Students interested in the bioengineering option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

**Required Courses**

Abbreviation	Course Number	Title	Credits
CHE	761	Biochemical Engineering	4
CHE	762	Biomedical Engineering	4
CHE	651	Biomanufacturing	4
Total			12

**Elective Courses**

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
BMCB	750	Physical Biochemistry	3
BMCB	751	Principles in Biochemistry	4
BMCB	752	Principles in Biochemistry	4
MATH	740	Design of Experiments I	4
Total			6-8

**Energy Option**

This option covers the major areas of current interest in the energy field. The required courses



provide students with a general background knowledge of fossil fuels, nuclear power, solar energy, and other alternative energy resources. The elective courses will permit the student to study topics of special interest in more depth or gain a broader perspective on energy and some closely related subjects. Three courses are required, and a minimum of two additional courses of at least three credits each should be selected from the electives list. Students interested in the energy option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

#### Required Courses

Abbreviation	Course Number	Title	Credits
CHE	705	Natural and Synthetic Fossil Fuels	4
CHE	712	Introduction to Nuclear Engineering	4
CHE	761	Biochemical Engineering	4
Total			12

#### Elective Courses

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
ENE	772	Physicochemical Processes for Water/Air Quality	4
MATH	740	Design of Experiments I	4
ME	705	Thermal Systems Analysis and Design	4
		Special Topics on Energy*	3-4
Total			6-8

\* This requires approval of the department - check with adviser. Courses offered in the past include Renewable Electrical Power, Renewable Energy and Peak Oil.

#### ***Environmental Engineering Option***

The chemical engineering program, with its substantial requirements in chemistry, fluid dynamics, heat transfer, mass transfer, unit operations, and reaction kinetics, provides students with a unique preparation to deal with many aspects of environmental pollution problems. The option gives students a special focus on the application of chemical engineering principles and processes to the solution of problems relating to air pollution, water pollution, and the disposal

of solid and hazardous waste. Three required courses must be selected, plus two electives from the electives list. Each course must carry a minimum of three credits. Students interested in the environmental engineering option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

#### Required Courses

Abbreviation	Course Number	Title	Credits
ENE	709	Fundamentals of Air Pollution and Its Control	4
ENE	772	Physicochemical Processes for Water/Air	4
ENE	742	Solid and Hazardous Waste Engineering	3
Total			11

#### Elective Courses

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
CHE	744	Corrosion	4
ENE	746	Bioenvironmental Engineering Design	3
ENE	749	Water Chemistry	4
MATH	740	Design of Experiments I	4
Total			6-8

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## Chemistry (CHEM) ▼

» <http://www.unh.edu/chemistry/>

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*Professor:* Christopher F. Bauer, Arthur Greenberg, Richard P. Johnson, Howard R. Mayne, Glen P. Miller, W. Rudolf Seitz, Sterling A. Tomellini, Gary R. Weisman, Edward H. Wong, Charles K. Zercher

*Associate Professor:* Roy Paul Planalp

*Assistant Professor:* Erik Berda, Margaret E. Greenslade, Gonghu Li, Samuel Pazicni

“Chemistry is everywhere. From agriculture to health care, chemistry extends life and improves its quality. From disposable diapers to space suits, chemistry provides new materials for clothing, shelter, and recreation. From computer chips to fiber optics, chemistry is the foundation of today’s high technology.” (American Chemical Society)

A study in chemistry is the pathway to multiple options. These options include careers in education, law, forensics, medicine, biotechnology, environmental protection, technical sales, pharmaceutical research, semiconductors, and industrial chemical production. The potential is limitless. Students interested in pursuing chemistry as an undergraduate degree have two options available to them, which are based on their career plans. These are the bachelor of science degree (B.S.) and a bachelor of arts degree (B.A.). Since the required chemistry courses in each degree program are the same the first year, it is easy to change from one program to another. A chemistry faculty adviser is assigned to a student once she/he enters the program. The adviser will work with the student throughout their chemistry major program to choose courses to meet requirements for their major and overall.

### **First Year Student Requirements:**

In general, a first-year student should register for the following courses, and this applies to both programs (B.A. and B.S.):

- **Semester I:** Freshman Seminar, Chemistry 400; General Chemistry with lab, Chemistry 403; Calculus I, Mathematics 425;
- **Semester II:** General Chemistry with lab, Chemistry 404; Calculus II, Mathematics 426; Freshman English, English 401W.
  - Math 425 satisfies the Discovery Foundation Quantitative Reasoning category and fulfills a Chemistry major science requirement.
  - ENGL 401 satisfies the Discovery Foundation Writing Skills category and is 1 of the 4 required writing intensive courses

### **Chemistry Major Requirements:**

1. Satisfy the Discovery Program requirements.
2. For specific chemistry major course requirements, see the Baccalaureate Degree Required Chemistry Courses table.

3. Chemistry majors cannot use CHEM 403, CHEM 404 and CHEM 405 to satisfy discovery program requirements.

### **Capstone Experience:**

A capstone experience is required for all chemistry majors during their senior year. The B.S. major offers CHEM 699, Senior Thesis, as the capstone experience.

Senior thesis is a year-long project involving literature research, developing scientific writing skills and obtaining lab experience using a variety of techniques and equipment. Senior thesis research is focused on an area of specialty in either analytical, inorganic, organic and physical areas of chemistry. Students must interview with a faculty member before choosing to register for CHEM 699. The interview process enables the student to explore areas of interest and the faculty adviser to determine a potential project. The senior thesis experience immerses the student into the lab environment: working with peers, graduate students, and a research adviser. This creates a community to facilitate discussion, questions, and new ideas for projects.

Completing a senior thesis in chemistry provides valuable field experience for careers in chemistry or closely related fields. Students combine their research with another course, CHEM 698 - Senior Seminar - to develop posters exhibiting their research. These are presented at the UNH Undergraduate Research Conference. This is in addition to creating a written bound thesis. Copies of students theses are displayed in the chemistry library and the adviser's personal library and students retain personal copies. Choosing to complete a senior thesis also enables students' B.S. degree to be ACS certified.

The B.A. major offers CHEM 698, Senior Seminar, as the capstone experience. Students work with the faculty member teaching the seminar to prepare a presentation based upon a research project or subject-driven professional engagement. The ability to integrate detailed subject matter and communicate this to the broader community, both scientific and general society, is encouraged. This exercise enhances the student's writing ability, aids in the development of broader communication skills, and enables the student to obtain valuable research experience.

B.A. majors have the additional research opportunity by taking CHEM 696, Independent study. This course can be taken prior to or parallel to the capstone course to enhance their program of study.

### **Bachelor of Arts in Chemistry**

This curriculum offers students the opportunity to combine the chemistry major with other interests; for example, preprofessional programs, education, and business.

**Requirements**

1. Satisfy the Discovery Program requirements
2. For specific course requirements, see the BA section in the Baccalaureate Degree Required Chemistry Courses table.

- Math 425 satisfies the Discovery Foundation Quantitative Reasoning category and fulfills a Chemistry major science requirement.

**Baccalaureate Degree Required Chemistry Courses**

Course Number	Title	BS	BA
400	Freshman Seminar	x	x
403, 404	General Chemistry	x	x
517, 518	Quantitative Analysis	x	x
547 & 549	Organic Chemistry I	x	x
548 & 550	Organic Chemistry II	x	x
574	Introduction to Inorganic Chemistry	x	x
683 & 685	Physical Chemistry I	x	x
684 & 686	Physical Chemistry II	x	x
762 & 763	Instrumental Methods of Chemical Analysis	x	x
698	Seminar	x	x
699	Thesis	x	
755 & 756	Advanced Organic Chemistry	x	
774 & 775	Advanced Inorganic Chemistry	x	
776	Physical Chemistry III	x	
708	Spectroscopic Investigations of Organic Molecules		

**Other Requirements:**

All majors: MATH 425-426, Calculus I and II. Math 425 satisfies the Discovery Foundation Quantitative Reasoning Category

B.S. degree: PHYS 407-408, General Physics I and II; BCHM 658 or 751, Biochemistry; one chemistry-related course. † Check course listings to see which meet a physical science discovery criteria or a biological science course criteria as a part of the Discovery Program.

B.A. degree, chemistry major: PHYS 407, General Physics I, or PHYS 401-402, Introduction to Physics I and II; two other CHEM courses, except 698, or two approved chemistry-related courses.†

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† Suggested courses: MATH 527, 528; PHYS 505; EE 620; BCHM 658, 751.

### **Bachelor of Science in Chemistry**

This curriculum prepares students for careers requiring a thorough knowledge of chemistry and provides a strong foundation for careers in industry, professional schools (e.g., medical schools), and for graduate study in chemistry or in interdisciplinary areas. The curriculum requires a greater depth in chemistry and physics than do the other degree programs.

#### **Requirements:**

1. Satisfy the Discovery Program requirements.
2. For specific course requirements, see the BS section in the Baccalaureate Degree Required Chemistry Courses table.

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### **Civil Engineering (CIE) ▼**

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*Chairperson:* M. Robin Collins

*Professor:* Jean Benoit, M. Robin Collins, David L. Gress, Nancy E. Kinner, James P. Malley Jr.

*Associate Professor:* Thomas P. Ballestero, Erin S. Bell, Raymond A. Cook, Jo S. Daniel, Kevin H. Gardner, Charles H. Goodspeed, Robert M. Henry, Jennifer M. Jacobs

*Assistant Professor:* Tat S. Fu, Ricardo A. Medina

*Research Assistant Professor:* Jeffrey S. Melton, Robert M. Roseen, Alison W. Watts

*Lecturer:* Rebekah J. Gaudreau

Civil engineering involves the planning, design, and construction of public works: buildings, bridges, roads, dams, water transmission systems, water treatment systems, tunnels, and more. These facilities must provide efficient service, be cost-effective, and be compatible with the environment. Moreover, civil engineers work under a code of ethics in which their primary, overriding responsibility is to uphold the public's trust by working to plan, design, build, and restore safe, sustainable, and environmentally responsible public works.

Civil engineers work as private consultants and for government agencies in a wide variety of indoor and outdoor settings around the world. There is a strong and constant market for civil engineers due to the demands placed on the profession to construct, maintain, and repair the infrastructure.

As civil engineering is such a broad field, it is traditionally divided into several sub-disciplines. At the University of New Hampshire, five are offered: civil engineering materials, environmental engineering, geotechnical engineering, structural engineering, and water resources engineering. Civil engineering majors may choose the sub-discipline in which to focus their studies during their senior year. Additionally, the College of Engineering and Physical Sciences, through the Departments of Civil Engineering and Chemical Engineering, offers a B.S. in environmental engineering (ENE) which is a major for students who choose to specifically focus their attention solely in that area. (Students who are interested in environmental engineering but who also want a broader or more traditional civil engineering focus should pursue the civil engineering major and elect environmental engineering courses in their senior year.) Students may readily transfer between the civil engineering (CIE) and ENE programs within the first two semesters. Both the B.S. in civil engineering and the B.S. in environmental engineering provide a firm base in mathematics, science, and engineering and all majors are expected to develop excellent communication and computer skills. Graduates are prepared to enter the profession and to pursue advanced study. Because of the broad technical background attained, some graduates also successfully pursue further education in business, architecture, education, and law.

### ***Mission***

The mission of the Department of Civil Engineering is to pursue and disseminate knowledge through teaching, research, and public service. As part of its teaching mission, the department provides rigorous, yet flexible, undergraduate and graduate education for both traditional and nontraditional students through classical and creative instruction in the classroom, laboratory, and field. While preparing students for the profession, the department offers an education in civil engineering that includes working in multidisciplinary teams that critically analyze and formulate solutions to civil engineering problems and apply engineering principles that provide social, economic, and environmental benefits to the public. The department encourages in its

students a lifelong desire to keep abreast of new developments in the field and teaches them the skills necessary to continue learning. As part of its research mission, the department maintains a rigorous multidisciplinary program of scholarship advancing the state of the art in civil engineering. As part of its mission in public service, the department enhances the quality of life for people, especially in New England and specifically New Hampshire, by providing expert services, advancing and transferring knowledge and technology, and serving as a resource for information.

### ***Educational Objectives***

In accordance with its University, college, and department missions, the faculty of the Department of Civil Engineering has established clear objectives for students to help them become successful professionals after graduation. To assist graduates to become practicing civil engineers, the program helps students achieve a basic competence in math, science, and engineering principles; learn how to apply this knowledge to solve engineering problems; achieve a working knowledge in the basic civil engineering areas of structural engineering, geotechnical engineering, civil engineering materials, water resources, and environmental engineering; and extend their knowledge in one or more of these areas. As part of this process, students learn how to critically analyze and design equipment, structures, systems, or processes to meet current needs without compromising the ability of future generations to meet theirs; and to use current, and be able to independently learn new, engineering software. Engineers also need to be effective communicators. Engineering students learn how to communicate and defend ideas in technical documents such as calculation sets, reports and correspondence, how to speak before a group and convey information to technical and non-technical audiences, and how to create and effectively use graphics in support of a presentation or report. Students also learn how to work effectively as good team players who are able to work effectively as team members and team leaders and who can work on multi-disciplinary teams.

As part of finding engineering solutions civil engineering students learn how to be effective researchers who can gather and synthesize information and data to accomplish tasks. Students learn to locate, compile, and use existing information; design and perform experiments to gather new information; analyze information; and draw conclusions. Due to the nature of civil engineering efforts, which involve the public, public safety, and significant financing, it is imperative that graduates become good engineering citizens who are ethical and aware of the social, economic, and environmental impact of engineering solutions. Students develop an awareness of sustainable engineering and the interaction between engineering practice and social, economic, and environmental issues; ASCE Code of Ethics; an awareness of contemporary, global issues; their effect on public policy and their interaction with civil engineering practice; and the importance of broadening their education by being familiar with



topics outside of the math, science, and engineering areas including the basics of business and management. Civil engineers also are professionals who often are licensed, seek continuing education, participate in professional societies, and perform public service. Students are prepared to take the Fundamentals of Engineering examination, understand the need for lifelong learning, and are encouraged to join and be active in professional organizations such as ASCE, SWE, SWB, Tau Beta Pi, and the Order of the Engineer.

### **Bachelor of Science in Civil Engineering**

Matriculating students should have strong aptitudes in mathematics and science along with imagination, spatial and graphic abilities, communication skills, and creativity. Students then follow a four-year program that conforms to the guidelines of, and is accredited by, the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

The first two years of the program provide the necessary technical knowledge in mathematics, chemistry, and physics, while introducing and developing problem-solving techniques in seven courses tailored to civil engineering students. The junior year provides courses in each of the civil engineering sub-disciplines, providing students with skills in each and allowing students to determine which they wish to pursue further. The senior year is flexible, allowing students to choose where to focus attention by selecting from more than thirty elective courses in civil and environmental engineering.

The required curriculum includes eight writing-intensive courses, thereby not only satisfying but exceeding the University's writing requirement. (See [University Academic Requirements](#).)

#### *Electives*

Approximately one-third of the major's total credits and more than half of the senior-level courses are elected by the student. Of these, there are Discovery Program electives required by the University and other electives required by the department in order to satisfy departmental objectives and accreditation requirements.

1. The Discovery Program is described in [University Academic Requirements](#). Courses required by the civil engineering major fulfill requirements in Inquiry (CIE 402); Writing Skills (ENGL 401); Quantitative Reasoning (MATH 425); Physical Sciences (PHYS 407); Laboratory Coursework (PHYS 407); Environment, Technology, and Society (CIE 402); and a Senior Capstone Experience (CIE 784/788). Therefore, students select electives to satisfy Discovery requirements in Biological Science, Fine and Performing Arts, Humanities, Historical

Perspectives, World Cultures, and Social Science.

2. Civil engineering majors wishing to participate in exchange programs must achieve a cumulative grade-point average of 3.0 or better in all MATH, PHYS, CHEM, CIE, and ENE courses taken to date at the end of each of the second and third semesters prior to their exchange semester.

3. In the senior year, students take four courses specific to civil engineering sub-disciplines, and a senior technical elective. Students can use these electives to focus on a particular civil engineering area or can acquire a broader perspective by taking courses in a variety of areas. At least one of these four elective courses must qualify also as a civil engineering design elective, and no more than three courses may be taken in one sub-discipline. Lists of courses that fulfill these electives are available from the department.

*Additional program policies and requirements*

1. To transfer into the civil engineering major, a student must have the following:

- a. an overall grade point average of 2.33 or greater;
- b. an overall grade point average of 2.33 or greater for all CIE and ENE courses taken to-date;
- c. a grade point average of 2.33 in courses taken to-date of MATH 425, PHYS 407, CHEM 405 or CHEM 403, CIE 525 or ME 525, and CIE 526 or ME 526;
- d. a minimum grade of C+ in courses taken to-date of CIE 525 and CIE 526.

2. Students who are transferring into the civil engineering major may only transfer in the following:

- a. a maximum of 20 credits for CIE and ENE 600- and 700-level coursework,
- b. CIE and ENE 600- and 700-level courses in which the student has received a grade of C- or better.

3. To continue as a civil engineering major, a student must adhere to the following restrictions:

- a. a maximum of two CIE or ENE courses may be repeated (though each of these may be repeated more than once),
- b. a semester grade-point average lower than 2.0 may be earned for a maximum of two consecutive semesters,
- c. a cumulative grade-point average of less than 2.0 for CIE and ENE courses may be earned

for a maximum of any two semesters.

4. CIE and ENE 600- and 700-level courses are intended for CIE and ENE majors only. All others may enroll in these courses only with the permission of the instructor, but others may take no more than 20 credits of these courses.

5. To enter the required 600-level courses in the junior year, students must achieve the following:

- a. the completion of CIE 525, CIE 526, MATH 425, PHYS 407, and CHEM 405 or CHEM 403,
- b. an overall grade-point average of 2.0 or greater for these courses,
- c. a grade of C or better in each of CIE 525 and CIE 526.

6. To graduate with a bachelor of science in civil engineering, a student must achieve the following:

- a. 130 or more credits,
- b. credit for the civil engineering program's major and elective courses,
- c. satisfaction of the University's **Discovery Program requirements**,
- d. satisfaction of the University's **writing intensive course requirements**,
- e. a cumulative grade-point average of 2.0 or better for all courses,
- f. a cumulative grade-point average of 2.0 or better for all CIE and ENE courses.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	402	Intro. to Civil Engineering	4	-
ENGL	401	First-Year Writing	4	-
TECH	564	Fundamentals of CAD	3	-
Elective (2)		Discovery Program requirement*	4	4
CIE	505	Surveying and Mapping	-	4
MATH	425	Calculus I	-	4

PHYS	407	General Physics I	-	4
Total			15	16

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	525	Statics	3	-
ENGL	502	Technical Writing	4	-
MATH	426	Calculus II	4	-
PHYS	408	General Physics II	4	-
Elective (2)		Discovery Program requirement*	4	4
CHEM	405	General Chemistry	-	4
CIE	526	Strength of Materials	-	3
CIE	533	Project Engineering	-	3
MATH	644	Statistics for Engineers and Scientists	-	4
Total			19	18

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	622	Engineering Materials	4	-
CIE	642	Fluid Mechanics	4	-
ENE	520	Environmental Pollution and Protection	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
CIE	665	Soil Mechanics	-	4
CIE	681	Classical Structural Analysis	-	3
ENE	645	Fundamental Aspects of Environmental Engineering	-	4

Elective (1)		Discovery Program requirement*	-	4
Total			16	15

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	760	Foundation Design I	4	-
CIE	774	Reinforced Concrete Design	4	-
CIE	784	Intro. to Project Planning and Design***	1	-
Elective (1)		Discovery Program requirement*	4	
Elective (3)		Civil Engineering**	3	6
CIE or ENE	788	Project Planning and Design***	-	3
Elective (1)		Civil Engineering Design**	-	3
Elective (1)		Senior Technical Elective**	-	3
Total			16	15

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

\*\* Approved list available in the CIE office.

\*\*\* Satisfies capstone requirement for Discovery.

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## Computer Science (CS) ▼

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*Chairperson:* Philip J. Hatcher

*Professor:* R. Daniel Bergeron, Philip J. Hatcher, Ted M. Sparr, Colin Ware

*Affiliate Professor:* Jason H. Moore

*Associate Professor:* Radim Bartos, Michel Charpentier, Robert D. Russell, Elizabeth Varki, James L. Weiner

*Affiliate Associate Professor:* Sylvia Weber Russell, Mihaela Sabin

*Assistant Professor:* Wheeler Ruml

*Affiliate Assistant Professor:* Michael S. Deutsch, Anthony J. Lapadula, Matthew Plumlee, Kurt Schwehr

*Instructor:* Michael Gildersleeve, Brian L. Johnson, Israel J. Yost

*Lecturer:* Mark L. Bochert, Ellen M. Hepp, Karl Shump

## **Computer Science**

Undergraduate students may choose from one of three degree options: The B.S. in computer science, which is designed for students interested in the design and implementation of software systems; the B.S. in computer science: bioinformatics option, which is designed for students who wish to apply computer science expertise in the life sciences; and the B.S. in information technology, which focuses on the application of existing computing technologies to the information needs of organizations and individual computer users.

### **Bachelor of Science in Computer Science**

Computer scientists are concerned with problem-solving in general, with particular emphasis on the design of computer-efficient solutions. This involves a detailed understanding of the nature of algorithms, the software implementation necessary to utilize algorithms on computers, and how algorithms can be combined in a structured manner to form highly complex systems.

#### **The broad objectives for B.S. in Computer Science graduates are:**

1. To be competent in formulating and solving computer science problems, including the development of complex software systems;
2. To understand computer science fundamentals along with supporting mathematics and science so they will be prepared for a wide range of jobs and the pursuit of advanced degrees;
3. To be able to function in the workplace with the necessary technical skills and with appropriate oral and written communication skills; and
4. To have a broad education that promotes professional advancement, lifelong personal development, and social responsibility.

The B.S. in computer science program is accredited by the Computing Accreditation Commission of ABET, 111 Market Place, suite 1050, Baltimore, MD 21202-4012, (410) 347-

7700.

The program is designed to prepare students for employment and/or graduate study. Most courses require heavy computer use, and the laboratories stress hands-on experience with building software systems.

Computer science majors must maintain an overall grade-point average of 2.0 or better in all required computer science, mathematics, and computer engineering courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as a CS major. In order to be able to take a CS or MATH course with prerequisites, the prerequisite course(s) must be passed with a grade of a C- or better.

Computer science majors should not take CS 401, CS 405, or CS 410.

If a student wishing to transfer into the computer science major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in computer science. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

The curriculum includes coursework in mathematics, computer engineering, science, English, and philosophy. The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
CS	415	Introduction to Computer Science I	4	
MATH	425	Calculus I	4	
	444	Inquiry	4	
		Discovery	4	
CS	416	Introduction to Computer Science II		4
MATH	426	Calculus II		4
ENGL	401	First-Year Writing		4

		Discovery Science*		4
		Total	17	16

\*Students are required to take four science courses. You must have at least one course in a biological science and at least one course in a physical science. Two courses must be a sequence and should be chosen from the following list: BIOL 411-412, CHEM 403-404, ESCI 401-402, ESCI 409-402, or PHYS 407-408. The other two courses must be chosen from the following two tables:

### Biological Science

Abbreviation	Course Number	Title
BIOL	411	Principles of Biology I
BIOL	412	Principles of Biology II
BIOL	413	Principles of Biology I (UNH Manchester Course)
BIOL	414	Principles of Biology II (UNH Manchester Course)
BMS	412	Biology of Animals
ECE	444	Bionics
MICR	501	Public Health Microbiology
PBIO	412	Introduction to Botany

### Physical Science

Abbreviation	Course Number	Title
CHEM	403	General Chemistry I
CHEM	404	General Chemistry II
CHEM	405	General Chemistry
ESCI	401	Principles of Geology
ESCI	402	Earth History
ESCI	409	Environmental Geology
ESCI	501	Introduction to Oceanography
NR	433	Wildlife Ecology
NR	504	Freshwater Resources
PHYS	407	General Physics I



PHYS	408	General Physics II
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**Sophomore Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	515	Data Structures	4	
MATH	531	Mathematical Proof	4	
		Discovery Science	4	
		Discovery	4	
CS	520	Assembly Language Programming and Machine Organization		4
CS	659	Introduction to the Theory of Computation		4
		Discovery Science		4
		Discovery		4
		Total	16	16

**Junior Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	620	Operating System Fundamentals	4	
CS	516	Introduction to Software Design and Development	4	
		Statistics Course*	4	
PHIL	424	Science, Technology and Society (Discovery ETS)	4	
CS	671	Programming Language Concepts and Features		4
		Computer Science Theory Course**		4
ECE	543	Introduction to Digital Systems		4
CS	595	Computer Science Seminar		2
ENGL	502	Technical Writing		4
		Total	16	18

\*The statistics requirement can be fulfilled by MATH 539, Introduction to Statistical Analysis, or MATH 644, Statistics for Engineers and Scientists.

\*\*The CS theory requirement can be fulfilled by CS 712, Compiler Design, CS 745 Formal

## Specification and Verification of Software Systems, or CS 758, Algorithms.

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	791	Senior Project I*	2	
CS		Writing Intensive Course	4	
ECE	562	Computer Organization	4	
		Discovery	4	
CS	792	Senior Project II*		2
CS	700-Level	Elective		4
CS	700-Level	Elective		4
		Discovery Science		4
		Free Elective		1
		Total	14	15

\*This is the senior capstone course.

**Bachelor of Science in Computer Science: Bioinformatics Option**

The bioinformatics field is an increasingly important sub-discipline in computer science. The demand for computer science graduates who can apply their knowledge in the life sciences is significant, and is expected to continue to grow. Students who choose this path are still computer science majors but have a concentration in the life sciences. The option has the same core as the B.S. program but requires appropriate coursework in chemistry, biology, biochemistry, and statistics.

Computer science: bioinformatics majors must maintain an overall grade-point average of 2.0 or better in all required computer science, mathematics, computer engineering, biology, and biochemistry courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as a computer science: bioinformatics major. In order to be able to take a CS or MATH course with prerequisites, the prerequisite course(s) must be passed with a grade of a C- or better.

Computer bioinformatics majors should not take CS 401, CS 405, or CS 410.

If a student wishing to transfer into the computer science: bioinformatics major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in computer science. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

**The broad objectives for B.S. in Computer Science: Bioinformatics graduates are:**

1. To be competent in formulating and solving computer science problems, including the development of non-trivial software systems;
2. To understand computer science fundamentals along with supporting mathematics and science so they will be prepared for a wide range of jobs in the biomedical industry and the pursuit of advanced degrees in both computer science and bioinformatics;
3. To be able to function in the workplace with the necessary technical skills and with appropriate oral and written communication skills; and
4. To have a broad education that promotes professional advancement, lifelong personal development, and social responsibility.

The B.S. in computer science: bioinformatics program is accredited by the Computing Accreditation Commission of ABET, 111 Market Place, suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

**First Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
CS	415	Introduction to Computer Science I	4	
MATH	425	Calculus I	4	
BIOL	411	Principles of Biology I	4	
	444	Discovery	4	

CS	416	Introduction to Computer Science II		4
MATH	426	Calculus II		4
BIOL	412	Principles of Biology II		4
ENGL	401	First-Year Writing		4
		Total	17	16

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CS	515	Data Structures	4	
MATH	531	Mathematical Proof	4	
CHEM	403	General Chemistry I	4	
		Discovery	4	
CS	520	Assembly Language Programming and Machine Organization		4
CS	659	Introduction to the Theory of Computation		4
CHEM	404	General Chemistry II		4
		Discovery		4
		Total	16	16

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
CS	620	Operating Systems Fundamentals	4	
		Statistics Course*	4	
CS	516	Introduction to Software Design and Development	4	
PHIL	424	Science, Technology and Society (Discovery ETS)	4	
CS	595	Computer Science Seminar	2	
CS	671	Programming Language Concepts and Features		4
		Computer Science Theory Course**		4
BIOL	604	Principles of Genetics		4
ENGL	502	Technical Writing		4
		Total	18	16

\*The Statistics requirement can be fulfilled by MATH 539, Introduction to Statistical Analysis, or MATH 644, Statistics for Engineers and Scientists.

\*\*The CS theory requirement can be fulfilled by CS 712, Compiler Design, CS 745 Formal Specification and Verification of Software Systems, or CS 758, Algorithms.

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CS	791	Senior Project I*	2	
BCHEM	711	Genomics and Bioinformatics	4	
	700-Level	Statistics Course**	4	
		Discovery	4	
CS	792	Senior Project II		2
CS		Writing Intensive Course***		4
CS	775	Database Systems		4
ECE	543	Introduction to Digital Systems		4
		Discovery		4
		Total	14	18

\*This is the senior capstone course.

\*\*This requirement can be fulfilled by the following courses: MATH 739, Applied Regression Analysis; MATH 742, Multivariate Statistical Methods; or MATH 755, Probability and Stochastic Processes with Applications.

\*\*\*This course must include a project that addresses bioinformatics issues.

### The Minor in Computer Science

The minor in computer science is designed for students in other majors who want to learn the fundamentals of designing and implementing computer software.

Credit toward the minor will be given only for courses passed with C- or better, and a 2.0 grade-point average must be maintained in courses for the minor. Courses taken on the pass/fail basis may not be used for the minor. Students should declare their intent to earn a minor as early as possible and no later than the end of the junior year. During the final term, an

application should be made to the dean of the student's major college to have the minor shown on the academic record. Students must consult with their major adviser and also the minor supervisor.

**Requirements:**

Abbreviation	Course Number	Title
CS	415	Introduction to Computer Science I
CS	416	Introduction to Computer Science II
CS	515	Data Structures

**Two additional courses chosen from:**

Abbreviation	Course Number	Title
CS	516	Introduction to Software Design and Development
CS	520	Assembly Language Programming and Machine Organization
CS	620	Operating System Fundamentals
*CS	659	Introduction to the Theory of Computation
CS	671	Programming Language Concepts and Features
		An approved CS 700-level course

\*CS 659 has mathematics prerequisites: MATH 425, MATH 426, and MATH 531.

### **The Bachelor of Science in Information Technology**

Information technology is concerned primarily with the application of existing computing technologies to the information needs of organizations and individual computer users. Potential careers include network administrator, database developer, system administrator, and webmaster.

IT programs aim to provide graduates with the skills and knowledge to take on appropriate professional positions in information technology upon graduation and grow into leadership positions in the field. Specifically, within five years of graduation a student must be able to:

1. apply the full range of core IT concepts and techniques to fill the IT needs of an organization and be prepared to assume managerial and other advanced responsibilities,
2. confront new problems effectively and anticipate the changing directions of technology,

3. communicate effectively with diverse stakeholders as well as function appropriately in a team environment,
4. navigate within the complex relationships between IT and larger organizational goals, and
5. understand the pervasive and changing role of computing technology in global society, and participate responsibly as both IT professional and citizen.

The B.S. in information technology degree program was approved by the College of Engineering and Physical Sciences in May 2008 and the USNH Board of Trustees in fall 2008. The university welcomed its first IT class in fall 2009. Note: the B.S. in information technology degree program has not yet been accredited by the Accreditation Board for Engineering and Technology because ABET requires new programs to graduate students before they are eligible. The CS department will apply for accreditation when it graduates its first class in May 2012.

Information technology majors must maintain an overall grade-point average of 2.0 or better in all required information technology and computer science required courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as an IT major. All required IT courses offered by the CS department at the 400-600 level must be passed with a C- or better.

If a student wishing to transfer into the information technology major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in Information Technology. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

The IT major requires students to take the equivalent of 10 courses within the CS department that constitute the core coverage of the breadth of IT topics. In addition, students must choose a depth track, consisting of three courses that focus on a more specialized area within the IT field. The CS department currently offers a Web track and an Admin track. Students who choose the Web Track must take IT 604, Intermediate Web Development; IT 775, Database Technology; and IT 704, Advanced Web Topics. Students who opt for the Admin Track must take IT 609, Network/System Administration; IT 725, Network Technology; and IT 775, Database Technology.

The IT curriculum includes a number of courses outside of the CS department. Two courses in mathematics are required: Calculus I (MATH 425) and a statistics course (MATH 439). A two-semester lab science sequence is also required, as are a philosophy course (PHIL 424) and a technical writing course (ENGL 502).

In addition, by the end of their sophomore year, each student must choose a second discipline in a particular domain outside of IT to which the student's IT skills can be applied. Second disciplines (typically five courses) have been defined by the CS department in such areas as business administration, health management and policy, and justice studies. If a student is interested in an area that is not currently defined, the option of a student-designed second discipline is also available.

The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
MATH	425	Calculus I (Discovery)	4	
CS	403	Weaving the Web (Discovery ETS)	4	
CS	415	Introduction to Computer Science I	4	
		Discovery	4	
IT	506	Intermediate Applications Programming with Visual Basic (or CS 416 Introduction to Computer Science II)		4
IT	502	Intermediate Web Design*		4
ENGL	401	First-Year Writing (Discovery)		4
		Discovery		4
		Total	17	16

\*Meets Discovery Inquiry requirement.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
MATH	439	Statistical Discovery for Everyone	4	
IT	505	Database Programming	4	
		Discovery	4	
		Lab Science I & II (Discovery)*	4	4
IT	520	Computer Architecture		4
ENGL	502	Technical Writing		4



		Discovery		4
		Total	16	16

\* Students are required to take a 2 course lab sequence chosen from the following list: BIOL 411-412, CHEM 403-404, ESCI 401-402, ESCI 409-402, PHYS 401-402, or PHYS 407-408.

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
		Depth Track I	4	
PHIL	424	Science, Technology and Society	4	
		Second Discipline I	4	
		Discovery	4	
CS	600	Internship		1
CS	595	Computer Science Seminar		2
IT	666	Computer Security		4
		Second Discipline II		4
		Discovery		4
		Total	16	15

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
		Depth Track II	4	
		Second Discipline III	4	
		Second Discipline IV	4	
IT	705	Project Management	4	
IT	710	Senior Project*		4
		Second Discipline V		4
		Depth Track III		4
		Free Elective		4
		Total	16	16

\*Meets Discovery Capstone Experience requirement.

### Minor in Information Technology

The information technology (IT) minor is a way for students in non-technical majors to bridge the gap between a primarily non-technical education and a technical world. Graduates from a variety of fields are discovering that there is a great need to have computer competency in addition to the knowledge they gain in their major; the IT minor, which is tailored to grow students' understanding of computer and information technology applications, helps prepare students for the future.

Students who minor in IT must complete a minimum of 20 credits of IT courses. All students must take IT 520, Computer Architecture, as well as an introductory programming course. The other three courses may be chosen from the list below.

Credit toward the minor will be given only for courses passed with C- or better, and a 2.0 grade-point average must be maintained in courses for the minor. Courses taken on the pass/fail basis may not be used for the minor. Students should declare their intent to earn a minor as early as possible and no later than the end of the junior year. During the final term, an application should be made to the dean of the student's major college to have the minor shown on the academic record. Students must consult with their major adviser and also the minor supervisor.

#### Requirements:

Abbreviation	Course Number	Title
		1.
IT	520	Computer Architecture
		2. A programming course chosen from the following list:
CS	405	Introduction to Applications Programming with Visual Basic
CS	410	Introduction to Scientific Programming
CS	503	Introduction to Web Programming
		3. Three courses from the following list
CS	403	Weaving the Web: Creating Content for the World Wide Web
IT	502	Intermediate Web Design
IT	505	Database Programming
IT	506	Intermediate Applications Programming with Visual Basic

IT	604	Intermediate Web Development
IT	609	Network/System Administration
IT	666	Computer Security

## Earth Sciences (ESCI) ▼

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*Chairperson:* William C. Clyde

*Professor:* Larry A. Mayer, Samuel B Mukasa

*Research Professor:* Stephen E. Frolking

*Affiliate Professor:* Andrew Armstrong, Jim Gardner, Christopher E. Parrish, Peter J. Thompson

*Associate Professor:* Julia G. Bryce, William C. Clyde, J. Matthew Davis, Jo Laird, Joseph M. Licciardi, James M. Pringle

*Research Associate Professor:* Jack E. Dibb, Thomas C. Lippmann, Ruth K. Varner, Cameron P. Wake, Larry G. Ward

*Affiliate Associate Professor:* Mark A. Fahnestock, Douglas C. Vandemark

*Assistant Professor:* Margaret S. Boettcher, Rosemarie E. Came, Joel E. Johnson, Linda Kalnejais, Anne Lightbody

*Affiliate Assistant Professor:* Joseph Salisbury, Mary D. Stampone

The courses offered in the Department of Earth Sciences cover the broad spectrum of geosciences, with emphases on geology, hydrology, geochemistry, and oceanography. The curriculum encompasses a group of related studies concerned with an understanding of the Earth and its environment. Study of the processes that shape the continents and oceans, drive the hydrologic cycle and ocean circulation, and affect climate change and the evolution of life is based on a foundation of basic mathematics, physics, and chemistry.

The need for people trained in the Earth and environmental sciences has been increasing in response to society's growing concern with sound environmental and resource management. Issues of particular concern include the impact of global climate change; the management of water resources; the development of energy and mineral resources; the disposal of waste on land and in the atmosphere and oceans; and the assessment of environmental hazards. In addition, the demand for well-trained secondary school teachers of Earth sciences has been steadily increasing.

The Department of Earth Sciences offers five majors: B.S. geology, B.S. environmental

sciences (interdisciplinary with the College of Life Sciences and Agriculture), B.A. Earth sciences, B.A. Earth sciences/oceanography, and B.A. Earth science teaching. These programs prepare students for advanced study in the geosciences; for entry-level professional employment in public or private institutions concerned with environmental and resource management, including consulting firms, government agencies, energy- and resource-extraction firms, utilities, and nonprofit organizations; and for secondary-school teaching of Earth sciences.

The Department of Earth Sciences also offers a minor in geology, as well as an interdisciplinary minor in oceanography.

Descriptions and requirements for the majors and minors are arranged alphabetically.

### ***Bachelor of Arts in Earth Sciences***

The bachelor of arts in Earth sciences is offered through the Department of Earth Sciences. This program provides students an opportunity to obtain a broad education and a general background in the Earth sciences with a greater degree of freedom in choosing electives than in the bachelor of science programs. By careful choice of electives, students can prepare for graduate school, business, or industry.

#### **Requirements**

1. Satisfy the **Discovery Program requirements**. ESCI 401, 402, 405, 409, 420, 501 cannot be taken to fulfill Discovery Program requirements.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete a minimum of eight courses in the department (with a C- or better), including ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 512, Principles of Mineralogy; and five upper-level courses, two of which must be 700 or above.
4. Math requirements: 425, Calculus I, and 426, Calculus II.

It is strongly advised that students complete, as early as possible, a year each of college chemistry and physics.

### ***Bachelor of Arts in Earth Sciences, Oceanography Option***

The bachelor of arts in Earth sciences, oceanography option, is offered by the Department of Earth Sciences. This program provides students an opportunity to obtain a broad education and a general background in the Earth sciences, as well as the flexibility to choose electives in the area of oceanography. A clear, comprehensive understanding of the ocean environment

will prepare students for graduate school or for employment opportunities available on our coasts in ocean-related fields such as aquaculture, fishing, tourism, environmental protection, shipping, construction, government regulation, and education.

**Requirements**

1. Satisfy the **Discovery Program requirements**. ESCI 401, 402, 405, 409, 420, 501 cannot be taken to fulfill Discovery Program requirements.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete a minimum of eight courses in the department (with a C- or better) including ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History or ZOOL 503, Introduction to Marine Biology; ESCI 501, Introduction to Oceanography; ESCI 512, Principles of Mineralogy; and four upper-level ocean related courses, two of which must be 700 or above. Typically these would be chosen from ESCI 658, Earth, Ocean, and Atmosphere Dynamics; ESCI 750, Biological Oceanography; ESCI 752, Chemical Oceanography; ESCI 758, Physical Oceanography; and ESCI 759, Geological Oceanography.
4. Math requirements: 425, Calculus I, and 426, Calculus II.

It is strongly advised that students complete, as early as possible, a year each of college chemistry and physics.

***Oceanography Minor***

See the **Special University Programs**, Interdisciplinary Programs, and **Marine Sciences** sections of the catalog.

***Bachelor of Arts in Earth Science Teaching***

The bachelor of arts in Earth science teaching program is offered by the Department of Earth Sciences in coordination with the Department of Education. The program is specifically designed to prepare students to teach Earth sciences in secondary school. Upon graduation from this program, students are prepared to complete a masters degree in Education with an additional year of graduate study, which includes a year-long internship (EDUC 900/901). After completing this typically five-year program, students receive full teacher certification, which is recognized in most states.

**Requirements**

1. Satisfy the **Discovery Program requirements**.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete the following: ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 501, Introduction to Oceanography; GEOG 473,

The Weather; CHEM 403-404, General Chemistry; PHYS 401-402, Introduction to Physics I and II; PHYS 406, Introduction to Modern Astronomy; plus 12 approved elective credits from intermediate and/or advanced Earth sciences courses.

4. Math requirements: 425, Calculus I, and 426, Calculus II.

5. Satisfy the [secondary-school teacher education program](#).

### ***General Science Certification***

Students majoring in animal sciences, biochemistry, biology, Earth sciences, environmental conservation studies, environmental sciences, forestry, microbiology, plant biology, wildlife management, or zoology may seek certification to teach science at the middle, junior, or high school level.

For further information, contact the coordinator of teacher education in the [Department of Education](#).

### ***Bachelor of Science in Geology***

The bachelor of science in geology is offered through the Department of Earth Sciences. The program represents a strong concentration in the Earth sciences and is especially well suited for students who plan to continue their studies in graduate school. Beyond a central core of courses, there is sufficient flexibility in course selection so that students may, in consultation with their academic advisers, orient the program toward a particular facet of the Earth sciences (e.g., mineralogy-petrology, oceanography, hydrogeology, geophysics-structural geology, geomorphology-glacial geology, geochemistry, paleontology-stratigraphy). Students are encouraged to attend an off-campus field camp, for which scholarship funds may be available.

#### **Requirements**

1. Satisfy the [Discovery Program requirements](#) and the [bachelor of science degree requirements](#).

2. Satisfactorily complete MATH 425 and 426, CHEM 403-404 (or CHEM 405), PHYS 407-408, and PHYS 505 or ESCI 658. Some of these courses may also satisfy Discovery Program requirements.

3. Complete a minimum of 12 courses in Earth sciences, which should include ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 501, Introduction to Oceanography; ESCI 512, Principles of Mineralogy; ESCI 614, Optical Mineralogy and Petrography; ESCI 530, Geological Field Methods; ESCI 561, Landscape Evolution; ESCI 631, Structural Geology; ESCI 652, Paleontology; and three approved Earth sciences 700-level electives.

4. Complete four approved science/math electives. The following should be considered: one additional 700-level course in the Earth sciences; additional courses in mathematics, chemistry,

and physics; courses in computer science, engineering, and the biological sciences; and an off-campus field camp.

### ***Capstone Experience***

A capstone experience is required of all our undergraduate Earth sciences majors during their senior year. All capstone experiences at UNH must meet one or more of the following criteria:

1. The capstone synthesizes and applies disciplinary knowledge and skills.
2. The capstone fosters reflection on undergraduate learning and experience.
3. The capstone demonstrates emerging professional competencies.
4. The capstone applies, analyzes, and/or interprets research or data or artistic expression.
5. The capstone explores areas of interest based on the integration of prior learning.

Examples of Department of Earth Sciences capstone experiences include Senior Thesis (ESCI 799), UROP/SURF projects, environmental or geologic field camps, or Earth Sciences education and outreach activities. Additional experiences may qualify (e.g. ESCI 795/796 field courses, INCO 590, INCO 790, internships) if they are designed according to the above criteria.

Students should work closely with their advisers to define the most appropriate capstone experience for their Earth sciences degree option and all capstone experiences must be approved by the Department of Earth Sciences undergraduate coordinator. Presentation of projects or experiences developed for the capstone is encouraged at the annual UNH Undergraduate Research Conference or other appropriate venue.

### ***Geology Minor***

Any University student who is interested in Earth sciences may minor in geology. The minor consists of at least 18 semester hours, typically from five ESCI courses, each with a grade of C- or better, while maintaining a cumulative grade-point average of 2.0. A maximum of eight credits may be used for both major and minor credit. Courses include both introductory and more advanced courses. Specific course requirements are flexible to accommodate the student's interest in different facets of the geosciences. Interested students should see the Earth sciences undergraduate coordinator to complete an Intent to Minor form no later than their junior year.

### **Environmental Sciences**

[www.unh.edu/envsci/](http://www.unh.edu/envsci/)

The College of Engineering and Physical Sciences (CEPS) and the College of Life Science and Agriculture (COLSA) jointly offer a Bachelor of Science Degree in Environmental Sciences. Environmental sciences is an interdisciplinary field concerned with the interaction of biological, chemical, and physical processes that shape our natural environment. Students graduating with a degree in Environmental Sciences will have an understanding of these interacting processes, the ability to effectively communicate with both scientific and lay audiences,

competency in field methods appropriate for entry-level environmental science positions, competency in the use and application of Geographic Information Systems (GIS), a basic understanding of environmental policy, and the ability to contribute to multidisciplinary teams.

The University of New Hampshire is a recognized leader in environmental sciences research, and the environmental sciences program capitalizes on faculty expertise in this area. The program has 12 full-time faculty members, with major teaching and research emphases in the areas of biogeochemical cycling, environmental chemistry, ecosystem science, global change, hydrology, plant ecology, soil science, and water resource management.

Employment opportunities include: environmental consulting firms, educational facilities (e.g., science centers), environmental monitoring laboratories (e.g., water treatment plants; the Environmental Protection Agency), government agencies (e.g., the U.S. Geological Survey, Bureau of Land Management, Natural Resource Conservation Service), university and government research laboratories, and nongovernment environmental organizations. The environmental sciences program also constitutes an excellent preparation for graduate programs in several areas relating to the environment. Students should consult with their adviser early if their goals include further study.

#### **Requirements**

In addition to **Discovery Program and University Writing requirements**, all students will take Introduction to Environmental Science (NR 403) and Professional Perspectives in Natural Resources (NR 400), plus one other elective introductory environmental science course.

Foundation courses include two semesters of chemistry (CHEM 403, 404) and calculus (MATH 425, 426), one semester of geology (ESCI 401, 402, or 409), one semester of statistics (MATH 644 or BIOL 528), one semester of physics (PHYS 407) and one approved biology course.

Core courses include Techniques in Environmental Sciences (ESCI 534), Introduction to GIS (NR 658), Fate and Transport in the Environment (ESCI 654), Natural Resource and Environmental Policy (NR 602), and a capstone experience (NR 791) and an independent study or capstone course approved by the program coordinator.

Students must complete an additional eight courses in one of the following options:

#### **Hydrology**

PHYS 408, General Physics II

ESCI 561, Landscape Evolution

NR 501, Studio Soils, or ESCI 512, Principles of Mineralogy

ESCI 705, Principles of Hydrology

ESCI 710, Groundwater Hydrology



Two approved electives

### **Soil and Watershed Management**

PHYS 408, General Physics II, or NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 501, Studio Soils

NR 703, Watershed Water Quality Management

NR 706, Soil Ecology, or NR 744, Biogeochemistry

Three approved electives

### **Ecosystems**

NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 730, Terrestrial Ecosystems

NR 765, Community Ecology

NR 751, Aquatic Ecosystems

Four approved electives

For a list of approved elective courses and for further information about the major, contact the program coordinator, Ruth K. Varner, 450 Morse Hall, (603) 862-0853; [ruth.varner@unh.edu](mailto:ruth.varner@unh.edu)

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## **Electrical and Computer Engineering (ECE) ▼**

» <http://www.ece.unh.edu/>

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*Professor:* Kent A. Chamberlin, L. Gordon Kraft, John R. LaCourse, W. Thomas Miller III, Andrzej Rucinski

*Affiliate Professor:* Charles H. Bianchi, William H. Lenharth, George Markowsky, Wolfgang Rehak

*Associate Professor:* Michael J. Carter, Allen D. Drake, Andrew L. Kun, Richard A. Messner

*Research Associate Professor:* Brian R. Calder

*Affiliate Associate Professor:* Raymond Barrett, Brad Gillespie, Barbara Kraft, Jipeng Li, Timothy Paek

*Assistant Professor:* Nicholas J. Kirsch, Qiaoyan Yu

*Instructor:* Francis C. Hludik Jr.

*Lecturer:* Christopher Bancroft, Wayne J. Smith

The Department of Electrical and Computer Engineering offers a B.S. in electrical engineering

and a B.S. in computer engineering. Both degree programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone (401) 347-7700.

Electrical engineers design, develop, and produce the electrical and electronic systems upon which modern society has come to depend: basic infrastructure, such as the electric power grid and fiber optic communication lines; public conveniences, such as mag lev transporters and LED signs; consumer products, such as iPods and MP3 players; personal communication devices, such as cell phones and BlackBerry© devices; military systems, such as rail guns and laser weapons; instruments that can image the ocean floor or analyze the Earth's atmosphere from satellites; and medical diagnostic machines like CAT and MRI scanners. Almost every facet of modern life is touched by the work of electrical engineers.

At UNH, the cornerstone of the electrical engineering program is the involvement of students in the solution of real-world problems. Students electing this major gain knowledge of advanced electronic circuit and system design through the use of computer-aided design tools, hardware circuit prototyping, and hands-on laboratory testing.

Computers have become embedded in virtually every engineering system. Computer engineering, traditionally a subset of electrical engineering, is a rapidly growing field that emphasizes the design, interfacing, hardware/software tradeoffs, and real-time applications of computers. Students who elect this major will gain a knowledge of both hardware and software concepts, and will learn to design, build, and test systems containing digital computers.

#### ECE Department Mission

The mission of the department is to foster and advance knowledge in electrical and computer engineering.

The mission involves:

- teaching courses in electrical and computer engineering and related fields at the bachelor's, master's, and doctoral levels;
- advancing knowledge through research and scholarship;
- serving the state and nation by making the department's intellectual resources available to industry and government agencies. The undergraduate EE and CE programs shall provide a firm foundation in electrical and computer engineering theory and practice, with a mix of laboratory and design experiences. The programs also shall foster teamwork and project management skills.

The graduate ECE program shall lead to the degrees of master of science in electrical

engineering and the doctor of philosophy in electrical and computer engineering. Research and scholarship are core components of the department's mission and they directly impact undergraduate and graduate education. Success in obtaining funds to procure equipment and support research efforts is therefore an essential objective for the department.

The department recognizes the need to conduct periodic reviews and adjustments to meet the current and projected needs of the state and nation according to its mission objectives. The current mission was approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in October 2001, and ratified by the ECE Industrial Advisory Board in April 2002. The mission was reaffirmed by the ECE Industrial Advisory Board in November 22, 2004 and on October 26, 2009.

*Electrical Engineering and Computer Engineering Program Educational Objectives*

The Department of Electrical and Computer Engineering has adopted a set of program educational objectives that consists of statements describing the expected accomplishments of graduates during the first several years following graduation from either program:

- graduates will function at a technically outstanding level in formulating and solving problems in their respective program area;
- graduates will produce competent written and oral reports, and provide project management and leadership;
- through a thorough grounding in engineering fundamentals, graduates will be prepared for a successful engineering career amid future technological changes;
- through a well-rounded education, graduates will be able to respond to changing career paths, to maintain an interest in lifelong learning, and to advance professionally;
- graduates will be creative and ethical when dealing with contemporary issues facing society in local, global, historical, social, economic, and political contexts in relation to electrical and computer engineering;
- graduates will be able to design, prototype, and test electrical and computer engineering designs using state-of-the-art test equipment in a laboratory environment.

The electrical and computer engineering educational program objectives were approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in November 2001, and ratified by the ECE Industrial Advisory Board in March 2002. The program educational objectives were reaffirmed by the ECE Industrial Advisory Board on November 22, 2004 and on October 26, 2009.

*Electrical Engineering and Computer Engineering Program Educational Outcomes*

The Department of Electrical and Computer Engineering has adopted a set of program educational outcomes that consists of statements describing what students are expected to know and are able to do by the time of graduation, the achievement of which indicates that the student is equipped to achieve the program objectives. The current electrical engineering

program educational outcomes and computer engineering program educational outcomes are:

- 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;
- an ability to function on multidisciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an ability to communicate effectively;
- an understanding of professional and ethical responsibility;
- the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- a recognition of the need for, and ability to engage in, lifelong learning;
- a knowledge of contemporary issues;
- an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

Electrical and computer program educational outcomes were approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in October 2001, and ratified by the ECE Industrial Advisory Board in March 2002. The program educational outcomes were reaffirmed by the ECE Industrial Advisory Board on November 22, 2004 and on October 26, 2009.

Students contemplating a decision between the electrical engineering and computer engineering degree programs should consider both the similarities and differences of the two programs. The two curricula require the same foundational courses in mathematics, physics, analog and digital electronic circuits, and a capstone senior design project. The computer engineering degree program requires additional fluency in software development and advanced computer system and hardware design. The electrical engineering degree program requires advanced study in analog and mixed-signal electronic circuit and system analysis and design. Discovery Program requirements are identical for both degree programs.

### **Electrical Engineering Program**

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements.

1. Any electrical engineering major whose cumulative grade-point average in ECE courses is less than 2.0 during any three semesters will not be allowed to continue as an electrical engineering major.

2. Electrical engineering majors must achieve a 2.0 grade-point average in ECE courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their advisers' assistance, should plan their programs based on the distribution of courses in the following chart.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	401	Perspectives in Electrical & Computer Engineering	4	-
MATH	425	Calculus I	4	-
CS	410	Introduction to Scientific Programming*	4	-
CHEM	405	General Chemistry	4	-
PHYS	407	Physics I	-	4
ENGL	401	First-Year Writing	-	4
MATH	426	Calculus II	-	4
		Discovery Program Category*	-	4
Total			16	16

\*Students who wish to preserve the option of transferring to the computer engineering major without incurring a delay in graduation should consult with their academic adviser before electing these courses. It is recommended that such students take CS 415, Introduction to Computer Science I, in the fall semester and CS 416, Introduction to Computer Science II, in the spring semester in place of the listed courses.

Students are restricted from taking CS 401 and CS 403.

Students are required to take either ECON 402 or EREC 411 to fulfill the Social Science Category of the Discovery Program.

Fulfilling the EE Program curriculum automatically meets Discovery Category, "Environment, Technology and Society."

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	541	Electrical Circuits	4	-
ECE	543	Introduction to Digital Systems	4	-
PHYS	408	Physics II	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
ECE	548	Electronic Design I	-	4
ECE	562	Computer Organization	-	4
ME	523	Introduction to Statics and Dynamics	-	3
		Discovery Program Category	-	4
Total			16	15

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	602	Engineering Analysis	4	-
ECE	617	Junior Lab I	4	-
ECE	633	Signals and Systems I	3	-
ECE	651	Electronic Design II	4	-
		Discovery Program Category	4	-
ECE	603	Electromagnetic Fields & Waves	-	4
ECE	618	Junior Laboratory II	-	4
ECE	634	Signals and Systems II	-	3
ECE	647	Random Processes and Signals in Engineering	-	3
ECE	694	Engineering Professional Principles		1
Total			19	15

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
		Professional Elective**	4	-
		Professional Elective**	4	-
		Discovery Program Category	4	-
		Discovery Program Category	4	-
ECE	791	Senior Project I*	2	-

		Professional Elective**	-	4
		Professional Elective**	-	4
		Discovery Program Category	-	4
ECE	792	Senior Project II*	-	2
Total			18	14

\*ECE 791 and 792 fulfills Discovery Program Capstone Experience.

\*\*Professional electives normally consist of 700-level ECE courses. Each course must carry at least three credits, and no more than one can be an independent study, special topics, or a project course. An alternative is a student-designed plan approved by the ECE undergraduate committee.

### Computer Engineering Program

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements:

1. Any computer engineering major whose cumulative grade-point average in ECE and CS courses is less than 2.0 during any three semesters will not be allowed to continue as a computer engineering major.
2. Computer engineering majors must achieve a 2.0 grade-point average in ECE and CS courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their advisers' assistance, should plan their programs based on the distribution of courses in the chart below.

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
		Perspectives in Electrical & Computer		

ECE	401	Engineering	4	-
MATH	425	Calculus I	4	-
CS	415	Intro to Computer Science I	4	-
		Discovery Program Category	4	-
ECE	543	Intro to Digital Systems	-	4
MATH	426	Calculus II	-	4
CS	416	Intro to Computer Science II	-	4
ENGL	401	First-Year Writing	-	4
Total			16	16

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	562	Computer Organization	4	-
PHYS	407	Physics I	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
CS	515	Data Structures	4	-
ECE	583	Design with Programmable Logic	-	4
PHYS	408	Physics II	-	4
CS	520	Assembly Language Programming	-	4
		Discovery Program Category	-	4
Total			16	16

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	541	Electrical Circuits	4	-
ECE	602	Engineering Analysis	4	-
ECE	633	Signals and Systems I	3	-
		Discovery Program Category	4	-
ECE	548	Electronic Design I	-	4
ECE	603	Electromagnetic Fields and Waves	-	4
ECE	647	Random Processes & Signals in Engineering	-	3
ECE	649	Embedded Microcomputer Based Design	-	4



ECE	694	Engineering Professional Principles		1
Total			15	16

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
ECE	714	Intro to Digital Signal Processing	4	-
		Professional Elective**	4	-
		Professional Elective**	4	-
		Discovery Program Category	4	-
ECE	791	Senior Project I*	2	-
ECE	734	Network Data Communications		4
		Professional Elective**	-	4
		Discovery Program Category	-	4
		Discovery Program Category	-	4
ECE	792	Senior Project II*	-	2
Total			18	18

\*ECE 791 and 792 fulfills Discovery Program Capstone Experience.

\*\* Three professional electives must be selected from the following categories of courses:

At least one from: ECE 711, ECE 715, ECE 717

No more than one from: ADMIN 640, DS 773, DS 774

Any of these: ECE 634, ECE 651, ECE 7XX, CS 620, CS 645, CS 659, CS 671, CS 7XX

Professional electives beyond those mentioned above must carry at least three credits and no more than one can be an independent study, special topic, or a project course. An alternative is a student-designed plan approved by the ECE undergraduate committee.

Students are required to take either ECON 402 or EREC 411 to fulfill the Social Science Category of the Discovery Program.

Students are restricted from taking CS 401 and CS 403.

Fulfilling the CE Program curriculum automatically meets Discovery Category, "Environment, Technology and Society."

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## Environmental Engineering (ENE) ▼

» <http://www.unh.edu/environmental-engineering/>

» [Click to view course offerings](#)

*Professor:* Dale P. Barkey, Russell T. Carr, M. Robin Collins, Ihab H. Farag, Nancy E. Kinner, James P. Malley Jr. , Palligarnai T. Vasudevan

*Associate Professor:* Thomas P. Ballestero, Kevin H. Gardner, Nivedita R. Gupta, Jennifer M. Jacobs

*Assistant Professor:* Jillian Goldfarb

*Research Assistant Professor:* Jeffrey S. Melton, Robert M. Roseen, Alison W. Watts

The College of Engineering and Physical Sciences offers a bachelor of science degree in environmental engineering (ENE) and an interdisciplinary minor in environmental engineering.

The bachelor of science degree in environmental engineering is accredited by the engineering accreditation commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

### ***Mission***

The environmental engineering program offers an undergraduate degree in environmental engineering that prepares students for productive careers in the public and private sectors and for graduate studies. The program emphasizes fundamental principles in environmental engineering and design, built upon a strong base of chemistry, physics, mathematics, and engineering science. The program prepares students to work in multidisciplinary teams that analyze, formulate, and communicate sustainable solutions to complex environmental problems. The importance of developing sustainable solutions that provide economic, social, and environmental benefits to society is emphasized. The program instills in its students an appreciation for the responsibilities engineers have to society and teaches them the skills necessary to continue learning and improving their professional expertise throughout their careers.

The ENE degree program provides an opportunity for students to specialize in industrial or

municipal processes. The curriculum prepares students to plan and design systems to minimize the impact of human activity on the environment and protect human health.

### ***Educational Objectives***

ENE program graduates will have the skills, experience, and knowledge to pursue successful careers as environmental engineers. They also will have demonstrated the ability to identify information needs; locate information resources and/or design laboratory or field experiments to attain required information; and evaluate and synthesize data with sound engineering principles, methodologies, and the latest technology into creative, sustainable, safe, and economical engineering solutions to environmental engineering problems. The solutions they develop will minimize the impact of human activities on the environment and protect human health. Program graduates will have a foundation for advanced studies in environmental engineering and oral and written communication skills that will enable them to clearly explain engineering options and recommend solutions to stakeholders. ENE program graduates will have demonstrated in-depth knowledge within environmental engineering and an awareness of potential social, economic, political, and environmental impacts of engineering practices. They will have an appreciation for the contribution of environmental engineers to the benefit of society and the responsibilities of a professional environmental engineer. They will work as part of multidisciplinary teams to arrive at solutions to environmental engineering problems. ENE program graduates will be prepared to obtain professional engineering licensure; have the capacity to continue learning and improving their professional expertise and skills by participating in professional associations, conferences, workshops and courses; and understand the importance of continued professional development.

At the end of the sophomore year, students are required to have a minimum overall grade-point average of 2.0 and a grade-point average of 2.0 in all mathematics, physics, chemistry, and engineering courses to be permitted to enroll in junior-level courses. To qualify for graduation, an ENE major must: have satisfied the previously specified course requirements, have satisfied the University's Academic Requirements, have a minimum cumulative grade-point average of 2.0, and have a minimum grade-point average of 2.0 in engineering courses.

### **Bachelor of Science in Environmental Engineering-Industrial Processes (IP) Emphasis**

The industrial processes (IP) emphasis of environmental engineering is a process-based program that draws on the principles of chemistry, physics, mathematics, and engineering sciences. Due to the complex nature of many aspects of environmental pollution, a broad

understanding of the fundamentals of engineering and sciences forms the most desirable preparation for a career in the environmental field. The program is designed to provide training not only for end-of-pipe pollution control technologies, but also for expertise in process engineering and process design, essential for achieving the objectives of pollution curtailment and prevention. Such training is especially valuable in resolving industrial pollution problems. Career opportunities for environmental engineers with this background are found in industry, research institutes, government agencies, teaching, and consulting practice. Students may also enter graduate study at the M.S. or Ph.D. levels.

Engineering design is a critical aspect of the IP curriculum. In order to meet the objective of producing creative, problem-solving engineers, design concepts are introduced early in the curriculum and design experience is integrated into every engineering course. Students learn to seek optimal solutions to open-ended problems and function in design-based team projects. Design ability is finally demonstrated at the end of the capstone course (ENE 708), when self-directed teams develop a comprehensive design report for a full-scale engineering process based on a national process design competition problem.

Since 1993, the program faculty has administered a pollution prevention internship program with industries in New Hampshire, Maine, and Massachusetts, initially funded by U.S. EPA and NHDES. In the past 12 years, the program has served more than 40 facilities. Each year about 12 students have enrolled in the pollution prevention internship program, which provides hands-on industrial employment for 10 weeks during the summer assisting industry with projects in process modification, material substitution, chemical re-use, risk assessment, safety, and economic analysis. The program faculty also assisted NHDES in setting up instrumentation in the Seacoast region of New Hampshire to monitor the precursor of ozone formation.

The B.S. program requires a minimum of 128 credits for graduation and can be completed in four years. There are nine electives in the curriculum: six for the fulfillment of the University's Discovery Program requirements and the remaining three for technical electives to be chosen from the specified elective course list. ENE-IP students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in their ENE-IP curriculum. Due to the substantial overlap in course requirements for the environmental engineering IP and chemical engineering majors, students will be able to transfer between these two programs during the first three semesters without losing any course credits toward graduation.

### **Suggested Technical Electives**

Abbreviation	Course Number	Title	Credits
CHE	602	Heat Transfer and Unit Operations	3
CHE	614	Separation Processes	3
CHE	707	Chemical Engineering Kinetics	3
CHE	744	Corrosion	4
CIE	766	Introduction to Geo-Environmental Engineering	3
ENE	739	Industrial Wastewater Treatment	3
ENE	746	Bioenvironmental Engineering Design	4
ENE	747	Introduction to Marine Pollution	3
ESCI	409	Geology and the Environment	4
ESCI	561	Landscape Evolution	4
ESCI	705	Principles of Hydrology	4
ESCI	715	Global Atmospheric Chemistry	3

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CHEM	405	General Chemistry	4	-
MATH	425-426	Calculus I & II	4	4
PHYS	407	General Physics I	-	4
ENGL	401	First-Year Writing	4	-
ENE	400	Environmental Engineering Lectures I	1	-
ENE	401	Environmental Engineering Lectures II	-	1
Discovery Program Electives			4	8
Total			17	17

1. PHYS 407 OR CHEM 405 satisfies the Discovery Physical Science (with lab) category.
2. MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.
3. ENGL 401 satisfies the Discovery Foundation Writing Skills category.
4. ENE-IP students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in the ENE-IP curriculum.

**Sophomore Year**

Abbreviation	Course Number	Title	Fall	Spring
CHE	501-502	Introduction to Chemical Engineering I & II	3	3
CHEM	683-684	Physical Chemistry I & II	3	3
CHEM	685	Physical Chemistry Lab I	2	-
MATH	527	Differential Equations	4	-
PHYS	408	General Physics II	4	-
MATH	644	Statistics for Engineers and Scientists		4
Discovery Program Electives			-	4
Total			16	14

CHE 502 satisfies the Discovery Inquiry requirement.

**Junior Year**

Abbreviation	Course Number	Title	Fall	Spring
CHE	601	Fluid Mechanics and Unit Operations	3	-
CHE	604	Chemical Engineering Thermodynamics	3	-
ENE	612	Unit Operations Lab II	-	3
ENE	742	Solid and Hazardous Waste Engineering	3	-
ENE	756	Environmental Engineering Microbiology		4
CHEM	651-652	Organic Chemistry I & II	3	3
CHEM	653	Organic Chemistry Lab I	2	-
Discovery Program Electives			-	4
Technical Elective (1)				4
Total			14	18

- The intent is to have ENE 756 satisfy the Biological Science requirement of the Discovery Program. It will have a different course number.

**Senior Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
CHE	703	Mass Transfer and Stagewise Operations	3	-
ENE	708	Industrial Process Design	-	4
ENE	709	Fundamentals of Air Pollution and Control	4	-
ENE	713	Unit Operations Lab II	3	-
ENE	752	Process Dynamics and Control	-	4
ENE	772	Physicochemical Processes for Water/Air Quality	-	4
ESCI	710	Groundwater Hydrology	-	4
Technical Electives (2)			6-8	-
Total			16-18	16

ENE 708 satisfies the Discovery Capstone Experience/Course.

**Bachelor of Science in Environmental Engineering-Municipal Processes (MP) Emphasis**

Environmental engineers graduating from the municipal processes (MP) emphasis will plan, design, and construct public and private facilities to minimize the impact of human activity on the environment and to protect human health. For example, environmental engineers with a municipal processes perspective design and build drinking water treatment systems, municipal and industrial wastewater treatment plants, solid waste management facilities, contaminated ground water remediation systems, and hazardous waste remediation facilities. These facilities must meet regulatory requirements, be cost-effective to build and maintain, be safe to operate, and have minimal environmental impact.

In ENE 400 and 401, students are introduced to the full spectrum of environmental engineering projects that they will subsequently explore in design teams during their degree program. As part of these experiences, students visit and tour field sites, and interact with engineers who have been involved in the design and/or construction of the projects. Design is integrated

throughout the curriculum, and particularly emphasized in junior- and senior-level courses. As part of these projects, students analyze treatment alternatives, recommend a system that meets regulatory operational needs, and prepare an implementation schedule and project budget. Detailed design projects are performed in ENE 744 and 746. ENE 788 serves as a capstone design experience where students work on a multi-interdisciplinary environmental engineering projects, and apply skills learned in other courses while working with real-world clients.

The following schedule is a sample of a planned program for environmental engineering students completing the major within the municipal processes emphasis.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
ENE	400, 401	Environmental Engineering Lectures I, II	1	1
ENGL	401	First-Year Writing	4	-
MATH	425, 426	Calculus I, II	4	4
Discovery Electives*			4	4
CHEM	405	General Chemistry	4	-
PHYS	407	General Physics I	-	4
ENGL	502	Technical Writing		4
Total			17	17

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

### Second Year

	Course			



Abbreviation	Number	Title	Fall	Spring
ENE	520	Environmental Pollution and Protection	4	-
ENE	521	Environmental Engineering Seminar	-	1
CIE	525	Statics	3	-
MATH	527	Differential Equations with Linear Algebra	4	-
MATH	644	Statistics for Engineers and Scientists	-	4
CHEM	545	Organic Chemistry Lecture	3	-
CHEM	546	Organic Chemistry Laboratory	2	-
CIE	533	Project Engineering	-	3
TECH	564	Fundamentals of CAD	-	3
Discovery Elective*			-	4
Total			16	15

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

### Third Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	642	Fluid Mechanics	4	-
Technical Elective**			4	-
ENE	645	Fundamental Aspects of Environmental Engineering	-	4
ENE	756	Environmental Engineering Microbiology	-	4
ENE	742	Solid and Hazardous Waste Engineering	3	-

Engineering Lab Elective**			-	4
Hydraulics Elective**			-	3-4
Discovery Elective*			4	-
Total			15	15/16

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

\*\*Approved lists of technical, hydraulics, engineering laboratory, and ENE design and non-design electives are available from the ENE undergraduate coordinator, Nancy Kinner. Students must take a minimum of three 700-level ENE electives totaling at least 10 credits. One ENE elective course must be from the design category.

\*\*\*The intent is to have ENE 756 satisfy the Biological Science requirement of the Discovery Program

#### Fourth Year

Abbreviation	Course Number	Title	Fall	Spring
ENE	746	Bioenvironmental Engineering Design	4	-
Discovery Elective*			4	-
Environmental Engineering Elective**			3-4	6-8
ENE	744	Physicochemical Treatment Design	-	4
ENE	784	Intro to Project Planning & Design	1	-
ESCI	710	Groundwater Hydrology	-	4
ENE	788	Project Planning and Design	-	3
ENE	749	Water Chemistry	4	-

Total			16/17	17/19
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\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

\*\*Approved lists of technical, hydraulics, engineering laboratory, and ENE design and non-design electives are available from the ENE undergraduate coordinator, Nancy Kinner. Students must take a minimum of three 700-level ENE electives totaling at least 10 credits. One ENE elective course must be from the design category.

The municipal processes emphasis of the ENE program requires a minimum of 128 total credits for graduation.

### **Environmental Engineering Minor**

The environmental engineering minor is intended primarily for students in engineering and physical sciences, who are not in the chemical, civil, or environmental engineering degree programs. Students contemplating such a minor should plan on a strong background in the sciences and mathematics (including differential equations).

The minor provides a comprehensive introduction to major areas of interest in environmental protection—namely, air pollution and water pollution—through the three required courses. Further breadth in environmental engineering or depth in specific areas can be attained through the choice of appropriate elective courses.

The minor requires a minimum of five courses, as follows: 1) three required courses: ENE 645, Fundamental Aspects of Environmental Engineering; ENE 709, Fundamentals of Air Pollution and Its Control; and ENE 772, Physicochemical Processes for Water and Air Quality Control, or ENE 743, Environmental Sampling and Analysis; 2) a minimum of two elective ENE courses.

Choice of elective courses should be made in consultation with the minor area adviser, Nancy Kinner, civil engineering, or Niva Gupta, chemical engineering. Students normally start this program in the junior year and should declare their intention to enter the program as early as possible during the sophomore year. During the final semester, students must apply to the dean to have the minor appear on the transcript.

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## Information Technology (IT) ▼

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## Integrated Applied Mathematics (IAM) ▼

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## International Affairs (dual major) ▼

For program description, see [Special University Programs](#).

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## Materials Science (MS) ▼

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*Professor:* Olof E. Echt, Todd S. Gross, James E. Krzanowski, Thomas M. Laue, Igor I. Tsukrov

*Associate Professor:* Carmela C. Amato-Wierda, Brad Lee Kinsey, Glen P. Miller, Karsten Pohl

*Research Associate Professor:* Yvon G. Durant, Weihua (Marshall) Ming

*Assistant Professor:* Jian-Ming Tang

*Research Assistant Professor:* John G. Tsavalas

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## Mathematics and Statistics (MATH) ▼

» <http://www.math.unh.edu>

» [Click to view course offerings](#)

*Professor:* Liming Ge, Karen J. Graham, Eric L. Grinberg, Donald W. Hadwin, Rita A.

Hibschweiler, A. Robb Jacoby, Ernst Linder, Dmitri A. Nikshych, Samuel D. Shore, Kevin M. Short, Marianna A. Shubov

*Associate Professor:* Maria Basterra, David V. Feldman, Edward K. Hinson, Linyuan Li, Sharon M. McCrone, Junhao Shen

*Assistant Professor:* Timothy P. Fukawa-Connelly, John F. Gibson, Brian W Gleason, Mark Lyon

*Instructor:* Philip J. Ramsey

*Lecturer:* Adam Boucher, Samuel L. Cook, Mehmet Orhon, Neil Portnoy, Yitang Zhang

The Department of Mathematics and Statistics offers a variety of programs. These programs provide flexibility through elective choices and are designed to maximize educational and employment opportunities. Each student must enroll in one specific program; however, changes between programs usually can be accommodated.

The first two years of all programs are similar. In the first year, students are expected to take Calculus I (MATH 425) and Calculus II (MATH 426) as well as an introductory scientific programming course (CS 410). A sophomore typically takes follow-up calculus courses in differential equations (MATH 527) and multidimensional calculus (MATH 528), an introductory statistics course (MATH 539), and a course in mathematical proof (MATH 531). The Senior Capstone Experience is fulfilled by a designated course in each of the degree programs; specific details are given in each program's course listing below.

In addition to its degree programs, the department has an active interest in the actuarial profession and is an examination center for the Society of Actuaries. Those interested in actuarial science should seek the advice of the coordinator of the actuarial program in the department.

For more information about the department's undergraduate programs, visit [www.math.unh.edu](http://www.math.unh.edu).

### ***Standards for Graduation***

To be certified for graduation with a degree from the Department of Mathematics and Statistics, a student must complete:

1. University Academic Requirements
2. All courses used to satisfy the requirements for the major program with a grade of C- or better and have an overall grade-point average of at least 2.0 in these courses.

Note that some Discovery Program requirements will be satisfied by required courses for the major program. In particular MATH 425 satisfies the Discovery Quantitative Reasoning

requirement; PHYS 406 (required for the Math Education Elementary Option) and 407 (required for the Mathematics BS) each satisfy the Discovery Physical Sciences requirement.

### ***Bachelor of Arts, Mathematics Major***

This program may offer a broader liberal arts program than the bachelor of science degree programs. By a careful selection of electives, students can shape this major into a preparation for graduate school, business, or industry.

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527\*, Differential Equations with Linear Algebra

MATH 528\*, Multidimensional Calculus

MATH 531, Mathematical Proof, or MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 761, Abstract Algebra

MATH 762, Linear Algebra

MATH 767, One-Dimensional Real Analysis

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be MATH 797\*\*, Senior Seminar, or MATH 799, Senior Thesis\*\*

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

#### **Other required courses**

CS 410, Introduction to Scientific Programming

#### **Foreign language requirement**

Foreign language requirement as defined by the University for the B.A. degree

### ***Bachelor of Science in Mathematics***

This program offers the strongest concentration in mathematics, requiring courses that are intended to prepare the student for graduate work in mathematics. Through a judicious choice of electives, students may design stronger pre-graduate programs, a program in applied mathematics, or slant the program toward a career in business or industry.

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527\*, Differential Equations with Linear Algebra

MATH 528\*, Multidimensional Calculus

MATH 531, Mathematical Proof, or MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 761, Abstract Algebra

MATH 762, Linear Algebra

MATH 767, One-Dimensional Real Analysis

MATH 784, Topology

MATH 788, Complex Analysis

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be MATH 797\*\*, Senior Seminar, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

### **Other required courses**

CS 410, Introduction to Scientific Programming

PHYS 407-408, General Physics I and II

### ***Bachelor of Science: Interdisciplinary Programs in Mathematics and Its Applications***

The programs in interdisciplinary mathematics prepare students for employment in areas of applied mathematics and statistics. Some of them can lead to graduate work in appropriate fields (e.g., physics, computer science, or economics). The major may consist of mathematics combined with:

- Computer science,
- Economics,
- Statistics,
- Electrical science, or
- Physics

Each program requires at least 10 mathematics courses along with at least six courses in the discipline of the option. Specific requirements for each option are given in the following listing.

### ***Computer Science Option***

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527, \* Differential Equations with Linear Algebra

MATH 528, \* Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 532, Discrete Mathematics  
MATH 539, Introduction to Statistical Analysis  
MATH 645,\* Linear Algebra for Applications  
MATH 753, Introduction to Numerical Methods I

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required CS courses**

CS 415, Introduction to Computer Science I  
CS 416, Introduction to Computer Science II  
CS 515, Data Structures  
CS 516, Introduction to Software Design and Development  
CS 658, Analysis of Algorithms  
CS 758, Algorithms  
One approved CS elective chosen in consultation with the academic adviser

***Economics Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 527,\* Differential Equations with Linear Algebra  
MATH 528,\* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645,\* Linear Algebra for Applications  
MATH 739, Applied Regression Analysis  
MATH 753, Introduction to Numerical Methods I  
MATH 755, Probability and Stochastic Processes with Applications

Two approved MATH courses at the 700-level chosen in consultation with the academic adviser, of which one must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.



**Other required courses**

CS 410, Introduction to Scientific Programming

ECON 401, Principles of Economics (Macro)

ECON 402, Principles of Economics (Micro)

ECON 605, Intermediate Microeconomic Analysis

ECON 611, Intermediate Macroeconomic Analysis

ECON 726, Introduction to Econometrics

One approved ECON or DS course chosen in consultation with the academic adviser

***Electrical Science Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527,\* Differential Equations with Linear Algebra

MATH 528,\* Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 645,\* Linear Algebra for Applications

MATH 646, Introduction to Partial Differential Equations

MATH 647, Complex Analysis for Applications

MATH 753, Introduction to Numerical Methods I

One course chosen in consultation with the academic adviser from MATH 797\*\*, Senior Seminar, MATH 798\*\*, Senior Project, and MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

ECE 541, Electrical Circuits

ECE 548, Electronics Design I

ECE 603, Electromagnetic Fields and Waves I

ECE 633, Signals and Systems I

ECE 634, Signals and Systems II

ECE 757, Fundamentals of Communication Systems

***Physics Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II  
MATH 527, \* Differential Equations with Linear Algebra  
MATH 528, \* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645, \* Linear Algebra for Applications  
MATH 646, Introduction to Partial Differential Equations  
MATH 647, Complex Analysis for Applications  
MATH 753, Introduction to Numerical Methods I

Two approved MATH courses at the 700-level chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming  
PHYS 407, General Physics I  
PHYS 408, General Physics II  
PHYS 505-506, General Physics III  
PHYS 615, Classical Mechanics and Mathematical Physics I  
PHYS 616, Classical Mechanics and Mathematical Physics II  
PHYS 701, Introduction to Quantum Mechanics I  
PHYS 703, Electricity and Magnetism I

***Statistics Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 527, \* Differential Equations with Linear Algebra  
MATH 528, \* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645, \* Linear Algebra for Applications  
MATH 739, Applied Regression Analysis

MATH 755, Probability and Stochastic Processes with Applications

MATH 756, Principles of Statistical Inference

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

**Other required courses**

CS 410, Introduction to Scientific Programming

Three MATH courses chosen in consultation with the academic adviser from the following:

MATH 736, Statistical Methods for Research

MTH 737, Statistical Methods for Quality Improvement

MATH 740, Design of Experiments I

MATH 741, Survival Analysis

MATH 743, Time Series Analysis

MATH 744, Design of Experiments II

Three approved MATH electives, at least two of which are at the 700-level, chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

***Bachelor of Science in Mathematics Education***

This professional degree program prepares students for mathematics teaching at the elementary, middle/junior high, or secondary level. The program is coordinated with the education department's teacher certification programs. For the elementary option, full certification requires the five-year program. Students may complete the degree requirements for middle/junior high or secondary option with full teacher certification in either four or five years. Students electing the four-year option must plan for one semester of student teaching (EDUC 694) in their senior year and must consult with the departmental adviser in order to accommodate the scheduling of required MATH courses. The five-year program requires a year-long teaching internship in the fifth year that can be coupled with other graduate work leading to a master's degree. See [Education, College of Liberal Arts](#).

***Elementary School Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis  
MATH 545, Introduction to Linear Algebra and Mathematical Proof  
MATH 619, Historical Foundations of Mathematics  
MATH 621, Number Systems for Teachers  
MATH 622, Geometry for Teachers  
MATH 623, Topics in Mathematics for Teachers  
MATH 657, Geometry  
MATH 700, Introduction to Mathematics Education  
MATH 703, The Teaching of Mathematics, K-6  
MATH 797\*\*, Senior Seminar

\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming  
PHYS 406, Introduction to Modern Astronomy,  
EDUC 500, Exploring Teaching  
EDUC 700, Educational Structure and Change  
EDUC 701, Human Development and Learning: Educational Psychology  
EDUC 705, Alternative Perspectives on the Nature of Education  
EDUC 706, Introduction to Reading Instruction in the Elementary Schools

*Note:* EDUC 703F, EDUC 703M and EDUC 751 are requirements for certification that may be taken as an undergraduate.

***Middle/Junior High School Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 545, Introduction to Linear Algebra and Mathematical Proof  
MATH 619, Historical Foundations of Mathematics  
MATH 621, Number Systems for Teachers  
MATH 622, Geometry for Teachers  
MATH 623, Topics in Mathematics for Teachers  
MATH 657, Geometry  
MATH 700, Introduction to Mathematics Education  
MATH 708, Teaching of Mathematics, 5-8  
MATH 797\*\*, Senior Seminar  
One approved MATH course chosen in consultation with the academic adviser

\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

EDUC 500, Exploring Teaching

EDUC 700, Educational Structure and Change

EDUC 701, Human Development and Learning: Educational Psychology

EDUC 705, Alternative Perspectives on the Nature of Education

*Note:* EDUC 751A or EDUC 751B is a requirement for certification that may be taken as an undergraduate.

***Secondary School Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527, Differential Equations with Linear Algebra

MATH 528, Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 619, Historical Foundations of Mathematics

MATH 624, Analysis for Secondary School Teachers

MATH 657, Geometry

MATH 700, Introduction to Mathematics Education

MATH 709, Teaching of Mathematics, 7-12

MATH 761, Abstract Algebra

MATH 797\*\*, Senior Seminar

\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

EDUC 500, Exploring Teaching

EDUC 700, Educational Structure and Change

EDUC 701, Human Development and Learning: Educational Psychology

EDUC 705, Alternative Perspectives on the Nature of Education

*Note:* EDUC 751A or EDUC 751B is a requirement for certification that may be taken as an

undergraduate.

### ***Minor in Mathematics***

The Department of Mathematics and Statistics offers three minor programs: mathematics, applied mathematics, and statistics. These programs, which are open to all students enrolled at the University, require a minimum of five MATH courses as detailed below. Students whose major program requires more than two courses required by the minor program must substitute additional courses from the list of optional courses to meet the five-course minimum.

#### ***Mathematics Minor***

Required (3): MATH 528\*, MATH 531 and either MATH 761 or MATH 767

Options (2): Two courses chosen from: MATH 527\*, 656, 657, 658, 761, 762, 764, 767, 776, 783, 784, 788

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

#### ***Applied Mathematics Minor***

Required (4): MATH 527\*, 528\*, 645\* (or 545), and 753

Options (1): One course chosen from: MATH 539, 644, 646, 647, 745, 746, 747, or 754

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

#### ***Statistics Minor***

Required (2): MATH 539 (or 644) and MATH 645 (or 545)

Options (3): Three courses chosen from: MATH 737, 740, 741, 742, 744, 755, 756

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## **Mechanical Engineering (ME) ▼**

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*Chairperson:* Todd S. Gross

*Professor:* Kenneth C. Baldwin, Barbaros Celikkol, Barry K. Fussell, Todd S. Gross, Robert Jerard, Joseph C. Klewicki, James E. Krzanowski, M. Robinson Swift, Igor I. Tsukrov

*Affiliate Professor:* Donald M. Esterling

*Associate Professor:* Gregory P. Chini, Diane L. Foster, Brad Lee Kinsey, John Philip McHugh,

May-Win L. Thein

*Assistant Professor:* Yannis Korkolis, Christopher M. White, Martin M. Wosnik

*Affiliate Assistant Professor:* Timothy Upton

The Mechanical Engineering Program at UNH is accredited by the Engineering Accreditation Commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

### ***Mission***

In support of the University and college missions, the Department of Mechanical Engineering is dedicated to educating the highest quality engineering professionals and leaders. Graduates will be prepared to creatively solve engineering problems through the use of analysis, computation, and experimentation. Students completing the program should be well-informed citizens who have the ability to grow intellectually and are able to solve new, challenging problems with self-confidence. It is the department's intent to maintain a general and flexible curriculum that prepares students for both industrial practice and graduate education.

### ***Educational Objectives***

The goal of the UNH mechanical engineering program is to produce graduates who are good professionals and good citizens who 1) skillfully apply the fundamental principles of mathematics, science, and engineering; 2) solve engineering problems by integrating strong design, analysis, and experimental abilities with excellent communication skills; 3) successfully contribute to their respective corporate, government, or academic organizations; 4) demonstrate continuous growth by assuming positions of leadership in their profession, or by becoming successful entrepreneurs; by successfully completing advanced degrees and professional education; 5) are broadly educated citizens of society with an understanding of the impact of engineering solutions in a global/societal context; and 6) demonstrate a high level of personal and social integrity through their ethical behavior and service to their peers, employers, communities, the nation, and the world.

Mechanical engineering is a challenging profession encompassing research, design, development, and production of aerospace vehicles, underwater vessels, instrumentation and control systems, nuclear and conventional power plants, and consumer and industrial products in general. The profession also makes contributions through more fundamental studies of material behavior, the mechanics of solids and fluids, and energy transformation. Additional information can be found at the mechanical engineering website, [www.unh.edu/mechanical-engineering](http://www.unh.edu/mechanical-engineering).

## The Program

The program begins with courses in physics, mathematics, chemistry, and computer-aided design. The department has a four-semester mechanics thread, a four-semester thread in the thermal/fluid sciences, and a three-semester thread in systems and controls. Modern experimental methods are taught in a two-semester course starting in the junior year. The two-semester senior design project requires students to utilize the skills they have learned in their courses and to learn how to function in an engineering team. The five technical electives offered in the program give the students the opportunity to focus on advanced technical areas of their choice.

With their advisers' assistance, students should plan a program, based on the following distribution of courses, that totals not less than 128 credits. The outline that follows is typical only in format. Within the constraints of satisfying all the requirements and having all the necessary prerequisites, schedules may vary because of scheduling needs or student preference. Some mechanical engineering elective courses may not be offered every year.

The mechanical engineering program curriculum requires five technical elective courses of at least three credits each. These may be selected from 600-700 level courses in the College of Engineering and Physical Sciences, except for one course that may be selected from one of the following 400-500 level courses: ME 442, ME 542, ENE 520, ESCI 501, and ECE 543.

Two technical electives can be used for studying a focused area such as a foreign language, professional program, or minor, with department approval. These five technical elective courses should be selected in consultation with a departmental adviser to lead to a balanced program that addresses chosen areas of interest.

Students must satisfy the University's Discovery Program requirements. The following features are unique to students in the mechanical engineering program:

- All students are required to take an Inquiry course or an Inquiry Attribute course during their first two years. This can be satisfied with ME 441. Students who are exempted from ME 441 due to prior CAD experience must select an Inquiry 444 course or a course with an Inquiry Attribute.
- The Discovery Environment, Technology, and Society category requirement is met upon receiving a BS degree in Mechanical Engineering.
- The Discovery Social Science category must be satisfied with either ECON 402 or EREC 411.
- The Discovery senior capstone experience is satisfied with either ME 755 and 756 or



## TECH 797.

Some programs may require additional elective courses to reach the minimum of 128 credits required for graduation. Other programs may exceed 128 credits to include all the required courses.

In order to graduate in the mechanical engineering major, students must have at least a 2.0 grade-point average in all engineering and science courses, including required technical electives, normally taken as department requirements after the start of the junior year.

Predictor courses: To enter the junior-year courses in the mechanical engineering major, students must achieve a minimum grade-point average of 2.0 with no grade below C- in the following courses: PHYS 407, MATH 426, ME 525, ME 526, and ME 503.

**First Year**

Abbreviation	Course Number	Title	Fall	Spring
MATH	425	Calculus I	4	-
*CHEM	405	General Chemistry	4	-
ME	441	Engineering Graphics	4	-
Discovery Program Elective			4	-
MATH	426	Calculus II	-	4
PHYS	407	General Physics I	-	4
Discovery Program Elective			-	4
English	401		-	4
Total			16	16

\*CHEM 403 and CHEM 404, General Chemistry, may be substituted for CHEM 405.

PHYS 407 or CHEM 405 satisfies the Discovery Physical Science (with lab) category.

MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.

ENGL 401 satisfies the Discovery Foundation Writing Skills category.

ME 441 satisfies the Discovery Inquiry requirement.

**Sophomore Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
**MATH	527	Differential Equations	-	4
**MATH	528	Multidimensional Calculus	4	-
ME	525	Mechanics I	3	-
ME	503	Thermodynamics	-	3
ME	561	Introduction to Materials Science	-	4
PHYS	408	General Physics II	4	-
Technical Elective			3-4	-
ME	526	Mechanics II	-	3
Discovery Program Elective			4	
Total			18-19	14

\*\*MATH 525 and 526, Linearity, may be substituted for MATH 527 and 528, and a technical elective course.

**Junior Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
Discovery Program Elective			4	-
ME	608	Fluid Dynamics	3	-
ME	627	Mechanics III	3	-
ME	643	Elements of Design		3
ECE	537	Introduction to Electrical Engineering	4	-
ME	603	Heat Transfer	-	3
ME	646	Experimental Measurement & Data Analysis	-	4
ME	670	Systems Modeling, Simulation, & Control	-	4
CS	410	Intro to Scientific Programming	4	
Total			18	14

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
ME	705	Thermal System Analysis and Design	4	-
***ME	755	Senior Design Project I	2	-
ME	747	Experimental Measurement & Modeling	4	-
Discovery Program Elective			4	-
Technical Elective			3-4	-
ME	756	Senior Design Project II	-	2
Technical Elective			-	3-4
Technical Elective			-	3-4
Discovery Program Elective			-	4
Technical Elective				3-4
Total			17-18	15-18

\*\*\*TECH 797, Undergraduate Ocean Research Project, may be substituted for ME 755 and ME 756. These courses satisfy the Discovery Senior Capstone Experience category.

**Mechanical Engineering Minor**

The minor, administered by the Department of Mechanical Engineering, is open to all students of the University and offers a broad introduction to mechanical engineering.

Students must complete a minimum of six courses as follows: ME 441, ME 525, ME 526, ME 627, ME 503, and ME 608. Electrical and Computer Engineering majors should take the following courses: ME 441, ME 523, ME 526, ME 503, ME 608, and ME 561. Interested students should contact the mechanical engineering chair, Todd Gross, (603) 862-2445.

**Materials Science Minor**

The minor, administered by the Department of Mechanical Engineering, is open to all students

of the University and offers a broad introduction to materials science.

Students must complete at least 18 credits and a minimum of five courses as follows: ME 561 (required); ME 760 (required); and ME 730 (required); and two additional courses from the following: 731, 744, 761, 762, 763, and 795 (materials).

By mid-semester of their junior year, interested students should consult the minor supervisor, James E. Krzanowski, Department of Mechanical Engineering, (603) 862-2315.

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## Physics (PHYS) ▼

» <http://www.physics.unh.edu/>

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*Chairperson:* Eberhard Möbius

*Professor:* L. Christian Balling, Amitava Bhattacharjee, John R. Calarco, Olof E. Echt, F. William Hersman, Martin A. Lee, Eberhard Möbius, James M. Ryan, Harlan E. Spence, Roy B. Torbert

*Research Professor:* Charles J. Farrugia, Terry Forbes, Philip A. Isenberg, Nelson Maynard, Charles W. Smith III

*Associate Professor:* Silas Robert Beane III, Per Berglund, Benjamin D. Chandran, James Connell, Maurik Holtrop, Lynn M. Kistler, Dawn C. Meredith, Karsten Pohl, Joachim Raeder, Nathan A. Schwadron

*Research Associate Professor:* Antoinette B. Galvin, Harald A. Kucharek, Marc R. Lessard, Clifford Lopate, Bernard J. Vasquez

*Assistant Professor:* Kai Germaschewski, Karl Silber, Jian-Ming Tang

*Research Assistant Professor:* Li-Jen Chen, Fatemeh Ebrahimi, David Mattingly, Mark L. McConnell

Physics is concerned with the properties of matter and the laws that describe its behavior. It is an exact science based on precise measurement, and its objective is the kind of understanding that leads to the formulation of mathematical relationships between measured quantities. As a fundamental science, its discoveries and laws are basic to understanding in nearly all areas of science and technology. Advances in such diverse fields as medical instrumentation, solid state

electronics, and space research have relied heavily on the application of basic physical laws and principles.

Students interested in the study of physics at the University of New Hampshire will find a strong interaction between research and academic programs. Undergraduates have participated in research studies ranging from nuclear scattering experiments at major particle accelerators to astrophysical studies of the solar system using space probes. These experiences have proven beneficial to engineering and physics students alike. The department is located in DeMeritt Hall (completed in 2008) and Morse Hall. Both buildings are equipped with state-of-the art research facilities and laboratories. DeMeritt Hall also houses the physics library, classrooms, and a number of open and comfortable meeting areas, which provide an inviting atmosphere for study, interaction, and collaboration.

The suggested programs that follow are indicative of the flexibility available to students, whether they are preparing for graduate work in physics or astronomy, industrial opportunities, governmental research, secondary-level teaching, or a general education that might utilize the fundamental knowledge of physics.

Several undergraduate degree programs are offered through the department of physics. The B.S. degree is designed for students who wish to work as professional physicists or engineers; the interdisciplinary options in chemical physics, materials science, and astronomy allow students to combine physics with other disciplines. The B.A. degree is designed for students who want a strong background in physics but also want a broad liberal arts education. A minor in physics allows a student to combine an interest in physics with another major.

Physics-related degrees are also offered in other departments. For those students with strong interests in both math and physics, the **Department of Mathematics** offers a B.S. interdisciplinary option in physics.

Interested students are encouraged to contact the department for further information. More detailed information is also on the physics department web page at [www.physics.unh.edu](http://www.physics.unh.edu).

### ***Minor in Physics***

The minor in physics consists of five courses in physics. All students must take PHYS 407, 408, and 505, including labs. Two other physics courses at the 500 level or above must be chosen in consultation with the student's physics minor adviser.

### **Physics Major, Bachelor of Arts**

This degree provides an opportunity for a broad and liberal arts education, which in some cases may be sufficient for graduate work. A judicious choice of electives may also prepare

students for interdisciplinary programs that require proficiency in a restricted area of physics.

### Requirements

1. Satisfy the University Discovery Program requirements. Note that no physics course can satisfy these requirement for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.
2. Satisfy bachelor of arts degree requirements.
3. PHYS 400, 407-408, 505, 506, 508, 605, 615, 616, 701, 703, 705. Note that MATH 425, 426, and MATH 525, 526 or MATH 527, 528 are prerequisites for some of the courses.
4. A capstone experience is required of all physics majors during their senior year. The Physics Department encourages students to write a senior thesis (PHYS 799) for their capstone experience. Other options include independent study research projects (PHYS795 or INCO 590) or a special project as part of senior lab (PHYS 705). All capstone experiences must be approved by the undergraduate committee.

In the following table, “electives” include Discovery courses, writing intensive courses, language courses required for the B.A., and free choice electives.

### Suggested Curriculum for B.A. in Physics

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	400	Freshman Seminar	1	-
PHYS	407-408	General Physics I and II	4	4
MATH	425, 426	Calculus I and II (Group 2)	4	4
ENGL	401	First-Year Writing	-	4
Elective			8	4
Total			17	16

#### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	505-506	General Physics III and Lab	4	-
PHYS	615	Classical Mechanics and Mathematical Physics I	-	4
MATH	525	Linearity I		

or MATH	527	Differential Equations	6 or 4	-
MATH	526	Linearity II		
or MATH	528	Multidimensional Calculus	-	6 or 4
Elective			8	8
Total			16 or 18	16 or 18

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	605	Experimental Physics I	5	-
PHYS	508	Thermodynamics and Statistical Mechanics	-	4
PHYS	616	Classical Mechanics and Mathematical Physics II	4	-
PHYS	701	Introduction to Quantum Mechanics I	-	4
Electives			8	8
Total			17	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	705	Experimental Physics II	-	4
PHYS	703	Electricity and Magnetism I	-	4
Elective			16	8
Total			16	16

### Bachelor of Science in Physics

The bachelor of science degree in physics prepares students for professional work as physicists. The required courses are those typically necessary for admission to graduate study in physics or astronomy. The interdisciplinary options require fewer physics courses combined with a concentration in another area (chemistry or materials science). The astronomy option emphasizes courses that help prepare a student for advanced studies in astronomy.

#### Requirements

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirement for a physics major. The rationale behind this is that a course in

physics does not broaden the education of a physics major.

2. Satisfy bachelor of science university requirements.
3. Minimum physics requirements: 400, 407-408, 505, 506, 508, 605, 615-616, 701, 702, 703, 704, 705; two physics electives selected from the 700-level physics courses.
4. Chemistry: 403-404 or 405
5. Math: 425-426, and 525-526 or 527-528
6. Computer Science: CS 410
7. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.
8. A capstone experience is required of all physics majors during their senior year. The Physics Department encourages students to write a senior thesis (PHYS 799) for their capstone experience. Other options include independent study research projects (PHYS795 or INCO 590) or a special project as part of senior lab (PHYS 705). All capstone experiences must be approved by the undergraduate committee.

#### Physics electives

In the following table, "electives" include Discovery courses, writing intensive courses, physics electives, and free choice electives. Note that physics electives can only be taken in the junior or senior year because of prerequisites, and are in general offered every other year.

#### Suggested Curriculum for B.S. in Physics

##### First Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	400	Freshman Seminar	1	-
PHYS	407-408	General Physics I and II	4	4
MATH	425, 426	Calculus I and II (Group 2)	4	4
CHEM	403-404	General Chemistry (Group 3)	4	4
ENGL	401	Freshman English	-	4
Elective			4	-
Total			17	16

##### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
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PHYS	505-506	General Physics III and Lab	4	-
PHYS	508	Thermodynamics and Statistical Mechanics	-	4
PHYS	615	Classical Mechanics and Mathematical Physics I	-	4
MATH	525	Linearity I		
or MATH	527	Differential Equations	6 or 4	-
MATH	526	Linearity II		
or MATH	528	Multidimensional Calculus	-	6 or 4
CS	410	Introduction to Scientific Programming	4	-
Elective			4	4
Total			16 or 18	16 or 18

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	605	Experimental Physics I	5	-
PHYS	616	Classical Mechanics and Mathematical Physics II	4	-
PHYS	701	Introduction to Quantum Mechanics I	-	4
PHYS	703	Electricity and Magnetism I	-	4
Electives			8	8
Total			17	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	702	Quantum Mechanics II	4	-
PHYS	704	Electricity and Magnetism II	4	-
PHYS	705	Experimental Physics II	-	4
Elective			8	12
Total			16	16

### Chemical Physics Option, Bachelor of Science in Physics

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy

these requirements for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.

2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 407-408, 505-506, 508, 605, 615, 616, 701, 702, 703, 705
4. Chemistry: CHEM 403, 404, 683-686, 762, 763, 776
5. Mathematics: MATH 425-426, 525-526 or 527-528
6. Computer Science: CS 410
7. Electives in Option: Two courses selected from CHEM 547/9, MATH 646, PHYS 718, PHYS 795
8. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

#### **Materials Science Option, Bachelor of Science in Physics**

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirements for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.
2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 407-408, 505-506, 508, 605, 615-616, 701, 703, 705, 795 (4 credit hours), 799 (4 credit hours).
4. Mechanical Engineering: 561, 730, 760
5. Math: 425-426, 525-526, or 527-528
6. Computer Science: CS 410
7. Electives in Option: Three courses selected from MATH 646, ME 731, 761, 762, 763, 795, PHYS 718
8. Chemistry: 403-404 or 405
9. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

#### **Astronomy Option, Bachelor of Science in Physics**

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirements for a physics major. The rationale behind this is that a course in

physics does not broaden the education of a physics major.

2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 406, 407-408, 505, 506, 508, 605, 615-616, 701, 702, 703, 704, 705, 710, 795 (4 credit hours), 799 (4 credit hours).
4. Chemistry: CHEM 403-404 or CHEM 405
5. Math: MATH 425-426 and 525-526 or 527-528 Computer Science: CS 410
6. Electives in option: Choose one course from PHYS 708, PHYS 712, PHYS 720, PHYS 764, PHYS 791
7. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

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## Technology (TECH) ▼

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### College of Engineering and Physical Sciences

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## Undergraduate Course Catalog 2011-2012

### College of Engineering and Physical Sciences ▼

» <http://www.ceps.unh.edu>

*Dean:* Samuel B Mukasa

*Associate Dean:* Robert M. Henry

### Introduction ▼

The College of Engineering and Physical Sciences (CEPS) provides an opportunity for students to achieve educational objectives appropriate to their interests in engineering, computer science, information technology, mathematics, the physical sciences, and the teaching of mathematics and physical sciences. The college offers an education in each of its primary disciplines leading to the bachelor of science, as well as bachelor of art degrees with majors in mathematics and each of the three physical sciences. All programs include an opportunity for study in the arts, humanities, and social sciences.

The key to an undergraduate program in the college is flexibility, with a strong emphasis on personal and individualized education. In addition to specific programs, a wide range of options within several majors are available. Special programs can be developed to meet the specific interests of individual students.

### Degree Requirement

MATH 425 and 426 (Calculus I and II) or the equivalent in transfer credits or advanced placement approved by the Department of Mathematics and Statistics are required by all departments of the college. The exception is the Information Technology major which only requires Math 425 (Calculus I). The prerequisites for calculus are three years of college-preparatory mathematics, including a half-year of trigonometry. Before students can register for MATH 425, they are required to take the Mathematics Placement Test or to have taken MATH 418 (or its equivalent) and received a grade of C or better.

### Mathematics Placement

First-year students arrive with a wide range of mathematical skills based upon their high school preparation. The college wants students to have a solid mathematics foundation so that they

will enjoy an enriched first-semester experience. A student's mathematics development will be assessed as part of the June orientation program. Based upon the Mathematics Placement Test, students are enrolled in the mathematics class that will allow them to continue that development. The initial mathematics entry course is Analysis and Applications of Functions (MATH 418). However, a student is placed into Math 425 (Calculus I) if he or she demonstrated a certain level of proficiency in Algebra and pre-Calculus through the Mathematics Placement Test. Students with AP credit for Calculus I and/or Calculus II may elect to accept those credits and continue with a math course at the next level.

### **Accreditation**

The baccalaureate-level programs in chemical, civil, computer, electrical, environmental, and mechanical engineering are accredited by the Engineering Accreditation Commission of **ABET**, Inc. The baccalaureate-level program in computer science and bioinformatics are accredited by the Computing Accreditation Commission of ABET, Inc. ABET contact information: 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700. The Department of Chemistry's undergraduate bachelor of science program is approved by the American Chemical Society.

### **Tech Courses**

The following courses are designed for students of the college and other majors within the University. These courses are offered through and administered by the Dean's Office.

TECH 400, Introduction to CEPS Programs, 1 cr.

TECH 444, Symmetry in Nature, The Arts, and Daily Life, 4 cr.

TECH 564, Fundamentals of CAD, 3 cr.

TECH 583, Technology: Cultural Aspects, 4 cr.

TECH 583H, Honors/Technology: Cultural Aspects, 4 cr.

TECH 601, Fundamentals Examination Review Course, 1 cr.

TECH 685, Budapest Program, 20 cr.

TECH 696, Independent Study, 1 to 4 cr.

TECH 797, Undergraduate Ocean Research Project, 2 cr.

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### College of Engineering and Physical Sciences

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## Undergraduate Course Catalog 2011-2012

### College of Engineering and Physical Sciences ▼

» <http://www.ceps.unh.edu>

### Bachelor of Arts ▼

Programs leading to a bachelor of arts degree are offered in the departments of chemistry, earth sciences, mathematics, and physics. These programs provide a broad liberal education along with a major in one of these fields. See [University Academic Requirements](#) for requirements for the bachelor of arts degree.

#### Chemistry

#### Earth Science Teaching

#### Earth Sciences

#### Oceanography

#### Mathematics

#### Physics

### Bachelor of Science ▼

The programs leading to the bachelor of science degree, offered in each of the departments of the college, emphasize students' preparation for a professional career and continuing or graduate education.

The degree requirements for the bachelor of science include the University Academic Requirements and the specific departmental requirements for graduation. A minimum grade-point average of 2.0 must be achieved. Graduation credit requirements established by the departments range from 128 to 134. There are entrance requirements in some programs, and it is not possible to guarantee all change-of-major requests.

#### Chemical Engineering\*

Bioengineering  
Energy  
Environmental Engineering

**Chemistry\***

**Civil Engineering\***

**Computer Engineering\***

**Computer Science\***

Bioinformatics

**Electrical Engineering\***

**Environmental Engineering\*†**

Industrial Process  
Municipal Process

**Environmental Sciences\***

Ecosystems  
Hydrology  
Soil and Watershed Management

**Geology\***

**Information Technology**

**Mathematics\***

**Mathematics Education\***

Elementary  
Middle/Junior High  
Secondary

**Mathematics, Interdisciplinary**

Computer Science  
Economics  
Electrical Science  
Physics  
Statistics

**Mechanical Engineering\***

**Physics\***

Astronomy



Chemical Physics  
Materials Science

\*Designated degree (the name of the specialization is on the diploma, e.g., B.S. in chemistry).

†Multidisciplinary; i.e., offered in collaboration with two departments.

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### College of Engineering and Physical Sciences ▼

» <http://www.ceps.unh.edu>

#### Interdisciplinary Programs ▼

#### Majors

##### *Bachelor of Science in Environmental Engineering*

The environmental engineering program consists of two emphases: industrial processes (IP) and municipal processes (MP).

##### *Bachelor of Science in Environmental Sciences*

The environmental sciences program is offered jointly with the College of Life Sciences and Agriculture (COLSA) and consists of three options: hydrology, soil and watershed management, and ecosystems.

#### Minors

Interdisciplinary minors enable students to obtain experience in a specialized area and to retain identification with their major professional area. The college's interdisciplinary minors are:

Applied Mathematics

Environmental Engineering

Geology

Information Technology

Materials Science

Mathematics

Mechanical Engineering

Ocean Engineering

Oceanography

Physics

Statistics

For requirements regarding minors, see [University Academic Requirements](#).

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### College of Engineering and Physical Sciences

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#### Programs of Study

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### College of Engineering and Physical Sciences ▼

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### Independent Study and Projects ▼

All departments within the college offer independent study opportunities and projects. The content of these courses varies and is based upon current scientific and technological needs in addition to the interests of the student and faculty involved.

Permission of the faculty member and/or department chairperson is required. One should review the course descriptions for the independent study and project courses for specific requirements. Students interested in working with a faculty member on a project or independent study should discuss this with the faculty member and their academic adviser prior to registering for the course.

#### ***Research Opportunities***

The talents and expertise of the faculty in all departments are reflected in the number of ongoing research projects. Undergraduates are included in many of these research projects with the intent that they will discover and foster their creative talents. When involved with a funded research project, students may have an opportunity to receive pay while learning about the research area.

The college has world-class laboratories and computer facilities in many areas. A few of these are: coastal and ocean mapping, space science, environmental engineering and science, fluid dynamics, wind turbulence, information systems, materials science, nanotechnology, sustainability, and medical imaging. These and other ongoing research areas within the college are described on the college's website: [www.ceps.unh.edu/research](http://www.ceps.unh.edu/research).

Students have the opportunity to acquire applied experience by working with faculty members who undertake sponsored professional projects in technical and managerial areas for business, industry, and for federal, state, and local governments.

### ***Special Provisions***

The requirement of a given topic/course prescribed to meet the requirements of major curriculum may be waived by the faculty of a student's department. This rule offers students the opportunity to develop a somewhat individualized plan of study with intellectual incentives and opportunities in addition to those found in a regular curriculum. The student's petition must be approved by his/her major adviser and the dean of the college. This power usually will be delegated by the faculty to the dean or to a committee. (Senate Rule 05.21(s): Waiver of Requirements in a Prescribed Curriculum.)

A student with senior status and a grade point average of 3.2 may petition to take a graduate course for undergraduate credit. In addition, upon the recommendation of the department chairperson, a superior student may be allowed to count credits from up to two 800-level courses toward both a bachelor's degree and a master's degree, provided that the student has been admitted to the master's program.

## **Study Abroad Programs ▼**

### ***Hungary***

The College of Engineering and Physical Sciences provides its students with the opportunity to spend a semester at the Budapest University of Technology and Economics (BME) in Budapest, Hungary. Most CEPS majors choosing to study abroad spend the fall semester of their junior year at BME. Electrical & Computer Engineering students spend the spring semester of their junior year at BME. Courses at BME are taught in English and receive prior approval for degree credit. Students studying in Budapest maintain their status as full-time UNH students, pay UNH tuition, and maintain their expected graduation date. For more information, visit the program's Web site at [www.ceps.unh.edu/academics/budapest/](http://www.ceps.unh.edu/academics/budapest/).

### ***Scotland, Heriot-Watt University Exchange Program***

College of Engineering and Physical Sciences students are eligible to participate in a spring semester exchange with Heriot-Watt University in Edinburgh, Scotland. The current program is designed for civil and environmental engineering majors. For more information, contact Ray Cook at (603) 862-1411 or the Center for International Education, Hood House.

## **Preparing for Teaching ▼**

Students interested in mathematics education (elementary, middle/junior high, or secondary), Earth science teaching, chemistry or physics teaching should refer to the appropriate department for a description of the program requirements.

## Combined Programs of Study ▼

In addition to pursuing a single major, students may combine programs of study as follows:

*Minors:* See [University Academic Requirements](#); see also [Degrees and Major Programs of Study](#) and [Departmental Programs of Study](#).

*Second majors:* See [University Academic Requirements](#).

*Interdisciplinary majors:* Many departments in the college offer programs that combine a major with another field of interest. See the descriptions that follow.

*Dual-degree programs:* See [University Academic Requirements](#).

*Student-designed majors:* See [Special University Programs](#).

*Other combined and interdisciplinary opportunities:* See [Special University Programs](#).

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» <http://www.ceps.unh.edu>

### Chemical Engineering (CHE) ▼

» <http://www.unh.edu/chemical-engineering/>

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*Chairperson:* Palligarnai T. Vasudevan

*Professor:* Dale P. Barkey, Russell T. Carr, Ihab H. Farag, Palligarnai T. Vasudevan

*Associate Professor:* Nivedita R. Gupta

*Assistant Professor:* Jillian Goldfarb, Qing Song, Xiaowei Teng

The Department of Chemical Engineering currently offers the undergraduate degree program in chemical engineering with options in bioengineering, energy, and environmental engineering. In addition, the College of Engineering and Physical Sciences offers an **interdisciplinary B.S.**

**program in environmental engineering** with the participation of the chemical engineering and civil engineering departments.

The B.S. program in chemical engineering is accredited by the Engineering Accreditation Commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

Chemical engineering is concerned with the analysis and design of processes that deal with the transfer and transformation of energy and material.

The practice of chemical engineering includes the conception, development, design, and application of physicochemical processes and their products; the development, design, construction, operation, control, and management of plants for these processes; and activities relating to public service, education, and research.

The curriculum prepares students for productive careers in industry or government and provides a foundation for graduate studies. The college's program emphasizes chemical

engineering fundamentals while offering opportunities for focused study in energy-, environmental-, or bioengineering.

Traditional employment areas in the chemical process industries include industrial chemicals, petroleum and petrochemicals, plastics, pharmaceuticals, metals, textiles, and food. Chemical engineers are also working in increasing numbers in the areas of energy engineering, pollution abatement, and biochemical and biomedical engineering; in addition, they are employed by many government laboratories and agencies as well as private industries and institutions.

### ***Mission***

The department strives to prepare our students for productive careers in industry or government as well as to provide a foundation for graduate studies. Our program emphasizes chemical engineering fundamentals while offering opportunities for focused study in energy-, environmental- or bio- engineering.

### ***Program Educational Objectives***

The chemical engineering program seeks to provide an environment that enables students to pursue their goals in an innovative program with a diversity of offerings that is rigorous and challenging.

**The program has the following major educational objectives with the expectation that our alumni will have successful careers in the many diverse areas of the chemical engineering profession. Within a few years of obtaining a bachelor's degree in chemical engineering, we expect our graduates to have the following attributes.**

**Depth.** To be effective in applying chemical engineering principles in engineering practice or for advanced study in chemical engineering.

**Breadth.** To have a productive career in the many diverse fields of chemical engineering such as bioengineering, energy and the environment, or in the pursuit of graduate education in disciplines such as chemical engineering, medicine, law or business.

**Professionalism.** To function effectively in the complex modern work environment with the ability to assume professional leadership roles.

### **Bachelor of Science in Chemical Engineering**

Chemical engineering is concerned with the analysis and design of processes that deal with the transfer and transformation of energy and material.

The practice of chemical engineering includes the conception, development, design, and application of physicochemical processes and their products; the development, design, construction, operation, control, and management of plants for these processes; and activities



relating to public service, education, and research.

The curriculum prepares students for productive careers in industry or government and provides a foundation for graduate studies. The program emphasizes chemical engineering fundamentals while offering opportunities for focused study in energy-, environmental-, or bioengineering.

Traditional employment areas in the chemical process industries include industrial chemicals, petroleum and petrochemicals, plastics, pharmaceuticals, metals, textiles, and food. Chemical engineers also are working in increasing numbers in the areas of energy engineering, pollution abatement, and biochemical and biomedical engineering; in addition, they are employed by many government laboratories and agencies as well as private industries and institutions.

Graduates from the program have the ability to apply knowledge of mathematics, science, and engineering to identify, formulate, and solve chemical engineering problems as well as to design and conduct experiments safely and analyze and interpret data. They are prepared to pursue advanced studies in chemical engineering. Program graduates gain a sense of professional and ethical responsibility with the ability to apply environmental, safety, economic, and ethical criteria in the design of engineering processes. They learn to function in individual and group working environments, and learn skills in written and oral communication and the effective use of computers for engineering practice, including information search in the library and on the Internet. They also understand the need for lifelong learning and the significance of societal and global issues relevant to chemical engineering.

A minimum of 129 credits is required for graduation with the degree of bachelor of science in chemical engineering. There are ten electives in the chemical engineering curriculum. Six of these are for the Discovery Program requirements. The remaining four electives should consist of three chemical engineering electives and one additional technical elective.

Students are required to obtain a minimum 2.0 grade-point average in CHE 501-502 and in overall standing at the end of the sophomore year in order to continue in the major. Study Abroad (Exchange) Chemical engineering students are required to have a cumulative GPA of 3.0 or better in math, physics, chemistry and CHE courses at the end of the semester prior to their exchange semester.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
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ENGL	401	First-Year Writing	4	-
MATH	425-426	Calculus I and II	4	4
PHYS	407	General Physics I	-	4
CHEM	405	General Chemistry	4	-
CHE	400	CHE Lectures	-	1
Discovery Program Electives (3)			4	8
Total			16	17

1. PHYS 407 OR CHEM 405 satisfies the Discovery Physical Science (with lab) category. Chemical engineering students can not take CHEM 401, CHEM 402 or CHEM 409 towards degree requirements.
2. MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.
3. ENGL 401 satisfies the Discovery Foundation Writing Skills category.
4. CHE students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in the CHE curriculum.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CHEM	683-684	Physical Chemistry I and II	3	3
CHEM	685-686	Physical Chemistry Laboratory	2	2
MATH	527	Differential Equations with Linear Algebra	4	-
PHYS	408	General Physics II	4	-
CHE	501-502	Introduction to Chemical Engineering I and II	3	3
CHE	603	Applied Mathematics for Chemical Engineers	-	4
Discovery Program Elective (1)			-	4
Total			16	16

CHE 502 satisfies the Discovery Inquiry requirement.

### Junior Year

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Abbreviation	Course Number	Title	Fall	Spring
CHEM	651-652	Organic Chemistry	3	3
CHEM	653	Organic Chemistry Laboratory	2	-
CHE	601	Fluid Mechanics and Unit Operations	3	-
CHE	602	Heat Transfer and Unit Operations	-	3
CHE	604	Chemical Engineering Thermodynamics	3	-
CHE	612	Chemical Engineering Laboratory I	-	3
CHE	614	Separation Processes	-	3
CHE Elective			4	-
Discovery Program Elective (1)			-	4
Total			15	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CHE	703	Mass Transfer and Stagewise Operations	3	-
CHE	707	Chemical Engineering Kinetics	3	-
CHE	708	Chemical Engineering Design	-	4
CHE	713	Chemical Engineering Laboratory II	3	-
CHE	752	Process Dynamics and Control	-	4
CHE Electives (2)			4	4
Technical Elective (1)			-	4
Discovery Program Elective (1)			4	-
Total			17	16

1. CHE 708 satisfies the Discovery Capstone Experience/Course
2. MATH 740 (Design of Experiments) or MATH 644 (Statistics for Engineers and Scientists) are the recommended Technical Electives.

**Bioengineering Option**

Under this option, the required courses deal with the application of basic biological sciences and chemical engineering principles to the design and operation of large-scale bioprocesses for the production of high-value medicinal products, food and beverage, pharmaceutical, biomedical, genetic engineering products, and health care products. The elective courses permit the student to study topics of special interest in more depth or gain a broader perspective in bioengineering or some closely related subjects such as biochemistry or biotechnology experience in manufacturing or research. Three courses are required, and a minimum of two additional courses of at least three credits each should be selected from the electives list. Students interested in the bioengineering option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

**Required Courses**

Abbreviation	Course Number	Title	Credits
CHE	761	Biochemical Engineering	4
CHE	762	Biomedical Engineering	4
CHE	651	Biomanufacturing	4
Total			12

**Elective Courses**

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
BMCB	750	Physical Biochemistry	3
BMCB	751	Principles in Biochemistry	4
BMCB	752	Principles in Biochemistry	4
MATH	740	Design of Experiments I	4
Total			6-8

**Energy Option**

This option covers the major areas of current interest in the energy field. The required courses

provide students with a general background knowledge of fossil fuels, nuclear power, solar energy, and other alternative energy resources. The elective courses will permit the student to study topics of special interest in more depth or gain a broader perspective on energy and some closely related subjects. Three courses are required, and a minimum of two additional courses of at least three credits each should be selected from the electives list. Students interested in the energy option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

### Required Courses

Abbreviation	Course Number	Title	Credits
CHE	705	Natural and Synthetic Fossil Fuels	4
CHE	712	Introduction to Nuclear Engineering	4
CHE	761	Biochemical Engineering	4
Total			12

### Elective Courses

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
ENE	772	Physicochemical Processes for Water/Air Quality	4
MATH	740	Design of Experiments I	4
ME	705	Thermal Systems Analysis and Design	4
		Special Topics on Energy*	3-4
Total			6-8

\* This requires approval of the department - check with adviser. Courses offered in the past include Renewable Electrical Power, Renewable Energy and Peak Oil.

### ***Environmental Engineering Option***

The chemical engineering program, with its substantial requirements in chemistry, fluid dynamics, heat transfer, mass transfer, unit operations, and reaction kinetics, provides students with a unique preparation to deal with many aspects of environmental pollution problems. The option gives students a special focus on the application of chemical engineering principles and processes to the solution of problems relating to air pollution, water pollution, and the disposal

of solid and hazardous waste. Three required courses must be selected, plus two electives from the electives list. Each course must carry a minimum of three credits. Students interested in the environmental engineering option should declare their intention to the department faculty during the sophomore year. They may consult with P.T. Vasudevan, (603) 862-2298.

#### Required Courses

Abbreviation	Course Number	Title	Credits
ENE	709	Fundamentals of Air Pollution and Its Control	4
ENE	772	Physicochemical Processes for Water/Air	4
ENE	742	Solid and Hazardous Waste Engineering	3
Total			11

#### Elective Courses

Abbreviation	Course Number	Title	Credits
CHE	695	Chemical Engineering Project	3-4
CHE	696	Independent Study	3-4
CHE	744	Corrosion	4
ENE	746	Bioenvironmental Engineering Design	3
ENE	749	Water Chemistry	4
MATH	740	Design of Experiments I	4
Total			6-8

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## Chemistry (CHEM) ▼

» <http://www.unh.edu/chemistry/>

» [Click to view course offerings](#)

*Professor:* Christopher F. Bauer, Arthur Greenberg, Richard P. Johnson, Howard R. Mayne, Glen P. Miller, W. Rudolf Seitz, Sterling A. Tomellini, Gary R. Weisman, Edward H. Wong, Charles K. Zercher

*Associate Professor:* Roy Paul Planalp

*Assistant Professor:* Erik Berda, Margaret E. Greenslade, Gonghu Li, Samuel Pazicni

“Chemistry is everywhere. From agriculture to health care, chemistry extends life and improves its quality. From disposable diapers to space suits, chemistry provides new materials for clothing, shelter, and recreation. From computer chips to fiber optics, chemistry is the foundation of today’s high technology.” (American Chemical Society)

A study in chemistry is the pathway to multiple options. These options include careers in education, law, forensics, medicine, biotechnology, environmental protection, technical sales, pharmaceutical research, semiconductors, and industrial chemical production. The potential is limitless. Students interested in pursuing chemistry as an undergraduate degree have two options available to them, which are based on their career plans. These are the bachelor of science degree (B.S.) and a bachelor of arts degree (B.A.). Since the required chemistry courses in each degree program are the same the first year, it is easy to change from one program to another. A chemistry faculty adviser is assigned to a student once she/he enters the program. The adviser will work with the student throughout their chemistry major program to choose courses to meet requirements for their major and overall.

### **First Year Student Requirements:**

In general, a first-year student should register for the following courses, and this applies to both programs (B.A. and B.S.):

- **Semester I:** Freshman Seminar, Chemistry 400; General Chemistry with lab, Chemistry 403; Calculus I, Mathematics 425;
- **Semester II:** General Chemistry with lab, Chemistry 404; Calculus II, Mathematics 426; Freshman English, English 401W.
  - Math 425 satisfies the Discovery Foundation Quantitative Reasoning category and fulfills a Chemistry major science requirement.
  - ENGL 401 satisfies the Discovery Foundation Writing Skills category and is 1 of the 4 required writing intensive courses

### **Chemistry Major Requirements:**

1. Satisfy the Discovery Program requirements.
2. For specific chemistry major course requirements, see the Baccalaureate Degree Required Chemistry Courses table.

3. Chemistry majors cannot use CHEM 403, CHEM 404 and CHEM 405 to satisfy discovery program requirements.

### **Capstone Experience:**

A capstone experience is required for all chemistry majors during their senior year. The B.S. major offers CHEM 699, Senior Thesis, as the capstone experience.

Senior thesis is a year-long project involving literature research, developing scientific writing skills and obtaining lab experience using a variety of techniques and equipment. Senior thesis research is focused on an area of specialty in either analytical, inorganic, organic and physical areas of chemistry. Students must interview with a faculty member before choosing to register for CHEM 699. The interview process enables the student to explore areas of interest and the faculty adviser to determine a potential project. The senior thesis experience immerses the student into the lab environment: working with peers, graduate students, and a research adviser. This creates a community to facilitate discussion, questions, and new ideas for projects.

Completing a senior thesis in chemistry provides valuable field experience for careers in chemistry or closely related fields. Students combine their research with another course, CHEM 698 - Senior Seminar - to develop posters exhibiting their research. These are presented at the UNH Undergraduate Research Conference. This is in addition to creating a written bound thesis. Copies of students theses are displayed in the chemistry library and the adviser's personal library and students retain personal copies. Choosing to complete a senior thesis also enables students' B.S. degree to be ACS certified.

The B.A. major offers CHEM 698, Senior Seminar, as the capstone experience. Students work with the faculty member teaching the seminar to prepare a presentation based upon a research project or subject-driven professional engagement. The ability to integrate detailed subject matter and communicate this to the broader community, both scientific and general society, is encouraged. This exercise enhances the student's writing ability, aids in the development of broader communication skills, and enables the student to obtain valuable research experience.

B.A. majors have the additional research opportunity by taking CHEM 696, Independent study. This course can be taken prior to or parallel to the capstone course to enhance their program of study.

### **Bachelor of Arts in Chemistry**

This curriculum offers students the opportunity to combine the chemistry major with other interests; for example, preprofessional programs, education, and business.



**Requirements**

1. Satisfy the Discovery Program requirements
2. For specific course requirements, see the BA section in the Baccalaureate Degree Required Chemistry Courses table.

- Math 425 satisfies the Discovery Foundation Quantitative Reasoning category and fulfills a Chemistry major science requirement.

**Baccalaureate Degree Required Chemistry Courses**

Course Number	Title	BS	BA
400	Freshman Seminar	x	x
403, 404	General Chemistry	x	x
517, 518	Quantitative Analysis	x	x
547 & 549	Organic Chemistry I	x	x
548 & 550	Organic Chemistry II	x	x
574	Introduction to Inorganic Chemistry	x	x
683 & 685	Physical Chemistry I	x	x
684 & 686	Physical Chemistry II	x	x
762 & 763	Instrumental Methods of Chemical Analysis	x	x
698	Seminar	x	x
699	Thesis	x	
755 & 756	Advanced Organic Chemistry	x	
774 & 775	Advanced Inorganic Chemistry	x	
776	Physical Chemistry III	x	
708	Spectroscopic Investigations of Organic Molecules		

Other Requirements:

All majors: MATH 425-426, Calculus I and II. Math 425 satisfies the Discovery Foundation Quantitative Reasoning Category

B.S. degree: PHYS 407-408, General Physics I and II; BCHM 658 or 751, Biochemistry; one chemistry-related course. † Check course listings to see which meet a physical science discovery criteria or a biological science course criteria as a part of the Discovery Program.

B.A. degree, chemistry major: PHYS 407, General Physics I, or PHYS 401-402, Introduction to Physics I and II; two other CHEM courses, except 698, or two approved chemistry-related courses.†

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† Suggested courses: MATH 527, 528; PHYS 505; EE 620; BCHM 658, 751.

### **Bachelor of Science in Chemistry**

This curriculum prepares students for careers requiring a thorough knowledge of chemistry and provides a strong foundation for careers in industry, professional schools (e.g., medical schools), and for graduate study in chemistry or in interdisciplinary areas. The curriculum requires a greater depth in chemistry and physics than do the other degree programs.

#### **Requirements:**

1. Satisfy the Discovery Program requirements.
2. For specific course requirements, see the BS section in the Baccalaureate Degree Required Chemistry Courses table.

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### **Civil Engineering (CIE) ▼**

» <http://www.unh.edu/civil-engineering/>

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*Chairperson:* M. Robin Collins

*Professor:* Jean Benoit, M. Robin Collins, David L. Gress, Nancy E. Kinner, James P. Malley Jr.

*Associate Professor:* Thomas P. Ballestero, Erin S. Bell, Raymond A. Cook, Jo S. Daniel, Kevin H. Gardner, Charles H. Goodspeed, Robert M. Henry, Jennifer M. Jacobs

*Assistant Professor:* Tat S. Fu, Ricardo A. Medina

*Research Assistant Professor:* Jeffrey S. Melton, Robert M. Roseen, Alison W. Watts

*Lecturer:* Rebekah J. Gaudreau

Civil engineering involves the planning, design, and construction of public works: buildings, bridges, roads, dams, water transmission systems, water treatment systems, tunnels, and more. These facilities must provide efficient service, be cost-effective, and be compatible with the environment. Moreover, civil engineers work under a code of ethics in which their primary, overriding responsibility is to uphold the public's trust by working to plan, design, build, and restore safe, sustainable, and environmentally responsible public works.

Civil engineers work as private consultants and for government agencies in a wide variety of indoor and outdoor settings around the world. There is a strong and constant market for civil engineers due to the demands placed on the profession to construct, maintain, and repair the infrastructure.

As civil engineering is such a broad field, it is traditionally divided into several sub-disciplines. At the University of New Hampshire, five are offered: civil engineering materials, environmental engineering, geotechnical engineering, structural engineering, and water resources engineering. Civil engineering majors may choose the sub-discipline in which to focus their studies during their senior year. Additionally, the College of Engineering and Physical Sciences, through the Departments of Civil Engineering and Chemical Engineering, offers a B.S. in environmental engineering (ENE) which is a major for students who choose to specifically focus their attention solely in that area. (Students who are interested in environmental engineering but who also want a broader or more traditional civil engineering focus should pursue the civil engineering major and elect environmental engineering courses in their senior year.) Students may readily transfer between the civil engineering (CIE) and ENE programs within the first two semesters. Both the B.S. in civil engineering and the B.S. in environmental engineering provide a firm base in mathematics, science, and engineering and all majors are expected to develop excellent communication and computer skills. Graduates are prepared to enter the profession and to pursue advanced study. Because of the broad technical background attained, some graduates also successfully pursue further education in business, architecture, education, and law.

### ***Mission***

The mission of the Department of Civil Engineering is to pursue and disseminate knowledge through teaching, research, and public service. As part of its teaching mission, the department provides rigorous, yet flexible, undergraduate and graduate education for both traditional and nontraditional students through classical and creative instruction in the classroom, laboratory, and field. While preparing students for the profession, the department offers an education in civil engineering that includes working in multidisciplinary teams that critically analyze and formulate solutions to civil engineering problems and apply engineering principles that provide social, economic, and environmental benefits to the public. The department encourages in its

students a lifelong desire to keep abreast of new developments in the field and teaches them the skills necessary to continue learning. As part of its research mission, the department maintains a rigorous multidisciplinary program of scholarship advancing the state of the art in civil engineering. As part of its mission in public service, the department enhances the quality of life for people, especially in New England and specifically New Hampshire, by providing expert services, advancing and transferring knowledge and technology, and serving as a resource for information.

### ***Educational Objectives***

In accordance with its University, college, and department missions, the faculty of the Department of Civil Engineering has established clear objectives for students to help them become successful professionals after graduation. To assist graduates to become practicing civil engineers, the program helps students achieve a basic competence in math, science, and engineering principles; learn how to apply this knowledge to solve engineering problems; achieve a working knowledge in the basic civil engineering areas of structural engineering, geotechnical engineering, civil engineering materials, water resources, and environmental engineering; and extend their knowledge in one or more of these areas. As part of this process, students learn how to critically analyze and design equipment, structures, systems, or processes to meet current needs without compromising the ability of future generations to meet theirs; and to use current, and be able to independently learn new, engineering software. Engineers also need to be effective communicators. Engineering students learn how to communicate and defend ideas in technical documents such as calculation sets, reports and correspondence, how to speak before a group and convey information to technical and non-technical audiences, and how to create and effectively use graphics in support of a presentation or report. Students also learn how to work effectively as good team players who are able to work effectively as team members and team leaders and who can work on multi-disciplinary teams.

As part of finding engineering solutions civil engineering students learn how to be effective researchers who can gather and synthesize information and data to accomplish tasks. Students learn to locate, compile, and use existing information; design and perform experiments to gather new information; analyze information; and draw conclusions. Due to the nature of civil engineering efforts, which involve the public, public safety, and significant financing, it is imperative that graduates become good engineering citizens who are ethical and aware of the social, economic, and environmental impact of engineering solutions. Students develop an awareness of sustainable engineering and the interaction between engineering practice and social, economic, and environmental issues; ASCE Code of Ethics; an awareness of contemporary, global issues; their effect on public policy and their interaction with civil engineering practice; and the importance of broadening their education by being familiar with

topics outside of the math, science, and engineering areas including the basics of business and management. Civil engineers also are professionals who often are licensed, seek continuing education, participate in professional societies, and perform public service. Students are prepared to take the Fundamentals of Engineering examination, understand the need for lifelong learning, and are encouraged to join and be active in professional organizations such as ASCE, SWE, SWB, Tau Beta Pi, and the Order of the Engineer.

### **Bachelor of Science in Civil Engineering**

Matriculating students should have strong aptitudes in mathematics and science along with imagination, spatial and graphic abilities, communication skills, and creativity. Students then follow a four-year program that conforms to the guidelines of, and is accredited by, the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

The first two years of the program provide the necessary technical knowledge in mathematics, chemistry, and physics, while introducing and developing problem-solving techniques in seven courses tailored to civil engineering students. The junior year provides courses in each of the civil engineering sub-disciplines, providing students with skills in each and allowing students to determine which they wish to pursue further. The senior year is flexible, allowing students to choose where to focus attention by selecting from more than thirty elective courses in civil and environmental engineering.

The required curriculum includes eight writing-intensive courses, thereby not only satisfying but exceeding the University's writing requirement. (See [University Academic Requirements](#).)

#### *Electives*

Approximately one-third of the major's total credits and more than half of the senior-level courses are elected by the student. Of these, there are Discovery Program electives required by the University and other electives required by the department in order to satisfy departmental objectives and accreditation requirements.

1. The Discovery Program is described in [University Academic Requirements](#). Courses required by the civil engineering major fulfill requirements in Inquiry (CIE 402); Writing Skills (ENGL 401); Quantitative Reasoning (MATH 425); Physical Sciences (PHYS 407); Laboratory Coursework (PHYS 407); Environment, Technology, and Society (CIE 402); and a Senior Capstone Experience (CIE 784/788). Therefore, students select electives to satisfy Discovery requirements in Biological Science, Fine and Performing Arts, Humanities, Historical

Perspectives, World Cultures, and Social Science.

2. Civil engineering majors wishing to participate in exchange programs must achieve a cumulative grade-point average of 3.0 or better in all MATH, PHYS, CHEM, CIE, and ENE courses taken to date at the end of each of the second and third semesters prior to their exchange semester.

3. In the senior year, students take four courses specific to civil engineering sub-disciplines, and a senior technical elective. Students can use these electives to focus on a particular civil engineering area or can acquire a broader perspective by taking courses in a variety of areas. At least one of these four elective courses must qualify also as a civil engineering design elective, and no more than three courses may be taken in one sub-discipline. Lists of courses that fulfill these electives are available from the department.

*Additional program policies and requirements*

1. To transfer into the civil engineering major, a student must have the following:

- a. an overall grade point average of 2.33 or greater;
- b. an overall grade point average of 2.33 or greater for all CIE and ENE courses taken to-date;
- c. a grade point average of 2.33 in courses taken to-date of MATH 425, PHYS 407, CHEM 405 or CHEM 403, CIE 525 or ME 525, and CIE 526 or ME 526;
- d. a minimum grade of C+ in courses taken to-date of CIE 525 and CIE 526.

2. Students who are transferring into the civil engineering major may only transfer in the following:

- a. a maximum of 20 credits for CIE and ENE 600- and 700-level coursework,
- b. CIE and ENE 600- and 700-level courses in which the student has received a grade of C- or better.

3. To continue as a civil engineering major, a student must adhere to the following restrictions:

- a. a maximum of two CIE or ENE courses may be repeated (though each of these may be repeated more than once),
- b. a semester grade-point average lower than 2.0 may be earned for a maximum of two consecutive semesters,
- c. a cumulative grade-point average of less than 2.0 for CIE and ENE courses may be earned

for a maximum of any two semesters.

4. CIE and ENE 600- and 700-level courses are intended for CIE and ENE majors only. All others may enroll in these courses only with the permission of the instructor, but others may take no more than 20 credits of these courses.

5. To enter the required 600-level courses in the junior year, students must achieve the following:

- a. the completion of CIE 525, CIE 526, MATH 425, PHYS 407, and CHEM 405 or CHEM 403,
- b. an overall grade-point average of 2.0 or greater for these courses,
- c. a grade of C or better in each of CIE 525 and CIE 526.

6. To graduate with a bachelor of science in civil engineering, a student must achieve the following:

- a. 130 or more credits,
- b. credit for the civil engineering program's major and elective courses,
- c. satisfaction of the University's **Discovery Program requirements**,
- d. satisfaction of the University's **writing intensive course requirements**,
- e. a cumulative grade-point average of 2.0 or better for all courses,
- f. a cumulative grade-point average of 2.0 or better for all CIE and ENE courses.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	402	Intro. to Civil Engineering	4	-
ENGL	401	First-Year Writing	4	-
TECH	564	Fundamentals of CAD	3	-
Elective (2)		Discovery Program requirement*	4	4
CIE	505	Surveying and Mapping	-	4
MATH	425	Calculus I	-	4

PHYS	407	General Physics I	-	4
Total			15	16

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	525	Statics	3	-
ENGL	502	Technical Writing	4	-
MATH	426	Calculus II	4	-
PHYS	408	General Physics II	4	-
Elective (2)		Discovery Program requirement*	4	4
CHEM	405	General Chemistry	-	4
CIE	526	Strength of Materials	-	3
CIE	533	Project Engineering	-	3
MATH	644	Statistics for Engineers and Scientists	-	4
Total			19	18

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	622	Engineering Materials	4	-
CIE	642	Fluid Mechanics	4	-
ENE	520	Environmental Pollution and Protection	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
CIE	665	Soil Mechanics	-	4
CIE	681	Classical Structural Analysis	-	3
ENE	645	Fundamental Aspects of Environmental Engineering	-	4



Elective (1)		Discovery Program requirement*	-	4
Total			16	15

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	760	Foundation Design I	4	-
CIE	774	Reinforced Concrete Design	4	-
CIE	784	Intro. to Project Planning and Design***	1	-
Elective (1)		Discovery Program requirement*	4	
Elective (3)		Civil Engineering**	3	6
CIE or ENE	788	Project Planning and Design***	-	3
Elective (1)		Civil Engineering Design**	-	3
Elective (1)		Senior Technical Elective**	-	3
Total			16	15

\*A course satisfying one each of the Discovery Program categories of Biological Science, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science.

\*\* Approved list available in the CIE office.

\*\*\* Satisfies capstone requirement for Discovery.

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## Computer Science (CS) ▼

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*Affiliate Associate Professor:* Sylvia Weber Russell, Mihaela Sabin

*Assistant Professor:* Wheeler Ruml

*Affiliate Assistant Professor:* Michael S. Deutsch, Anthony J. Lapadula, Matthew Plumlee, Kurt Schwehr

*Instructor:* Michael Gildersleeve, Brian L. Johnson, Israel J. Yost

*Lecturer:* Mark L. Bochert, Ellen M. Hepp, Karl Shump

## **Computer Science**

Undergraduate students may choose from one of three degree options: The B.S. in computer science, which is designed for students interested in the design and implementation of software systems; the B.S. in computer science: bioinformatics option, which is designed for students who wish to apply computer science expertise in the life sciences; and the B.S. in information technology, which focuses on the application of existing computing technologies to the information needs of organizations and individual computer users.

### **Bachelor of Science in Computer Science**

Computer scientists are concerned with problem-solving in general, with particular emphasis on the design of computer-efficient solutions. This involves a detailed understanding of the nature of algorithms, the software implementation necessary to utilize algorithms on computers, and how algorithms can be combined in a structured manner to form highly complex systems.

#### **The broad objectives for B.S. in Computer Science graduates are:**

1. To be competent in formulating and solving computer science problems, including the development of complex software systems;
2. To understand computer science fundamentals along with supporting mathematics and science so they will be prepared for a wide range of jobs and the pursuit of advanced degrees;
3. To be able to function in the workplace with the necessary technical skills and with appropriate oral and written communication skills; and
4. To have a broad education that promotes professional advancement, lifelong personal development, and social responsibility.

The B.S. in computer science program is accredited by the Computing Accreditation Commission of ABET, 111 Market Place, suite 1050, Baltimore, MD 21202-4012, (410) 347-

7700.

The program is designed to prepare students for employment and/or graduate study. Most courses require heavy computer use, and the laboratories stress hands-on experience with building software systems.

Computer science majors must maintain an overall grade-point average of 2.0 or better in all required computer science, mathematics, and computer engineering courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as a CS major. In order to be able to take a CS or MATH course with prerequisites, the prerequisite course(s) must be passed with a grade of a C- or better.

Computer science majors should not take CS 401, CS 405, or CS 410.

If a student wishing to transfer into the computer science major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in computer science. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

The curriculum includes coursework in mathematics, computer engineering, science, English, and philosophy. The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
CS	415	Introduction to Computer Science I	4	
MATH	425	Calculus I	4	
	444	Inquiry	4	
		Discovery	4	
CS	416	Introduction to Computer Science II		4
MATH	426	Calculus II		4
ENGL	401	First-Year Writing		4

		Discovery Science*		4
		Total	17	16

\*Students are required to take four science courses. You must have at least one course in a biological science and at least one course in a physical science. Two courses must be a sequence and should be chosen from the following list: BIOL 411-412, CHEM 403-404, ESCI 401-402, ESCI 409-402, or PHYS 407-408. The other two courses must be chosen from the following two tables:

### Biological Science

Abbreviation	Course Number	Title
BIOL	411	Principles of Biology I
BIOL	412	Principles of Biology II
BIOL	413	Principles of Biology I (UNH Manchester Course)
BIOL	414	Principles of Biology II (UNH Manchester Course)
BMS	412	Biology of Animals
ECE	444	Bionics
MICR	501	Public Health Microbiology
PBIO	412	Introduction to Botany

### Physical Science

Abbreviation	Course Number	Title
CHEM	403	General Chemistry I
CHEM	404	General Chemistry II
CHEM	405	General Chemistry
ESCI	401	Principles of Geology
ESCI	402	Earth History
ESCI	409	Environmental Geology
ESCI	501	Introduction to Oceanography
NR	433	Wildlife Ecology
NR	504	Freshwater Resources
PHYS	407	General Physics I

PHYS	408	General Physics II
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**Sophomore Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	515	Data Structures	4	
MATH	531	Mathematical Proof	4	
		Discovery Science	4	
		Discovery	4	
CS	520	Assembly Language Programming and Machine Organization		4
CS	659	Introduction to the Theory of Computation		4
		Discovery Science		4
		Discovery		4
		Total	16	16

**Junior Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	620	Operating System Fundamentals	4	
CS	516	Introduction to Software Design and Development	4	
		Statistics Course*	4	
PHIL	424	Science, Technology and Society (Discovery ETS)	4	
CS	671	Programming Language Concepts and Features		4
		Computer Science Theory Course**		4
ECE	543	Introduction to Digital Systems		4
CS	595	Computer Science Seminar		2
ENGL	502	Technical Writing		4
		Total	16	18

\*The statistics requirement can be fulfilled by MATH 539, Introduction to Statistical Analysis, or MATH 644, Statistics for Engineers and Scientists.

\*\*The CS theory requirement can be fulfilled by CS 712, Compiler Design, CS 745 Formal

## Specification and Verification of Software Systems, or CS 758, Algorithms.

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	791	Senior Project I*	2	
CS		Writing Intensive Course	4	
ECE	562	Computer Organization	4	
		Discovery	4	
CS	792	Senior Project II*		2
CS	700-Level	Elective		4
CS	700-Level	Elective		4
		Discovery Science		4
		Free Elective		1
		Total	14	15

\*This is the senior capstone course.

**Bachelor of Science in Computer Science: Bioinformatics Option**

The bioinformatics field is an increasingly important sub-discipline in computer science. The demand for computer science graduates who can apply their knowledge in the life sciences is significant, and is expected to continue to grow. Students who choose this path are still computer science majors but have a concentration in the life sciences. The option has the same core as the B.S. program but requires appropriate coursework in chemistry, biology, biochemistry, and statistics.

Computer science: bioinformatics majors must maintain an overall grade-point average of 2.0 or better in all required computer science, mathematics, computer engineering, biology, and biochemistry courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as a computer science: bioinformatics major. In order to be able to take a CS or MATH course with prerequisites, the prerequisite course(s) must be passed with a grade of a C- or better.

Computer bioinformatics majors should not take CS 401, CS 405, or CS 410.

If a student wishing to transfer into the computer science: bioinformatics major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in computer science. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

**The broad objectives for B.S. in Computer Science: Bioinformatics graduates are:**

1. To be competent in formulating and solving computer science problems, including the development of non-trivial software systems;
2. To understand computer science fundamentals along with supporting mathematics and science so they will be prepared for a wide range of jobs in the biomedical industry and the pursuit of advanced degrees in both computer science and bioinformatics;
3. To be able to function in the workplace with the necessary technical skills and with appropriate oral and written communication skills; and
4. To have a broad education that promotes professional advancement, lifelong personal development, and social responsibility.

The B.S. in computer science: bioinformatics program is accredited by the Computing Accreditation Commission of ABET, 111 Market Place, suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

**First Year**

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
CS	415	Introduction to Computer Science I	4	
MATH	425	Calculus I	4	
BIOL	411	Principles of Biology I	4	
	444	Discovery	4	

CS	416	Introduction to Computer Science II		4
MATH	426	Calculus II		4
BIOL	412	Principles of Biology II		4
ENGL	401	First-Year Writing		4
		Total	17	16

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
CS	515	Data Structures	4	
MATH	531	Mathematical Proof	4	
CHEM	403	General Chemistry I	4	
		Discovery	4	
CS	520	Assembly Language Programming and Machine Organization		4
CS	659	Introduction to the Theory of Computation		4
CHEM	404	General Chemistry II		4
		Discovery		4
		Total	16	16

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
CS	620	Operating Systems Fundamentals	4	
		Statistics Course*	4	
CS	516	Introduction to Software Design and Development	4	
PHIL	424	Science, Technology and Society (Discovery ETS)	4	
CS	595	Computer Science Seminar	2	
CS	671	Programming Language Concepts and Features		4
		Computer Science Theory Course**		4
BIOL	604	Principles of Genetics		4
ENGL	502	Technical Writing		4
		Total	18	16



\*The Statistics requirement can be fulfilled by MATH 539, Introduction to Statistical Analysis, or MATH 644, Statistics for Engineers and Scientists.

\*\*The CS theory requirement can be fulfilled by CS 712, Compiler Design, CS 745 Formal Specification and Verification of Software Systems, or CS 758, Algorithms.

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
CS	791	Senior Project I*	2	
BCHEM	711	Genomics and Bioinformatics	4	
	700-Level	Statistics Course**	4	
		Discovery	4	
CS	792	Senior Project II		2
CS		Writing Intensive Course***		4
CS	775	Database Systems		4
ECE	543	Introduction to Digital Systems		4
		Discovery		4
		Total	14	18

\*This is the senior capstone course.

\*\*This requirement can be fulfilled by the following courses: MATH 739, Applied Regression Analysis; MATH 742, Multivariate Statistical Methods; or MATH 755, Probability and Stochastic Processes with Applications.

\*\*\*This course must include a project that addresses bioinformatics issues.

### The Minor in Computer Science

The minor in computer science is designed for students in other majors who want to learn the fundamentals of designing and implementing computer software.

Credit toward the minor will be given only for courses passed with C- or better, and a 2.0 grade-point average must be maintained in courses for the minor. Courses taken on the pass/fail basis may not be used for the minor. Students should declare their intent to earn a minor as early as possible and no later than the end of the junior year. During the final term, an

application should be made to the dean of the student's major college to have the minor shown on the academic record. Students must consult with their major adviser and also the minor supervisor.

**Requirements:**

Abbreviation	Course Number	Title
CS	415	Introduction to Computer Science I
CS	416	Introduction to Computer Science II
CS	515	Data Structures

**Two additional courses chosen from:**

Abbreviation	Course Number	Title
CS	516	Introduction to Software Design and Development
CS	520	Assembly Language Programming and Machine Organization
CS	620	Operating System Fundamentals
*CS	659	Introduction to the Theory of Computation
CS	671	Programming Language Concepts and Features
		An approved CS 700-level course

\*CS 659 has mathematics prerequisites: MATH 425, MATH 426, and MATH 531.

**The Bachelor of Science in Information Technology**

Information technology is concerned primarily with the application of existing computing technologies to the information needs of organizations and individual computer users. Potential careers include network administrator, database developer, system administrator, and webmaster.

IT programs aim to provide graduates with the skills and knowledge to take on appropriate professional positions in information technology upon graduation and grow into leadership positions in the field. Specifically, within five years of graduation a student must be able to:

1. apply the full range of core IT concepts and techniques to fill the IT needs of an organization and be prepared to assume managerial and other advanced responsibilities,
2. confront new problems effectively and anticipate the changing directions of technology,

3. communicate effectively with diverse stakeholders as well as function appropriately in a team environment,
4. navigate within the complex relationships between IT and larger organizational goals, and
5. understand the pervasive and changing role of computing technology in global society, and participate responsibly as both IT professional and citizen.

The B.S. in information technology degree program was approved by the College of Engineering and Physical Sciences in May 2008 and the USNH Board of Trustees in fall 2008. The university welcomed its first IT class in fall 2009. Note: the B.S. in information technology degree program has not yet been accredited by the Accreditation Board for Engineering and Technology because ABET requires new programs to graduate students before they are eligible. The CS department will apply for accreditation when it graduates its first class in May 2012.

Information technology majors must maintain an overall grade-point average of 2.0 or better in all required information technology and computer science required courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as an IT major. All required IT courses offered by the CS department at the 400-600 level must be passed with a C- or better.

If a student wishing to transfer into the information technology major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in Information Technology. The student must have an overall grade-point average of 2.0 or better in all courses taken at the University.

The IT major requires students to take the equivalent of 10 courses within the CS department that constitute the core coverage of the breadth of IT topics. In addition, students must choose a depth track, consisting of three courses that focus on a more specialized area within the IT field. The CS department currently offers a Web track and an Admin track. Students who choose the Web Track must take IT 604, Intermediate Web Development; IT 775, Database Technology; and IT 704, Advanced Web Topics. Students who opt for the Admin Track must take IT 609, Network/System Administration; IT 725, Network Technology; and IT 775, Database Technology.

The IT curriculum includes a number of courses outside of the CS department. Two courses in mathematics are required: Calculus I (MATH 425) and a statistics course (MATH 439). A two-semester lab science sequence is also required, as are a philosophy course (PHIL 424) and a technical writing course (ENGL 502).

In addition, by the end of their sophomore year, each student must choose a second discipline in a particular domain outside of IT to which the student's IT skills can be applied. Second disciplines (typically five courses) have been defined by the CS department in such areas as business administration, health management and policy, and justice studies. If a student is interested in an area that is not currently defined, the option of a student-designed second discipline is also available.

The following is a sample schedule depicting the necessary requirements and the layout of the curriculum. Students must consult with their advisers in order to come up with the proper schedule for themselves.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
CS	400	Introduction to Computing	1	
MATH	425	Calculus I (Discovery)	4	
CS	403	Weaving the Web (Discovery ETS)	4	
CS	415	Introduction to Computer Science I	4	
		Discovery	4	
IT	506	Intermediate Applications Programming with Visual Basic (or CS 416 Introduction to Computer Science II)		4
IT	502	Intermediate Web Design*		4
ENGL	401	First-Year Writing (Discovery)		4
		Discovery		4
		Total	17	16

\*Meets Discovery Inquiry requirement.

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
MATH	439	Statistical Discovery for Everyone	4	
IT	505	Database Programming	4	
		Discovery	4	
		Lab Science I & II (Discovery)*	4	4
IT	520	Computer Architecture		4
ENGL	502	Technical Writing		4

		Discovery		4
		Total	16	16

\* Students are required to take a 2 course lab sequence chosen from the following list: BIOL 411-412, CHEM 403-404, ESCI 401-402, ESCI 409-402, PHYS 401-402, or PHYS 407-408.

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
		Depth Track I	4	
PHIL	424	Science, Technology and Society	4	
		Second Discipline I	4	
		Discovery	4	
CS	600	Internship		1
CS	595	Computer Science Seminar		2
IT	666	Computer Security		4
		Second Discipline II		4
		Discovery		4
		Total	16	15

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
		Depth Track II	4	
		Second Discipline III	4	
		Second Discipline IV	4	
IT	705	Project Management	4	
IT	710	Senior Project*		4
		Second Discipline V		4
		Depth Track III		4
		Free Elective		4
		Total	16	16

\*Meets Discovery Capstone Experience requirement.

### Minor in Information Technology

The information technology (IT) minor is a way for students in non-technical majors to bridge the gap between a primarily non-technical education and a technical world. Graduates from a variety of fields are discovering that there is a great need to have computer competency in addition to the knowledge they gain in their major; the IT minor, which is tailored to grow students' understanding of computer and information technology applications, helps prepare students for the future.

Students who minor in IT must complete a minimum of 20 credits of IT courses. All students must take IT 520, Computer Architecture, as well as an introductory programming course. The other three courses may be chosen from the list below.

Credit toward the minor will be given only for courses passed with C- or better, and a 2.0 grade-point average must be maintained in courses for the minor. Courses taken on the pass/fail basis may not be used for the minor. Students should declare their intent to earn a minor as early as possible and no later than the end of the junior year. During the final term, an application should be made to the dean of the student's major college to have the minor shown on the academic record. Students must consult with their major adviser and also the minor supervisor.

#### Requirements:

Abbreviation	Course Number	Title
		1.
IT	520	Computer Architecture
		2. A programming course chosen from the following list:
CS	405	Introduction to Applications Programming with Visual Basic
CS	410	Introduction to Scientific Programming
CS	503	Introduction to Web Programming
		3. Three courses from the following list
CS	403	Weaving the Web: Creating Content for the World Wide Web
IT	502	Intermediate Web Design
IT	505	Database Programming
IT	506	Intermediate Applications Programming with Visual Basic

IT	604	Intermediate Web Development
IT	609	Network/System Administration
IT	666	Computer Security

## Earth Sciences (ESCI) ▼

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*Affiliate Associate Professor:* Mark A. Fahnestock, Douglas C. Vandemark

*Assistant Professor:* Margaret S. Boettcher, Rosemarie E. Came, Joel E. Johnson, Linda Kalnejais, Anne Lightbody

*Affiliate Assistant Professor:* Joseph Salisbury, Mary D. Stampone

The courses offered in the Department of Earth Sciences cover the broad spectrum of geosciences, with emphases on geology, hydrology, geochemistry, and oceanography. The curriculum encompasses a group of related studies concerned with an understanding of the Earth and its environment. Study of the processes that shape the continents and oceans, drive the hydrologic cycle and ocean circulation, and affect climate change and the evolution of life is based on a foundation of basic mathematics, physics, and chemistry.

The need for people trained in the Earth and environmental sciences has been increasing in response to society's growing concern with sound environmental and resource management. Issues of particular concern include the impact of global climate change; the management of water resources; the development of energy and mineral resources; the disposal of waste on land and in the atmosphere and oceans; and the assessment of environmental hazards. In addition, the demand for well-trained secondary school teachers of Earth sciences has been steadily increasing.

The Department of Earth Sciences offers five majors: B.S. geology, B.S. environmental

sciences (interdisciplinary with the College of Life Sciences and Agriculture), B.A. Earth sciences, B.A. Earth sciences/oceanography, and B.A. Earth science teaching. These programs prepare students for advanced study in the geosciences; for entry-level professional employment in public or private institutions concerned with environmental and resource management, including consulting firms, government agencies, energy- and resource-extraction firms, utilities, and nonprofit organizations; and for secondary-school teaching of Earth sciences.

The Department of Earth Sciences also offers a minor in geology, as well as an interdisciplinary minor in oceanography.

Descriptions and requirements for the majors and minors are arranged alphabetically.

### ***Bachelor of Arts in Earth Sciences***

The bachelor of arts in Earth sciences is offered through the Department of Earth Sciences. This program provides students an opportunity to obtain a broad education and a general background in the Earth sciences with a greater degree of freedom in choosing electives than in the bachelor of science programs. By careful choice of electives, students can prepare for graduate school, business, or industry.

#### **Requirements**

1. Satisfy the **Discovery Program requirements**. ESCI 401, 402, 405, 409, 420, 501 cannot be taken to fulfill Discovery Program requirements.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete a minimum of eight courses in the department (with a C- or better), including ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 512, Principles of Mineralogy; and five upper-level courses, two of which must be 700 or above.
4. Math requirements: 425, Calculus I, and 426, Calculus II.

It is strongly advised that students complete, as early as possible, a year each of college chemistry and physics.

### ***Bachelor of Arts in Earth Sciences, Oceanography Option***

The bachelor of arts in Earth sciences, oceanography option, is offered by the Department of Earth Sciences. This program provides students an opportunity to obtain a broad education and a general background in the Earth sciences, as well as the flexibility to choose electives in the area of oceanography. A clear, comprehensive understanding of the ocean environment



will prepare students for graduate school or for employment opportunities available on our coasts in ocean-related fields such as aquaculture, fishing, tourism, environmental protection, shipping, construction, government regulation, and education.

**Requirements**

1. Satisfy the **Discovery Program requirements**. ESCI 401, 402, 405, 409, 420, 501 cannot be taken to fulfill Discovery Program requirements.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete a minimum of eight courses in the department (with a C- or better) including ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History or ZOOL 503, Introduction to Marine Biology; ESCI 501, Introduction to Oceanography; ESCI 512, Principles of Mineralogy; and four upper-level ocean related courses, two of which must be 700 or above. Typically these would be chosen from ESCI 658, Earth, Ocean, and Atmosphere Dynamics; ESCI 750, Biological Oceanography; ESCI 752, Chemical Oceanography; ESCI 758, Physical Oceanography; and ESCI 759, Geological Oceanography.
4. Math requirements: 425, Calculus I, and 426, Calculus II.

It is strongly advised that students complete, as early as possible, a year each of college chemistry and physics.

***Oceanography Minor***

See the **Special University Programs**, Interdisciplinary Programs, and **Marine Sciences** sections of the catalog.

***Bachelor of Arts in Earth Science Teaching***

The bachelor of arts in Earth science teaching program is offered by the Department of Earth Sciences in coordination with the Department of Education. The program is specifically designed to prepare students to teach Earth sciences in secondary school. Upon graduation from this program, students are prepared to complete a masters degree in Education with an additional year of graduate study, which includes a year-long internship (EDUC 900/901). After completing this typically five-year program, students receive full teacher certification, which is recognized in most states.

**Requirements**

1. Satisfy the **Discovery Program requirements**.
2. Satisfy the **bachelor of arts degree requirements**.
3. Complete the following: ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 501, Introduction to Oceanography; GEOG 473,

The Weather; CHEM 403-404, General Chemistry; PHYS 401-402, Introduction to Physics I and II; PHYS 406, Introduction to Modern Astronomy; plus 12 approved elective credits from intermediate and/or advanced Earth sciences courses.

4. Math requirements: 425, Calculus I, and 426, Calculus II.

5. Satisfy the [secondary-school teacher education program](#).

### ***General Science Certification***

Students majoring in animal sciences, biochemistry, biology, Earth sciences, environmental conservation studies, environmental sciences, forestry, microbiology, plant biology, wildlife management, or zoology may seek certification to teach science at the middle, junior, or high school level.

For further information, contact the coordinator of teacher education in the [Department of Education](#).

### ***Bachelor of Science in Geology***

The bachelor of science in geology is offered through the Department of Earth Sciences. The program represents a strong concentration in the Earth sciences and is especially well suited for students who plan to continue their studies in graduate school. Beyond a central core of courses, there is sufficient flexibility in course selection so that students may, in consultation with their academic advisers, orient the program toward a particular facet of the Earth sciences (e.g., mineralogy-petrology, oceanography, hydrogeology, geophysics-structural geology, geomorphology-glacial geology, geochemistry, paleontology-stratigraphy). Students are encouraged to attend an off-campus field camp, for which scholarship funds may be available.

#### **Requirements**

1. Satisfy the [Discovery Program requirements](#) and the [bachelor of science degree requirements](#).

2. Satisfactorily complete MATH 425 and 426, CHEM 403-404 (or CHEM 405), PHYS 407-408, and PHYS 505 or ESCI 658. Some of these courses may also satisfy Discovery Program requirements.

3. Complete a minimum of 12 courses in Earth sciences, which should include ESCI 401, The Dynamic Earth, or ESCI 409, Geology and the Environment; ESCI 402, Earth History; ESCI 501, Introduction to Oceanography; ESCI 512, Principles of Mineralogy; ESCI 614, Optical Mineralogy and Petrography; ESCI 530, Geological Field Methods; ESCI 561, Landscape Evolution; ESCI 631, Structural Geology; ESCI 652, Paleontology; and three approved Earth sciences 700-level electives.

4. Complete four approved science/math electives. The following should be considered: one additional 700-level course in the Earth sciences; additional courses in mathematics, chemistry,

and physics; courses in computer science, engineering, and the biological sciences; and an off-campus field camp.

### ***Capstone Experience***

A capstone experience is required of all our undergraduate Earth sciences majors during their senior year. All capstone experiences at UNH must meet one or more of the following criteria:

1. The capstone synthesizes and applies disciplinary knowledge and skills.
2. The capstone fosters reflection on undergraduate learning and experience.
3. The capstone demonstrates emerging professional competencies.
4. The capstone applies, analyzes, and/or interprets research or data or artistic expression.
5. The capstone explores areas of interest based on the integration of prior learning.

Examples of Department of Earth Sciences capstone experiences include Senior Thesis (ESCI 799), UROP/SURF projects, environmental or geologic field camps, or Earth Sciences education and outreach activities. Additional experiences may qualify (e.g. ESCI 795/796 field courses, INCO 590, INCO 790, internships) if they are designed according to the above criteria.

Students should work closely with their advisers to define the most appropriate capstone experience for their Earth sciences degree option and all capstone experiences must be approved by the Department of Earth Sciences undergraduate coordinator. Presentation of projects or experiences developed for the capstone is encouraged at the annual UNH Undergraduate Research Conference or other appropriate venue.

### ***Geology Minor***

Any University student who is interested in Earth sciences may minor in geology. The minor consists of at least 18 semester hours, typically from five ESCI courses, each with a grade of C- or better, while maintaining a cumulative grade-point average of 2.0. A maximum of eight credits may be used for both major and minor credit. Courses include both introductory and more advanced courses. Specific course requirements are flexible to accommodate the student's interest in different facets of the geosciences. Interested students should see the Earth sciences undergraduate coordinator to complete an Intent to Minor form no later than their junior year.

### **Environmental Sciences**

[www.unh.edu/envsci/](http://www.unh.edu/envsci/)

The College of Engineering and Physical Sciences (CEPS) and the College of Life Science and Agriculture (COLSA) jointly offer a Bachelor of Science Degree in Environmental Sciences. Environmental sciences is an interdisciplinary field concerned with the interaction of biological, chemical, and physical processes that shape our natural environment. Students graduating with a degree in Environmental Sciences will have an understanding of these interacting processes, the ability to effectively communicate with both scientific and lay audiences,

competency in field methods appropriate for entry-level environmental science positions, competency in the use and application of Geographic Information Systems (GIS), a basic understanding of environmental policy, and the ability to contribute to multidisciplinary teams.

The University of New Hampshire is a recognized leader in environmental sciences research, and the environmental sciences program capitalizes on faculty expertise in this area. The program has 12 full-time faculty members, with major teaching and research emphases in the areas of biogeochemical cycling, environmental chemistry, ecosystem science, global change, hydrology, plant ecology, soil science, and water resource management.

Employment opportunities include: environmental consulting firms, educational facilities (e.g., science centers), environmental monitoring laboratories (e.g., water treatment plants; the Environmental Protection Agency), government agencies (e.g., the U.S. Geological Survey, Bureau of Land Management, Natural Resource Conservation Service), university and government research laboratories, and nongovernment environmental organizations. The environmental sciences program also constitutes an excellent preparation for graduate programs in several areas relating to the environment. Students should consult with their adviser early if their goals include further study.

#### **Requirements**

In addition to **Discovery Program and University Writing requirements**, all students will take Introduction to Environmental Science (NR 403) and Professional Perspectives in Natural Resources (NR 400), plus one other elective introductory environmental science course.

Foundation courses include two semesters of chemistry (CHEM 403, 404) and calculus (MATH 425, 426), one semester of geology (ESCI 401, 402, or 409), one semester of statistics (MATH 644 or BIOL 528), one semester of physics (PHYS 407) and one approved biology course.

Core courses include Techniques in Environmental Sciences (ESCI 534), Introduction to GIS (NR 658), Fate and Transport in the Environment (ESCI 654), Natural Resource and Environmental Policy (NR 602), and a capstone experience (NR 791) and an independent study or capstone course approved by the program coordinator.

Students must complete an additional eight courses in one of the following options:

#### **Hydrology**

PHYS 408, General Physics II

ESCI 561, Landscape Evolution

NR 501, Studio Soils, or ESCI 512, Principles of Mineralogy

ESCI 705, Principles of Hydrology

ESCI 710, Groundwater Hydrology

Two approved electives

### **Soil and Watershed Management**

PHYS 408, General Physics II, or NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 501, Studio Soils

NR 703, Watershed Water Quality Management

NR 706, Soil Ecology, or NR 744, Biogeochemistry

Three approved electives

### **Ecosystems**

NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 730, Terrestrial Ecosystems

NR 765, Community Ecology

NR 751, Aquatic Ecosystems

Four approved electives

For a list of approved elective courses and for further information about the major, contact the program coordinator, Ruth K. Varner, 450 Morse Hall, (603) 862-0853; [ruth.varner@unh.edu](mailto:ruth.varner@unh.edu)

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## **Electrical and Computer Engineering (ECE) ▼**

» <http://www.ece.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Kent A. Chamberlin, L. Gordon Kraft, John R. LaCourse, W. Thomas Miller III, Andrzej Rucinski

*Affiliate Professor:* Charles H. Bianchi, William H. Lenharth, George Markowsky, Wolfgang Rehak

*Associate Professor:* Michael J. Carter, Allen D. Drake, Andrew L. Kun, Richard A. Messner

*Research Associate Professor:* Brian R. Calder

*Affiliate Associate Professor:* Raymond Barrett, Brad Gillespie, Barbara Kraft, Jipeng Li, Timothy Paek

*Assistant Professor:* Nicholas J. Kirsch, Qiaoyan Yu

*Instructor:* Francis C. Hludik Jr.

*Lecturer:* Christopher Bancroft, Wayne J. Smith

The Department of Electrical and Computer Engineering offers a B.S. in electrical engineering

and a B.S. in computer engineering. Both degree programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone (401) 347-7700.

Electrical engineers design, develop, and produce the electrical and electronic systems upon which modern society has come to depend: basic infrastructure, such as the electric power grid and fiber optic communication lines; public conveniences, such as mag lev transporters and LED signs; consumer products, such as iPods and MP3 players; personal communication devices, such as cell phones and BlackBerry© devices; military systems, such as rail guns and laser weapons; instruments that can image the ocean floor or analyze the Earth's atmosphere from satellites; and medical diagnostic machines like CAT and MRI scanners. Almost every facet of modern life is touched by the work of electrical engineers.

At UNH, the cornerstone of the electrical engineering program is the involvement of students in the solution of real-world problems. Students electing this major gain knowledge of advanced electronic circuit and system design through the use of computer-aided design tools, hardware circuit prototyping, and hands-on laboratory testing.

Computers have become embedded in virtually every engineering system. Computer engineering, traditionally a subset of electrical engineering, is a rapidly growing field that emphasizes the design, interfacing, hardware/software tradeoffs, and real-time applications of computers. Students who elect this major will gain a knowledge of both hardware and software concepts, and will learn to design, build, and test systems containing digital computers.

#### ECE Department Mission

The mission of the department is to foster and advance knowledge in electrical and computer engineering.

The mission involves:

- teaching courses in electrical and computer engineering and related fields at the bachelor's, master's, and doctoral levels;
- advancing knowledge through research and scholarship;
- serving the state and nation by making the department's intellectual resources available to industry and government agencies. The undergraduate EE and CE programs shall provide a firm foundation in electrical and computer engineering theory and practice, with a mix of laboratory and design experiences. The programs also shall foster teamwork and project management skills.

The graduate ECE program shall lead to the degrees of master of science in electrical

engineering and the doctor of philosophy in electrical and computer engineering. Research and scholarship are core components of the department's mission and they directly impact undergraduate and graduate education. Success in obtaining funds to procure equipment and support research efforts is therefore an essential objective for the department.

The department recognizes the need to conduct periodic reviews and adjustments to meet the current and projected needs of the state and nation according to its mission objectives. The current mission was approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in October 2001, and ratified by the ECE Industrial Advisory Board in April 2002. The mission was reaffirmed by the ECE Industrial Advisory Board in November 22, 2004 and on October 26, 2009.

*Electrical Engineering and Computer Engineering Program Educational Objectives*

The Department of Electrical and Computer Engineering has adopted a set of program educational objectives that consists of statements describing the expected accomplishments of graduates during the first several years following graduation from either program:

- graduates will function at a technically outstanding level in formulating and solving problems in their respective program area;
- graduates will produce competent written and oral reports, and provide project management and leadership;
- through a thorough grounding in engineering fundamentals, graduates will be prepared for a successful engineering career amid future technological changes;
- through a well-rounded education, graduates will be able to respond to changing career paths, to maintain an interest in lifelong learning, and to advance professionally;
- graduates will be creative and ethical when dealing with contemporary issues facing society in local, global, historical, social, economic, and political contexts in relation to electrical and computer engineering;
- graduates will be able to design, prototype, and test electrical and computer engineering designs using state-of-the-art test equipment in a laboratory environment.

The electrical and computer engineering educational program objectives were approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in November 2001, and ratified by the ECE Industrial Advisory Board in March 2002. The program educational objectives were reaffirmed by the ECE Industrial Advisory Board on November 22, 2004 and on October 26, 2009.

*Electrical Engineering and Computer Engineering Program Educational Outcomes*

The Department of Electrical and Computer Engineering has adopted a set of program educational outcomes that consists of statements describing what students are expected to know and are able to do by the time of graduation, the achievement of which indicates that the student is equipped to achieve the program objectives. The current electrical engineering

program educational outcomes and computer engineering program educational outcomes are:

- 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;
- an ability to function on multidisciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an ability to communicate effectively;
- an understanding of professional and ethical responsibility;
- the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- a recognition of the need for, and ability to engage in, lifelong learning;
- a knowledge of contemporary issues;
- an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

Electrical and computer program educational outcomes were approved by the ECE faculty in March 2001 and again on October 27, 2009, approved by the ECE Student Advisory Board in October 2001, and ratified by the ECE Industrial Advisory Board in March 2002. The program educational outcomes were reaffirmed by the ECE Industrial Advisory Board on November 22, 2004 and on October 26, 2009.

Students contemplating a decision between the electrical engineering and computer engineering degree programs should consider both the similarities and differences of the two programs. The two curricula require the same foundational courses in mathematics, physics, analog and digital electronic circuits, and a capstone senior design project. The computer engineering degree program requires additional fluency in software development and advanced computer system and hardware design. The electrical engineering degree program requires advanced study in analog and mixed-signal electronic circuit and system analysis and design. Discovery Program requirements are identical for both degree programs.

### **Electrical Engineering Program**

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements.

1. Any electrical engineering major whose cumulative grade-point average in ECE courses is less than 2.0 during any three semesters will not be allowed to continue as an electrical engineering major.



2. Electrical engineering majors must achieve a 2.0 grade-point average in ECE courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their advisers' assistance, should plan their programs based on the distribution of courses in the following chart.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	401	Perspectives in Electrical & Computer Engineering	4	-
MATH	425	Calculus I	4	-
CS	410	Introduction to Scientific Programming*	4	-
CHEM	405	General Chemistry	4	-
PHYS	407	Physics I	-	4
ENGL	401	First-Year Writing	-	4
MATH	426	Calculus II	-	4
		Discovery Program Category*	-	4
Total			16	16

\*Students who wish to preserve the option of transferring to the computer engineering major without incurring a delay in graduation should consult with their academic adviser before electing these courses. It is recommended that such students take CS 415, Introduction to Computer Science I, in the fall semester and CS 416, Introduction to Computer Science II, in the spring semester in place of the listed courses.

Students are restricted from taking CS 401 and CS 403.

Students are required to take either ECON 402 or EREC 411 to fulfill the Social Science Category of the Discovery Program.

Fulfilling the EE Program curriculum automatically meets Discovery Category, "Environment, Technology and Society."

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	541	Electrical Circuits	4	-
ECE	543	Introduction to Digital Systems	4	-
PHYS	408	Physics II	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
ECE	548	Electronic Design I	-	4
ECE	562	Computer Organization	-	4
ME	523	Introduction to Statics and Dynamics	-	3
		Discovery Program Category	-	4
Total			16	15

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	602	Engineering Analysis	4	-
ECE	617	Junior Lab I	4	-
ECE	633	Signals and Systems I	3	-
ECE	651	Electronic Design II	4	-
		Discovery Program Category	4	-
ECE	603	Electromagnetic Fields & Waves	-	4
ECE	618	Junior Laboratory II	-	4
ECE	634	Signals and Systems II	-	3
ECE	647	Random Processes and Signals in Engineering	-	3
ECE	694	Engineering Professional Principles		1
Total			19	15

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
		Professional Elective**	4	-
		Professional Elective**	4	-
		Discovery Program Category	4	-
		Discovery Program Category	4	-
ECE	791	Senior Project I*	2	-

		Professional Elective**	-	4
		Professional Elective**	-	4
		Discovery Program Category	-	4
ECE	792	Senior Project II*	-	2
Total			18	14

\*ECE 791 and 792 fulfills Discovery Program Capstone Experience.

\*\*Professional electives normally consist of 700-level ECE courses. Each course must carry at least three credits, and no more than one can be an independent study, special topics, or a project course. An alternative is a student-designed plan approved by the ECE undergraduate committee.

### Computer Engineering Program

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements:

1. Any computer engineering major whose cumulative grade-point average in ECE and CS courses is less than 2.0 during any three semesters will not be allowed to continue as a computer engineering major.
2. Computer engineering majors must achieve a 2.0 grade-point average in ECE and CS courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their advisers' assistance, should plan their programs based on the distribution of courses in the chart below.

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
		Perspectives in Electrical & Computer		

ECE	401	Engineering	4	-
MATH	425	Calculus I	4	-
CS	415	Intro to Computer Science I	4	-
		Discovery Program Category	4	-
ECE	543	Intro to Digital Systems	-	4
MATH	426	Calculus II	-	4
CS	416	Intro to Computer Science II	-	4
ENGL	401	First-Year Writing	-	4
Total			16	16

### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	562	Computer Organization	4	-
PHYS	407	Physics I	4	-
MATH	527	Differential Equations with Linear Algebra	4	-
CS	515	Data Structures	4	-
ECE	583	Design with Programmable Logic	-	4
PHYS	408	Physics II	-	4
CS	520	Assembly Language Programming	-	4
		Discovery Program Category	-	4
Total			16	16

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
ECE	541	Electrical Circuits	4	-
ECE	602	Engineering Analysis	4	-
ECE	633	Signals and Systems I	3	-
		Discovery Program Category	4	-
ECE	548	Electronic Design I	-	4
ECE	603	Electromagnetic Fields and Waves	-	4
ECE	647	Random Processes & Signals in Engineering	-	3
ECE	649	Embedded Microcomputer Based Design	-	4

ECE	694	Engineering Professional Principles		1
Total			15	16

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
ECE	714	Intro to Digital Signal Processing	4	-
		Professional Elective**	4	-
		Professional Elective**	4	-
		Discovery Program Category	4	-
ECE	791	Senior Project I*	2	-
ECE	734	Network Data Communications		4
		Professional Elective**	-	4
		Discovery Program Category	-	4
		Discovery Program Category	-	4
ECE	792	Senior Project II*	-	2
Total			18	18

\*ECE 791 and 792 fulfills Discovery Program Capstone Experience.

\*\* Three professional electives must be selected from the following categories of courses:

At least one from: ECE 711, ECE 715, ECE 717

No more than one from: ADMIN 640, DS 773, DS 774

Any of these: ECE 634, ECE 651, ECE 7XX, CS 620, CS 645, CS 659, CS 671, CS 7XX

Professional electives beyond those mentioned above must carry at least three credits and no more than one can be an independent study, special topic, or a project course. An alternative is a student-designed plan approved by the ECE undergraduate committee.

Students are required to take either ECON 402 or EREC 411 to fulfill the Social Science Category of the Discovery Program.

Students are restricted from taking CS 401 and CS 403.

Fulfilling the CE Program curriculum automatically meets Discovery Category, "Environment, Technology and Society."

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## Environmental Engineering (ENE) ▼

» <http://www.unh.edu/environmental-engineering/>

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*Professor:* Dale P. Barkey, Russell T. Carr, M. Robin Collins, Ihab H. Farag, Nancy E. Kinner, James P. Malley Jr. , Palligarnai T. Vasudevan

*Associate Professor:* Thomas P. Ballestero, Kevin H. Gardner, Nivedita R. Gupta, Jennifer M. Jacobs

*Assistant Professor:* Jillian Goldfarb

*Research Assistant Professor:* Jeffrey S. Melton, Robert M. Roseen, Alison W. Watts

The College of Engineering and Physical Sciences offers a bachelor of science degree in environmental engineering (ENE) and an interdisciplinary minor in environmental engineering.

The bachelor of science degree in environmental engineering is accredited by the engineering accreditation commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

### ***Mission***

The environmental engineering program offers an undergraduate degree in environmental engineering that prepares students for productive careers in the public and private sectors and for graduate studies. The program emphasizes fundamental principles in environmental engineering and design, built upon a strong base of chemistry, physics, mathematics, and engineering science. The program prepares students to work in multidisciplinary teams that analyze, formulate, and communicate sustainable solutions to complex environmental problems. The importance of developing sustainable solutions that provide economic, social, and environmental benefits to society is emphasized. The program instills in its students an appreciation for the responsibilities engineers have to society and teaches them the skills necessary to continue learning and improving their professional expertise throughout their careers.

The ENE degree program provides an opportunity for students to specialize in industrial or

municipal processes. The curriculum prepares students to plan and design systems to minimize the impact of human activity on the environment and protect human health.

### ***Educational Objectives***

ENE program graduates will have the skills, experience, and knowledge to pursue successful careers as environmental engineers. They also will have demonstrated the ability to identify information needs; locate information resources and/or design laboratory or field experiments to attain required information; and evaluate and synthesize data with sound engineering principles, methodologies, and the latest technology into creative, sustainable, safe, and economical engineering solutions to environmental engineering problems. The solutions they develop will minimize the impact of human activities on the environment and protect human health. Program graduates will have a foundation for advanced studies in environmental engineering and oral and written communication skills that will enable them to clearly explain engineering options and recommend solutions to stakeholders. ENE program graduates will have demonstrated in-depth knowledge within environmental engineering and an awareness of potential social, economic, political, and environmental impacts of engineering practices. They will have an appreciation for the contribution of environmental engineers to the benefit of society and the responsibilities of a professional environmental engineer. They will work as part of multidisciplinary teams to arrive at solutions to environmental engineering problems. ENE program graduates will be prepared to obtain professional engineering licensure; have the capacity to continue learning and improving their professional expertise and skills by participating in professional associations, conferences, workshops and courses; and understand the importance of continued professional development.

At the end of the sophomore year, students are required to have a minimum overall grade-point average of 2.0 and a grade-point average of 2.0 in all mathematics, physics, chemistry, and engineering courses to be permitted to enroll in junior-level courses. To qualify for graduation, an ENE major must: have satisfied the previously specified course requirements, have satisfied the University's Academic Requirements, have a minimum cumulative grade-point average of 2.0, and have a minimum grade-point average of 2.0 in engineering courses.

### **Bachelor of Science in Environmental Engineering-Industrial Processes (IP) Emphasis**

The industrial processes (IP) emphasis of environmental engineering is a process-based program that draws on the principles of chemistry, physics, mathematics, and engineering sciences. Due to the complex nature of many aspects of environmental pollution, a broad

understanding of the fundamentals of engineering and sciences forms the most desirable preparation for a career in the environmental field. The program is designed to provide training not only for end-of-pipe pollution control technologies, but also for expertise in process engineering and process design, essential for achieving the objectives of pollution curtailment and prevention. Such training is especially valuable in resolving industrial pollution problems. Career opportunities for environmental engineers with this background are found in industry, research institutes, government agencies, teaching, and consulting practice. Students may also enter graduate study at the M.S. or Ph.D. levels.

Engineering design is a critical aspect of the IP curriculum. In order to meet the objective of producing creative, problem-solving engineers, design concepts are introduced early in the curriculum and design experience is integrated into every engineering course. Students learn to seek optimal solutions to open-ended problems and function in design-based team projects. Design ability is finally demonstrated at the end of the capstone course (ENE 708), when self-directed teams develop a comprehensive design report for a full-scale engineering process based on a national process design competition problem.

Since 1993, the program faculty has administered a pollution prevention internship program with industries in New Hampshire, Maine, and Massachusetts, initially funded by U.S. EPA and NHDES. In the past 12 years, the program has served more than 40 facilities. Each year about 12 students have enrolled in the pollution prevention internship program, which provides hands-on industrial employment for 10 weeks during the summer assisting industry with projects in process modification, material substitution, chemical re-use, risk assessment, safety, and economic analysis. The program faculty also assisted NHDES in setting up instrumentation in the Seacoast region of New Hampshire to monitor the precursor of ozone formation.

The B.S. program requires a minimum of 128 credits for graduation and can be completed in four years. There are nine electives in the curriculum: six for the fulfillment of the University's Discovery Program requirements and the remaining three for technical electives to be chosen from the specified elective course list. ENE-IP students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in their ENE-IP curriculum. Due to the substantial overlap in course requirements for the environmental engineering IP and chemical engineering majors, students will be able to transfer between these two programs during the first three semesters without losing any course credits toward graduation.

### **Suggested Technical Electives**



Abbreviation	Course Number	Title	Credits
CHE	602	Heat Transfer and Unit Operations	3
CHE	614	Separation Processes	3
CHE	707	Chemical Engineering Kinetics	3
CHE	744	Corrosion	4
CIE	766	Introduction to Geo-Environmental Engineering	3
ENE	739	Industrial Wastewater Treatment	3
ENE	746	Bioenvironmental Engineering Design	4
ENE	747	Introduction to Marine Pollution	3
ESCI	409	Geology and the Environment	4
ESCI	561	Landscape Evolution	4
ESCI	705	Principles of Hydrology	4
ESCI	715	Global Atmospheric Chemistry	3

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
CHEM	405	General Chemistry	4	-
MATH	425-426	Calculus I & II	4	4
PHYS	407	General Physics I	-	4
ENGL	401	First-Year Writing	4	-
ENE	400	Environmental Engineering Lectures I	1	-
ENE	401	Environmental Engineering Lectures II	-	1
Discovery Program Electives			4	8
Total			17	17

1. PHYS 407 OR CHEM 405 satisfies the Discovery Physical Science (with lab) category.
2. MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.
3. ENGL 401 satisfies the Discovery Foundation Writing Skills category.
4. ENE-IP students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in the ENE-IP curriculum.

**Sophomore Year**

Abbreviation	Course Number	Title	Fall	Spring
CHE	501-502	Introduction to Chemical Engineering I & II	3	3
CHEM	683-684	Physical Chemistry I & II	3	3
CHEM	685	Physical Chemistry Lab I	2	-
MATH	527	Differential Equations	4	-
PHYS	408	General Physics II	4	-
MATH	644	Statistics for Engineers and Scientists		4
Discovery Program Electives			-	4
Total			16	14

CHE 502 satisfies the Discovery Inquiry requirement.

**Junior Year**

Abbreviation	Course Number	Title	Fall	Spring
CHE	601	Fluid Mechanics and Unit Operations	3	-
CHE	604	Chemical Engineering Thermodynamics	3	-
ENE	612	Unit Operations Lab II	-	3
ENE	742	Solid and Hazardous Waste Engineering	3	-
ENE	756	Environmental Engineering Microbiology		4
CHEM	651-652	Organic Chemistry I & II	3	3
CHEM	653	Organic Chemistry Lab I	2	-
Discovery Program Electives			-	4
Technical Elective (1)				4
Total			14	18

- The intent is to have ENE 756 satisfy the Biological Science requirement of the Discovery Program. It will have a different course number.

**Senior Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
CHE	703	Mass Transfer and Stagewise Operations	3	-
ENE	708	Industrial Process Design	-	4
ENE	709	Fundamentals of Air Pollution and Control	4	-
ENE	713	Unit Operations Lab II	3	-
ENE	752	Process Dynamics and Control	-	4
ENE	772	Physicochemical Processes for Water/Air Quality	-	4
ESCI	710	Groundwater Hydrology	-	4
Technical Electives (2)			6-8	-
Total			16-18	16

ENE 708 satisfies the Discovery Capstone Experience/Course.

**Bachelor of Science in Environmental Engineering-Municipal Processes (MP) Emphasis**

Environmental engineers graduating from the municipal processes (MP) emphasis will plan, design, and construct public and private facilities to minimize the impact of human activity on the environment and to protect human health. For example, environmental engineers with a municipal processes perspective design and build drinking water treatment systems, municipal and industrial wastewater treatment plants, solid waste management facilities, contaminated ground water remediation systems, and hazardous waste remediation facilities. These facilities must meet regulatory requirements, be cost-effective to build and maintain, be safe to operate, and have minimal environmental impact.

In ENE 400 and 401, students are introduced to the full spectrum of environmental engineering projects that they will subsequently explore in design teams during their degree program. As part of these experiences, students visit and tour field sites, and interact with engineers who have been involved in the design and/or construction of the projects. Design is integrated

throughout the curriculum, and particularly emphasized in junior- and senior-level courses. As part of these projects, students analyze treatment alternatives, recommend a system that meets regulatory operational needs, and prepare an implementation schedule and project budget. Detailed design projects are performed in ENE 744 and 746. ENE 788 serves as a capstone design experience where students work on a multi-interdisciplinary environmental engineering projects, and apply skills learned in other courses while working with real-world clients.

The following schedule is a sample of a planned program for environmental engineering students completing the major within the municipal processes emphasis.

### First Year

Abbreviation	Course Number	Title	Fall	Spring
ENE	400, 401	Environmental Engineering Lectures I, II	1	1
ENGL	401	First-Year Writing	4	-
MATH	425, 426	Calculus I, II	4	4
Discovery Electives*			4	4
CHEM	405	General Chemistry	4	-
PHYS	407	General Physics I	-	4
ENGL	502	Technical Writing		4
Total			17	17

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

### Second Year

	Course			

Abbreviation	Number	Title	Fall	Spring
ENE	520	Environmental Pollution and Protection	4	-
ENE	521	Environmental Engineering Seminar	-	1
CIE	525	Statics	3	-
MATH	527	Differential Equations with Linear Algebra	4	-
MATH	644	Statistics for Engineers and Scientists	-	4
CHEM	545	Organic Chemistry Lecture	3	-
CHEM	546	Organic Chemistry Laboratory	2	-
CIE	533	Project Engineering	-	3
TECH	564	Fundamentals of CAD	-	3
Discovery Elective*			-	4
Total			16	15

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

### Third Year

Abbreviation	Course Number	Title	Fall	Spring
CIE	642	Fluid Mechanics	4	-
Technical Elective**			4	-
ENE	645	Fundamental Aspects of Environmental Engineering	-	4
ENE	756	Environmental Engineering Microbiology	-	4
ENE	742	Solid and Hazardous Waste Engineering	3	-

Engineering Lab Elective**			-	4
Hydraulics Elective**			-	3-4
Discovery Elective*			4	-
Total			15	15/16

\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

\*\*Approved lists of technical, hydraulics, engineering laboratory, and ENE design and non-design electives are available from the ENE undergraduate coordinator, Nancy Kinner. Students must take a minimum of three 700-level ENE electives totaling at least 10 credits. One ENE elective course must be from the design category.

\*\*\*The intent is to have ENE 756 satisfy the Biological Science requirement of the Discovery Program

#### Fourth Year

Abbreviation	Course Number	Title	Fall	Spring
ENE	746	Bioenvironmental Engineering Design	4	-
Discovery Elective*			4	-
Environmental Engineering Elective**			3-4	6-8
ENE	744	Physicochemical Treatment Design	-	4
ENE	784	Intro to Project Planning & Design	1	-
ESCI	710	Groundwater Hydrology	-	4
ENE	788	Project Planning and Design	-	3
ENE	749	Water Chemistry	4	-

Total			16/17	17/19
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\*See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401, MATH 425, and PHYS 707, respectively. ENE 520 fulfills the Environmental, Technology, and Society requirement. ENE 784 and 788 fulfill the Senior Capstone requirement. Environmental Engineering Microbiology will fulfill Biological Science. Courses in the ENE:MP curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an inquiry attribute.

\*\*Approved lists of technical, hydraulics, engineering laboratory, and ENE design and non-design electives are available from the ENE undergraduate coordinator, Nancy Kinner. Students must take a minimum of three 700-level ENE electives totaling at least 10 credits. One ENE elective course must be from the design category.

The municipal processes emphasis of the ENE program requires a minimum of 128 total credits for graduation.

### **Environmental Engineering Minor**

The environmental engineering minor is intended primarily for students in engineering and physical sciences, who are not in the chemical, civil, or environmental engineering degree programs. Students contemplating such a minor should plan on a strong background in the sciences and mathematics (including differential equations).

The minor provides a comprehensive introduction to major areas of interest in environmental protection—namely, air pollution and water pollution—through the three required courses. Further breadth in environmental engineering or depth in specific areas can be attained through the choice of appropriate elective courses.

The minor requires a minimum of five courses, as follows: 1) three required courses: ENE 645, Fundamental Aspects of Environmental Engineering; ENE 709, Fundamentals of Air Pollution and Its Control; and ENE 772, Physicochemical Processes for Water and Air Quality Control, or ENE 743, Environmental Sampling and Analysis; 2) a minimum of two elective ENE courses.

Choice of elective courses should be made in consultation with the minor area adviser, Nancy Kinner, civil engineering, or Niva Gupta, chemical engineering. Students normally start this program in the junior year and should declare their intention to enter the program as early as possible during the sophomore year. During the final semester, students must apply to the dean to have the minor appear on the transcript.

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## Integrated Applied Mathematics (IAM) ▼

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## International Affairs (dual major) ▼

For program description, see [Special University Programs](#).

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## Materials Science (MS) ▼

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*Professor:* Olof E. Echt, Todd S. Gross, James E. Krzanowski, Thomas M. Laue, Igor I. Tsukrov

*Associate Professor:* Carmela C. Amato-Wierda, Brad Lee Kinsey, Glen P. Miller, Karsten Pohl

*Research Associate Professor:* Yvon G. Durant, Weihua (Marshall) Ming

*Assistant Professor:* Jian-Ming Tang

*Research Assistant Professor:* John G. Tsavalas

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## Mathematics and Statistics (MATH) ▼

» <http://www.math.unh.edu>

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*Professor:* Liming Ge, Karen J. Graham, Eric L. Grinberg, Donald W. Hadwin, Rita A.



Hibschweiler, A. Robb Jacoby, Ernst Linder, Dmitri A. Nikshych, Samuel D. Shore, Kevin M. Short, Marianna A. Shubov

*Associate Professor:* Maria Basterra, David V. Feldman, Edward K. Hinson, Linyuan Li, Sharon M. McCrone, Junhao Shen

*Assistant Professor:* Timothy P. Fukawa-Connelly, John F. Gibson, Brian W Gleason, Mark Lyon

*Instructor:* Philip J. Ramsey

*Lecturer:* Adam Boucher, Samuel L. Cook, Mehmet Orhon, Neil Portnoy, Yitang Zhang

The Department of Mathematics and Statistics offers a variety of programs. These programs provide flexibility through elective choices and are designed to maximize educational and employment opportunities. Each student must enroll in one specific program; however, changes between programs usually can be accommodated.

The first two years of all programs are similar. In the first year, students are expected to take Calculus I (MATH 425) and Calculus II (MATH 426) as well as an introductory scientific programming course (CS 410). A sophomore typically takes follow-up calculus courses in differential equations (MATH 527) and multidimensional calculus (MATH 528), an introductory statistics course (MATH 539), and a course in mathematical proof (MATH 531). The Senior Capstone Experience is fulfilled by a designated course in each of the degree programs; specific details are given in each program's course listing below.

In addition to its degree programs, the department has an active interest in the actuarial profession and is an examination center for the Society of Actuaries. Those interested in actuarial science should seek the advice of the coordinator of the actuarial program in the department.

For more information about the department's undergraduate programs, visit [www.math.unh.edu](http://www.math.unh.edu).

### ***Standards for Graduation***

To be certified for graduation with a degree from the Department of Mathematics and Statistics, a student must complete:

1. University Academic Requirements
2. All courses used to satisfy the requirements for the major program with a grade of C- or better and have an overall grade-point average of at least 2.0 in these courses.

Note that some Discovery Program requirements will be satisfied by required courses for the major program. In particular MATH 425 satisfies the Discovery Quantitative Reasoning

requirement; PHYS 406 (required for the Math Education Elementary Option) and 407 (required for the Mathematics BS) each satisfy the Discovery Physical Sciences requirement.

### ***Bachelor of Arts, Mathematics Major***

This program may offer a broader liberal arts program than the bachelor of science degree programs. By a careful selection of electives, students can shape this major into a preparation for graduate school, business, or industry.

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527\*, Differential Equations with Linear Algebra

MATH 528\*, Multidimensional Calculus

MATH 531, Mathematical Proof, or MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 761, Abstract Algebra

MATH 762, Linear Algebra

MATH 767, One-Dimensional Real Analysis

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be MATH 797\*\*, Senior Seminar, or MATH 799, Senior Thesis\*\*

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

#### **Other required courses**

CS 410, Introduction to Scientific Programming

#### **Foreign language requirement**

Foreign language requirement as defined by the University for the B.A. degree

### ***Bachelor of Science in Mathematics***

This program offers the strongest concentration in mathematics, requiring courses that are intended to prepare the student for graduate work in mathematics. Through a judicious choice of electives, students may design stronger pre-graduate programs, a program in applied mathematics, or slant the program toward a career in business or industry.

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527\*, Differential Equations with Linear Algebra

MATH 528\*, Multidimensional Calculus

MATH 531, Mathematical Proof, or MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 761, Abstract Algebra

MATH 762, Linear Algebra

MATH 767, One-Dimensional Real Analysis

MATH 784, Topology

MATH 788, Complex Analysis

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be MATH 797\*\*, Senior Seminar, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

### **Other required courses**

CS 410, Introduction to Scientific Programming

PHYS 407-408, General Physics I and II

### ***Bachelor of Science: Interdisciplinary Programs in Mathematics and Its Applications***

The programs in interdisciplinary mathematics prepare students for employment in areas of applied mathematics and statistics. Some of them can lead to graduate work in appropriate fields (e.g., physics, computer science, or economics). The major may consist of mathematics combined with:

- Computer science,
- Economics,
- Statistics,
- Electrical science, or
- Physics

Each program requires at least 10 mathematics courses along with at least six courses in the discipline of the option. Specific requirements for each option are given in the following listing.

### ***Computer Science Option***

#### **Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527, \* Differential Equations with Linear Algebra

MATH 528, \* Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 532, Discrete Mathematics  
MATH 539, Introduction to Statistical Analysis  
MATH 645,\* Linear Algebra for Applications  
MATH 753, Introduction to Numerical Methods I

Two approved MATH courses chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required CS courses**

CS 415, Introduction to Computer Science I  
CS 416, Introduction to Computer Science II  
CS 515, Data Structures  
CS 516, Introduction to Software Design and Development  
CS 658, Analysis of Algorithms  
CS 758, Algorithms  
One approved CS elective chosen in consultation with the academic adviser

***Economics Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 527,\* Differential Equations with Linear Algebra  
MATH 528,\* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645,\* Linear Algebra for Applications  
MATH 739, Applied Regression Analysis  
MATH 753, Introduction to Numerical Methods I  
MATH 755, Probability and Stochastic Processes with Applications

Two approved MATH courses at the 700-level chosen in consultation with the academic adviser, of which one must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

ECON 401, Principles of Economics (Macro)

ECON 402, Principles of Economics (Micro)

ECON 605, Intermediate Microeconomic Analysis

ECON 611, Intermediate Macroeconomic Analysis

ECON 726, Introduction to Econometrics

One approved ECON or DS course chosen in consultation with the academic adviser

***Electrical Science Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527,\* Differential Equations with Linear Algebra

MATH 528,\* Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 645,\* Linear Algebra for Applications

MATH 646, Introduction to Partial Differential Equations

MATH 647, Complex Analysis for Applications

MATH 753, Introduction to Numerical Methods I

One course chosen in consultation with the academic adviser from MATH 797\*\*, Senior Seminar, MATH 798\*\*, Senior Project, and MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

ECE 541, Electrical Circuits

ECE 548, Electronics Design I

ECE 603, Electromagnetic Fields and Waves I

ECE 633, Signals and Systems I

ECE 634, Signals and Systems II

ECE 757, Fundamentals of Communication Systems

***Physics Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II  
MATH 527, \* Differential Equations with Linear Algebra  
MATH 528, \* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645, \* Linear Algebra for Applications  
MATH 646, Introduction to Partial Differential Equations  
MATH 647, Complex Analysis for Applications  
MATH 753, Introduction to Numerical Methods I

Two approved MATH courses at the 700-level chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

**Other required courses**

CS 410, Introduction to Scientific Programming  
PHYS 407, General Physics I  
PHYS 408, General Physics II  
PHYS 505-506, General Physics III  
PHYS 615, Classical Mechanics and Mathematical Physics I  
PHYS 616, Classical Mechanics and Mathematical Physics II  
PHYS 701, Introduction to Quantum Mechanics I  
PHYS 703, Electricity and Magnetism I

***Statistics Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 527, \* Differential Equations with Linear Algebra  
MATH 528, \* Multidimensional Calculus  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 645, \* Linear Algebra for Applications  
MATH 739, Applied Regression Analysis

MATH 755, Probability and Stochastic Processes with Applications

MATH 756, Principles of Statistical Inference

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

**Other required courses**

CS 410, Introduction to Scientific Programming

Three MATH courses chosen in consultation with the academic adviser from the following:

MATH 736, Statistical Methods for Research

MTH 737, Statistical Methods for Quality Improvement

MATH 740, Design of Experiments I

MATH 741, Survival Analysis

MATH 743, Time Series Analysis

MATH 744, Design of Experiments II

Three approved MATH electives, at least two of which are at the 700-level, chosen in consultation with the academic adviser, one of which must be either MATH 797\*\*, Senior Seminar, or MATH 798\*\*, Senior Project, or MATH 799\*\*, Senior Thesis

\*\* Each of these courses satisfies the Capstone Experience requirement for this program.

***Bachelor of Science in Mathematics Education***

This professional degree program prepares students for mathematics teaching at the elementary, middle/junior high, or secondary level. The program is coordinated with the education department's teacher certification programs. For the elementary option, full certification requires the five-year program. Students may complete the degree requirements for middle/junior high or secondary option with full teacher certification in either four or five years. Students electing the four-year option must plan for one semester of student teaching (EDUC 694) in their senior year and must consult with the departmental adviser in order to accommodate the scheduling of required MATH courses. The five-year program requires a year-long teaching internship in the fifth year that can be coupled with other graduate work leading to a master's degree. See [Education, College of Liberal Arts](#).

***Elementary School Option***

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis  
MATH 545, Introduction to Linear Algebra and Mathematical Proof  
MATH 619, Historical Foundations of Mathematics  
MATH 621, Number Systems for Teachers  
MATH 622, Geometry for Teachers  
MATH 623, Topics in Mathematics for Teachers  
MATH 657, Geometry  
MATH 700, Introduction to Mathematics Education  
MATH 703, The Teaching of Mathematics, K-6  
MATH 797\*\*, Senior Seminar

\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming  
PHYS 406, Introduction to Modern Astronomy,  
EDUC 500, Exploring Teaching  
EDUC 700, Educational Structure and Change  
EDUC 701, Human Development and Learning: Educational Psychology  
EDUC 705, Alternative Perspectives on the Nature of Education  
EDUC 706, Introduction to Reading Instruction in the Elementary Schools

*Note:* EDUC 703F, EDUC 703M and EDUC 751 are requirements for certification that may be taken as an undergraduate.

***Middle/Junior High School Option***

**Required MATH courses**

MATH 425, Calculus I  
MATH 426, Calculus II  
MATH 531, Mathematical Proof  
MATH 539, Introduction to Statistical Analysis  
MATH 545, Introduction to Linear Algebra and Mathematical Proof  
MATH 619, Historical Foundations of Mathematics  
MATH 621, Number Systems for Teachers  
MATH 622, Geometry for Teachers  
MATH 623, Topics in Mathematics for Teachers  
MATH 657, Geometry  
MATH 700, Introduction to Mathematics Education  
MATH 708, Teaching of Mathematics, 5-8  
MATH 797\*\*, Senior Seminar  
One approved MATH course chosen in consultation with the academic adviser



\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

EDUC 500, Exploring Teaching

EDUC 700, Educational Structure and Change

EDUC 701, Human Development and Learning: Educational Psychology

EDUC 705, Alternative Perspectives on the Nature of Education

*Note:* EDUC 751A or EDUC 751B is a requirement for certification that may be taken as an undergraduate.

**Secondary School Option**

**Required MATH courses**

MATH 425, Calculus I

MATH 426, Calculus II

MATH 527, Differential Equations with Linear Algebra

MATH 528, Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 539, Introduction to Statistical Analysis

MATH 545, Introduction to Linear Algebra and Mathematical Proof

MATH 619, Historical Foundations of Mathematics

MATH 624, Analysis for Secondary School Teachers

MATH 657, Geometry

MATH 700, Introduction to Mathematics Education

MATH 709, Teaching of Mathematics, 7-12

MATH 761, Abstract Algebra

MATH 797\*\*, Senior Seminar

\*\* This course satisfies the Capstone Experience requirement in this program.

**Other required courses**

CS 410, Introduction to Scientific Programming

EDUC 500, Exploring Teaching

EDUC 700, Educational Structure and Change

EDUC 701, Human Development and Learning: Educational Psychology

EDUC 705, Alternative Perspectives on the Nature of Education

*Note:* EDUC 751A or EDUC 751B is a requirement for certification that may be taken as an

undergraduate.

### ***Minor in Mathematics***

The Department of Mathematics and Statistics offers three minor programs: mathematics, applied mathematics, and statistics. These programs, which are open to all students enrolled at the University, require a minimum of five MATH courses as detailed below. Students whose major program requires more than two courses required by the minor program must substitute additional courses from the list of optional courses to meet the five-course minimum.

#### ***Mathematics Minor***

Required (3): MATH 528\*, MATH 531 and either MATH 761 or MATH 767

Options (2): Two courses chosen from: MATH 527\*, 656, 657, 658, 761, 762, 764, 767, 776, 783, 784, 788

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

#### ***Applied Mathematics Minor***

Required (4): MATH 527\*, 528\*, 645\* (or 545), and 753

Options (1): One course chosen from: MATH 539, 644, 646, 647, 745, 746, 747, or 754

\*These requirements can be satisfied by MATH 525-526, Linearity I-II.

#### ***Statistics Minor***

Required (2): MATH 539 (or 644) and MATH 645 (or 545)

Options (3): Three courses chosen from: MATH 737, 740, 741, 742, 744, 755, 756

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## **Mechanical Engineering (ME) ▼**

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*Chairperson:* Todd S. Gross

*Professor:* Kenneth C. Baldwin, Barbaros Celikkol, Barry K. Fussell, Todd S. Gross, Robert Jerard, Joseph C. Klewicki, James E. Krzanowski, M. Robinson Swift, Igor I. Tsukrov

*Affiliate Professor:* Donald M. Esterling

*Associate Professor:* Gregory P. Chini, Diane L. Foster, Brad Lee Kinsey, John Philip McHugh,

May-Win L. Thein

*Assistant Professor:* Yannis Korkolis, Christopher M. White, Martin M. Wosnik

*Affiliate Assistant Professor:* Timothy Upton

The Mechanical Engineering Program at UNH is accredited by the Engineering Accreditation Commission of **ABET**, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

### ***Mission***

In support of the University and college missions, the Department of Mechanical Engineering is dedicated to educating the highest quality engineering professionals and leaders. Graduates will be prepared to creatively solve engineering problems through the use of analysis, computation, and experimentation. Students completing the program should be well-informed citizens who have the ability to grow intellectually and are able to solve new, challenging problems with self-confidence. It is the department's intent to maintain a general and flexible curriculum that prepares students for both industrial practice and graduate education.

### ***Educational Objectives***

The goal of the UNH mechanical engineering program is to produce graduates who are good professionals and good citizens who 1) skillfully apply the fundamental principles of mathematics, science, and engineering; 2) solve engineering problems by integrating strong design, analysis, and experimental abilities with excellent communication skills; 3) successfully contribute to their respective corporate, government, or academic organizations; 4) demonstrate continuous growth by assuming positions of leadership in their profession, or by becoming successful entrepreneurs; by successfully completing advanced degrees and professional education; 5) are broadly educated citizens of society with an understanding of the impact of engineering solutions in a global/societal context; and 6) demonstrate a high level of personal and social integrity through their ethical behavior and service to their peers, employers, communities, the nation, and the world.

Mechanical engineering is a challenging profession encompassing research, design, development, and production of aerospace vehicles, underwater vessels, instrumentation and control systems, nuclear and conventional power plants, and consumer and industrial products in general. The profession also makes contributions through more fundamental studies of material behavior, the mechanics of solids and fluids, and energy transformation. Additional information can be found at the mechanical engineering website, [www.unh.edu/mechanical-engineering](http://www.unh.edu/mechanical-engineering).

## The Program

The program begins with courses in physics, mathematics, chemistry, and computer-aided design. The department has a four-semester mechanics thread, a four-semester thread in the thermal/fluid sciences, and a three-semester thread in systems and controls. Modern experimental methods are taught in a two-semester course starting in the junior year. The two-semester senior design project requires students to utilize the skills they have learned in their courses and to learn how to function in an engineering team. The five technical electives offered in the program give the students the opportunity to focus on advanced technical areas of their choice.

With their advisers' assistance, students should plan a program, based on the following distribution of courses, that totals not less than 128 credits. The outline that follows is typical only in format. Within the constraints of satisfying all the requirements and having all the necessary prerequisites, schedules may vary because of scheduling needs or student preference. Some mechanical engineering elective courses may not be offered every year.

The mechanical engineering program curriculum requires five technical elective courses of at least three credits each. These may be selected from 600-700 level courses in the College of Engineering and Physical Sciences, except for one course that may be selected from one of the following 400-500 level courses: ME 442, ME 542, ENE 520, ESCI 501, and ECE 543.

Two technical electives can be used for studying a focused area such as a foreign language, professional program, or minor, with department approval. These five technical elective courses should be selected in consultation with a departmental adviser to lead to a balanced program that addresses chosen areas of interest.

Students must satisfy the University's Discovery Program requirements. The following features are unique to students in the mechanical engineering program:

- All students are required to take an Inquiry course or an Inquiry Attribute course during their first two years. This can be satisfied with ME 441. Students who are exempted from ME 441 due to prior CAD experience must select an Inquiry 444 course or a course with an Inquiry Attribute.
- The Discovery Environment, Technology, and Society category requirement is met upon receiving a BS degree in Mechanical Engineering.
- The Discovery Social Science category must be satisfied with either ECON 402 or EREC 411.
- The Discovery senior capstone experience is satisfied with either ME 755 and 756 or

## TECH 797.

Some programs may require additional elective courses to reach the minimum of 128 credits required for graduation. Other programs may exceed 128 credits to include all the required courses.

In order to graduate in the mechanical engineering major, students must have at least a 2.0 grade-point average in all engineering and science courses, including required technical electives, normally taken as department requirements after the start of the junior year.

Predictor courses: To enter the junior-year courses in the mechanical engineering major, students must achieve a minimum grade-point average of 2.0 with no grade below C- in the following courses: PHYS 407, MATH 426, ME 525, ME 526, and ME 503.

**First Year**

Abbreviation	Course Number	Title	Fall	Spring
MATH	425	Calculus I	4	-
*CHEM	405	General Chemistry	4	-
ME	441	Engineering Graphics	4	-
Discovery Program Elective			4	-
MATH	426	Calculus II	-	4
PHYS	407	General Physics I	-	4
Discovery Program Elective			-	4
English	401		-	4
Total			16	16

\*CHEM 403 and CHEM 404, General Chemistry, may be substituted for CHEM 405.

PHYS 407 or CHEM 405 satisfies the Discovery Physical Science (with lab) category.

MATH 425 satisfies the Discovery Foundation Quantitative Reasoning category.

ENGL 401 satisfies the Discovery Foundation Writing Skills category.

ME 441 satisfies the Discovery Inquiry requirement.

**Sophomore Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
**MATH	527	Differential Equations	-	4
**MATH	528	Multidimensional Calculus	4	-
ME	525	Mechanics I	3	-
ME	503	Thermodynamics	-	3
ME	561	Introduction to Materials Science	-	4
PHYS	408	General Physics II	4	-
Technical Elective			3-4	-
ME	526	Mechanics II	-	3
Discovery Program Elective			4	
Total			18-19	14

\*\*MATH 525 and 526, Linearity, may be substituted for MATH 527 and 528, and a technical elective course.

**Junior Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
Discovery Program Elective			4	-
ME	608	Fluid Dynamics	3	-
ME	627	Mechanics III	3	-
ME	643	Elements of Design		3
ECE	537	Introduction to Electrical Engineering	4	-
ME	603	Heat Transfer	-	3
ME	646	Experimental Measurement & Data Analysis	-	4
ME	670	Systems Modeling, Simulation, & Control	-	4
CS	410	Intro to Scientific Programming	4	
Total			18	14

**Senior Year**

Abbreviation	Course Number	Title	Fall	Spring
ME	705	Thermal System Analysis and Design	4	-
***ME	755	Senior Design Project I	2	-
ME	747	Experimental Measurement & Modeling	4	-
Discovery Program Elective			4	-
Technical Elective			3-4	-
ME	756	Senior Design Project II	-	2
Technical Elective			-	3-4
Technical Elective			-	3-4
Discovery Program Elective			-	4
Technical Elective				3-4
Total			17-18	15-18

\*\*\*TECH 797, Undergraduate Ocean Research Project, may be substituted for ME 755 and ME 756. These courses satisfy the Discovery Senior Capstone Experience category.

**Mechanical Engineering Minor**

The minor, administered by the Department of Mechanical Engineering, is open to all students of the University and offers a broad introduction to mechanical engineering.

Students must complete a minimum of six courses as follows: ME 441, ME 525, ME 526, ME 627, ME 503, and ME 608. Electrical and Computer Engineering majors should take the following courses: ME 441, ME 523, ME 526, ME 503, ME 608, and ME 561. Interested students should contact the mechanical engineering chair, Todd Gross, (603) 862-2445.

**Materials Science Minor**

The minor, administered by the Department of Mechanical Engineering, is open to all students

of the University and offers a broad introduction to materials science.

Students must complete at least 18 credits and a minimum of five courses as follows: ME 561 (required); ME 760 (required); and ME 730 (required); and two additional courses from the following: 731, 744, 761, 762, 763, and 795 (materials).

By mid-semester of their junior year, interested students should consult the minor supervisor, James E. Krzanowski, Department of Mechanical Engineering, (603) 862-2315.

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## Physics (PHYS) ▼

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*Chairperson:* Eberhard Möbius

*Professor:* L. Christian Balling, Amitava Bhattacharjee, John R. Calarco, Olof E. Echt, F. William Hersman, Martin A. Lee, Eberhard Möbius, James M. Ryan, Harlan E. Spence, Roy B. Torbert

*Research Professor:* Charles J. Farrugia, Terry Forbes, Philip A. Isenberg, Nelson Maynard, Charles W. Smith III

*Associate Professor:* Silas Robert Beane III, Per Berglund, Benjamin D. Chandran, James Connell, Maurik Holtrop, Lynn M. Kistler, Dawn C. Meredith, Karsten Pohl, Joachim Raeder, Nathan A. Schwadron

*Research Associate Professor:* Antoinette B. Galvin, Harald A. Kucharek, Marc R. Lessard, Clifford Lopate, Bernard J. Vasquez

*Assistant Professor:* Kai Germaschewski, Karl Silber, Jian-Ming Tang

*Research Assistant Professor:* Li-Jen Chen, Fatemeh Ebrahimi, David Mattingly, Mark L. McConnell

Physics is concerned with the properties of matter and the laws that describe its behavior. It is an exact science based on precise measurement, and its objective is the kind of understanding that leads to the formulation of mathematical relationships between measured quantities. As a fundamental science, its discoveries and laws are basic to understanding in nearly all areas of science and technology. Advances in such diverse fields as medical instrumentation, solid state



electronics, and space research have relied heavily on the application of basic physical laws and principles.

Students interested in the study of physics at the University of New Hampshire will find a strong interaction between research and academic programs. Undergraduates have participated in research studies ranging from nuclear scattering experiments at major particle accelerators to astrophysical studies of the solar system using space probes. These experiences have proven beneficial to engineering and physics students alike. The department is located in DeMeritt Hall (completed in 2008) and Morse Hall. Both buildings are equipped with state-of-the art research facilities and laboratories. DeMeritt Hall also houses the physics library, classrooms, and a number of open and comfortable meeting areas, which provide an inviting atmosphere for study, interaction, and collaboration.

The suggested programs that follow are indicative of the flexibility available to students, whether they are preparing for graduate work in physics or astronomy, industrial opportunities, governmental research, secondary-level teaching, or a general education that might utilize the fundamental knowledge of physics.

Several undergraduate degree programs are offered through the department of physics. The B.S. degree is designed for students who wish to work as professional physicists or engineers; the interdisciplinary options in chemical physics, materials science, and astronomy allow students to combine physics with other disciplines. The B.A. degree is designed for students who want a strong background in physics but also want a broad liberal arts education. A minor in physics allows a student to combine an interest in physics with another major.

Physics-related degrees are also offered in other departments. For those students with strong interests in both math and physics, the **Department of Mathematics** offers a B.S. interdisciplinary option in physics.

Interested students are encouraged to contact the department for further information. More detailed information is also on the physics department web page at [www.physics.unh.edu](http://www.physics.unh.edu).

### ***Minor in Physics***

The minor in physics consists of five courses in physics. All students must take PHYS 407, 408, and 505, including labs. Two other physics courses at the 500 level or above must be chosen in consultation with the student's physics minor adviser.

### **Physics Major, Bachelor of Arts**

This degree provides an opportunity for a broad and liberal arts education, which in some cases may be sufficient for graduate work. A judicious choice of electives may also prepare

students for interdisciplinary programs that require proficiency in a restricted area of physics.

### Requirements

1. Satisfy the University Discovery Program requirements. Note that no physics course can satisfy these requirement for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.
2. Satisfy bachelor of arts degree requirements.
3. PHYS 400, 407-408, 505, 506, 508, 605, 615, 616, 701, 703, 705. Note that MATH 425, 426, and MATH 525, 526 or MATH 527, 528 are prerequisites for some of the courses.
4. A capstone experience is required of all physics majors during their senior year. The Physics Department encourages students to write a senior thesis (PHYS 799) for their capstone experience. Other options include independent study research projects (PHYS795 or INCO 590) or a special project as part of senior lab (PHYS 705). All capstone experiences must be approved by the undergraduate committee.

In the following table, “electives” include Discovery courses, writing intensive courses, language courses required for the B.A., and free choice electives.

### Suggested Curriculum for B.A. in Physics

#### First Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	400	Freshman Seminar	1	-
PHYS	407-408	General Physics I and II	4	4
MATH	425, 426	Calculus I and II (Group 2)	4	4
ENGL	401	First-Year Writing	-	4
Elective			8	4
Total			17	16

#### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	505-506	General Physics III and Lab	4	-
PHYS	615	Classical Mechanics and Mathematical Physics I	-	4
MATH	525	Linearity I		

or MATH	527	Differential Equations	6 or 4	-
MATH	526	Linearity II		
or MATH	528	Multidimensional Calculus	-	6 or 4
Elective			8	8
Total			16 or 18	16 or 18

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	605	Experimental Physics I	5	-
PHYS	508	Thermodynamics and Statistical Mechanics	-	4
PHYS	616	Classical Mechanics and Mathematical Physics II	4	-
PHYS	701	Introduction to Quantum Mechanics I	-	4
Electives			8	8
Total			17	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	705	Experimental Physics II	-	4
PHYS	703	Electricity and Magnetism I	-	4
Elective			16	8
Total			16	16

### Bachelor of Science in Physics

The bachelor of science degree in physics prepares students for professional work as physicists. The required courses are those typically necessary for admission to graduate study in physics or astronomy. The interdisciplinary options require fewer physics courses combined with a concentration in another area (chemistry or materials science). The astronomy option emphasizes courses that help prepare a student for advanced studies in astronomy.

#### Requirements

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirement for a physics major. The rationale behind this is that a course in

physics does not broaden the education of a physics major.

2. Satisfy bachelor of science university requirements.
3. Minimum physics requirements: 400, 407-408, 505, 506, 508, 605, 615-616, 701, 702, 703, 704, 705; two physics electives selected from the 700-level physics courses.
4. Chemistry: 403-404 or 405
5. Math: 425-426, and 525-526 or 527-528
6. Computer Science: CS 410
7. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.
8. A capstone experience is required of all physics majors during their senior year. The Physics Department encourages students to write a senior thesis (PHYS 799) for their capstone experience. Other options include independent study research projects (PHYS795 or INCO 590) or a special project as part of senior lab (PHYS 705). All capstone experiences must be approved by the undergraduate committee.

#### Physics electives

In the following table, “electives” include Discovery courses, writing intensive courses, physics electives, and free choice electives. Note that physics electives can only be taken in the junior or senior year because of prerequisites, and are in general offered every other year.

#### Suggested Curriculum for B.S. in Physics

##### First Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	400	Freshman Seminar	1	-
PHYS	407-408	General Physics I and II	4	4
MATH	425, 426	Calculus I and II (Group 2)	4	4
CHEM	403-404	General Chemistry (Group 3)	4	4
ENGL	401	Freshman English	-	4
Elective			4	-
Total			17	16

##### Sophomore Year

Abbreviation	Course Number	Title	Fall	Spring
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PHYS	505-506	General Physics III and Lab	4	-
PHYS	508	Thermodynamics and Statistical Mechanics	-	4
PHYS	615	Classical Mechanics and Mathematical Physics I	-	4
MATH	525	Linearity I		
or MATH	527	Differential Equations	6 or 4	-
MATH	526	Linearity II		
or MATH	528	Multidimensional Calculus	-	6 or 4
CS	410	Introduction to Scientific Programming	4	-
Elective			4	4
Total			16 or 18	16 or 18

### Junior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	605	Experimental Physics I	5	-
PHYS	616	Classical Mechanics and Mathematical Physics II	4	-
PHYS	701	Introduction to Quantum Mechanics I	-	4
PHYS	703	Electricity and Magnetism I	-	4
Electives			8	8
Total			17	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
PHYS	702	Quantum Mechanics II	4	-
PHYS	704	Electricity and Magnetism II	4	-
PHYS	705	Experimental Physics II	-	4
Elective			8	12
Total			16	16

### Chemical Physics Option, Bachelor of Science in Physics

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy

these requirements for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.

2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 407-408, 505-506, 508, 605, 615, 616, 701, 702, 703, 705
4. Chemistry: CHEM 403, 404, 683-686, 762, 763, 776
5. Mathematics: MATH 425-426, 525-526 or 527-528
6. Computer Science: CS 410
7. Electives in Option: Two courses selected from CHEM 547/9, MATH 646, PHYS 718, PHYS 795
8. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

#### **Materials Science Option, Bachelor of Science in Physics**

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirements for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.
2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 407-408, 505-506, 508, 605, 615-616, 701, 703, 705, 795 (4 credit hours), 799 (4 credit hours).
4. Mechanical Engineering: 561, 730, 760
5. Math: 425-426, 525-526, or 527-528
6. Computer Science: CS 410
7. Electives in Option: Three courses selected from MATH 646, ME 731, 761, 762, 763, 795, PHYS 718
8. Chemistry: 403-404 or 405
9. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

#### **Astronomy Option, Bachelor of Science in Physics**

1. Satisfy the University Discovery requirements. Note that no physics course can satisfy these requirements for a physics major. The rationale behind this is that a course in

physics does not broaden the education of a physics major.

2. Satisfy bachelor of science University requirements.
3. Physics requirements: PHYS 400, 406, 407-408, 505, 506, 508, 605, 615-616, 701, 702, 703, 704, 705, 710, 795 (4 credit hours), 799 (4 credit hours).
4. Chemistry: CHEM 403-404 or CHEM 405
5. Math: MATH 425-426 and 525-526 or 527-528 Computer Science: CS 410
6. Electives in option: Choose one course from PHYS 708, PHYS 712, PHYS 720, PHYS 764, PHYS 791
7. By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.

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## Technology (TECH) ▼

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### College of Health and Human Services

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## Undergraduate Course Catalog 2011-2012

### College of Health and Human Services ▼

[» http://www.chhs.unh.edu/](http://www.chhs.unh.edu/)*Dean:* Barbara Arrington*Associate Dean:* Neil B. Vroman

### Introduction ▼

The College of Health and Human Services, established in 1968, was created in response to the growing need for programs in higher education that prepare young men and women for health-related careers. The College offers undergraduate instruction leading to the bachelor of science degree in athletic training, communication sciences and disorders, family studies, health management and policy, kinesiology, nursing, occupational therapy, recreation management and policy, and social work. Each program enables students to acquire the basic knowledge and skills needed to practice their chosen professions and to obtain a broad cultural background in the humanities and social sciences.

### Undeclared Major ▼

A limited number of well-qualified first-year students who have expressed an interest in a health-related career but who are undecided about a specific major may enter the College of Health and Human Services as undeclared students. Undeclared students should explore possible majors by selecting courses from those listed below. Degree candidates must satisfy all of the University and Discovery Program requirements in addition to satisfying the requirements of their major. Students will also be required to complete a senior capstone course/experience within their major.

#### Required Courses

ENGL 401, Freshman English

PSYC 401, Introduction to Psychology

BMS 507-508, Human Anatomy and Physiology

#### Exploration Courses

COMM 520, Survey of Communication Disorders



FS 525, Human Development  
HMP 401, U.S. Health Care Systems  
KIN 500, Historical and Contemporary Issues in Physical Education  
KIN 585, Emergency First Responder  
NUTR 400, Nutrition Health and Well Being

OT 510, Exploring Occupational Therapy and Occupation  
RMP 490, Recreation and Leisure in Society  
SW 424, Introduction to Social Work

All HHS undeclared students are advised by a professional academic counselor. Upon declaration of a specific major, each student is assigned to a faculty adviser within the major department.

## Degree Requirements ▼

Candidates for the B.S. degree must satisfy all **University requirements** for graduation, earn at least 128 credits, successfully complete the courses required in one of the curricula described in this section, and achieve the required minimum grade-point average in the chosen curriculum. Generally, courses are to be completed in the sequence in which they are arranged. Degree candidates must satisfy all of the University and Discovery Program requirements in addition to satisfying the requirements of an individual major program, which includes a senior capstone course/experience.

*Minors:* See **University Academic Requirements**; also see Degrees and Major Programs of Study.

*Dual-degree programs:* See **University Academic Requirements**.

*Student-designed majors:* See **Special University Programs**.

*Second majors:* See **University Academic Requirements**.

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### Bachelor of Science ▼

#### Athletic Training

#### Communication Sciences and Disorders

#### Family Studies

Child Advocacy and Family Policy  
Young Child/Nursery-Kindergarten  
Family Support/Family Life Education  
Individual and Family Development

#### Health Management and Policy

Public Health

#### International Affairs (dual major)

#### Kinesiology

Exercise Science  
Outdoor Education  
Sports Studies  
Physical Education Pedagogy

#### Nursing

#### Occupational Therapy

#### Recreation Management and Policy

Program Administration  
Therapeutic Recreation

#### Social Work

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### College of Health and Human Services

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### College of Health and Human Services ▼

[» http://www.chhs.unh.edu/](http://www.chhs.unh.edu/)

### Disabilities Minor ▼

This interdisciplinary minor is offered by several of the departments in the School of Health and Human Services. The minor will prepare undergraduate students to apply their unique disciplinary skills in an interdisciplinary service delivery environment to work with and support individuals with disabilities and their families to become fully engaged in their communities achieving independence and increasing quality of life. The 18-credit curriculum consists of two required courses (EDUC 750, HHS 798), two elective courses, and a 2-credit independent study.

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### College of Health and Human Services

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- Athletic Training
- Communication Sciences and Disorders
- Family Studies
- Health Management and Policy
- International Affairs (dual major)
- Kinesiology
- Nursing
- Occupational Therapy
- Recreation Management and Policy
- Social Work

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### College of Health and Human Services ▼

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### Athletic Training ▼

» [http://www.chhs.unh.edu/kin\\_at/](http://www.chhs.unh.edu/kin_at/)

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*Associate Professor:* John P. Miller, Erik E. Swartz

*Clinical Associate Professor:* Daniel R. Sedory

An athletic trainer collaborates with physicians to optimize the activity and participation of patients and clients. Athletic training encompasses the prevention, diagnosis, first aid, and rehabilitation of emergency, acute, and chronic medical conditions. The athletic training major has been accredited by the Commission on Accreditation of Athletic Training Education (CAATE) since 1991 and prepares professionals qualified to attend to the athlete, the fitness-conscious jogger, the skilled professional athlete, or anyone engaged in physical activity.

Students must earn a grade of C (2.0) or better in all KIN required courses and BMS 507-508.

Students gain clinical experience in University athletic training rooms and at off-campus clinical sites. Successful completion of the entire program, including supervised clinical experience, qualifies students to take the BOC certification exam. Students who wish to pursue both BOC certification and public school teacher certification also should see the Department of Kinesiology pedagogy option. This double course of study will require between five and six years.

Students are admitted to the University in athletic training with conditional status. Specific competitive criteria must be met during the student's first year before he or she may apply for full-time status in the major, which is awarded only to students demonstrating exemplary performance in classes and directed observation. Detailed criteria may be found at [www.chhs.unh.edu/kin\\_at/admission\\_at.html](http://www.chhs.unh.edu/kin_at/admission_at.html). Additionally, technical standards establish the qualities considered necessary for students to achieve the knowledge, skills, and competencies

associated with the program. Candidates for full-time status will be required to verify they understand and meet these technical standards or that, with reasonable accommodation, they can meet them. Interested students should consult with program coordinator, Dan Sedory, regarding entry criteria and the technical standards.

Students in athletic training complete **KIN 718, Career Preparation in Athletic Training**, as the **capstone course for the major**. This course integrates the knowledge and skills learned in all previous major courses and clinical experiences into practical applications the students will use as they prepare to enter the athletic training profession. Additionally, this capstone course prepares the students to successfully challenge the BOC Examination which is necessary to practice professionally.

## Courses

### Required Courses

Abbreviation	Course Number	Title	Credits
KIN	506	Concepts of Athletic Training	4
KIN	507	Concepts of Athletic Training Lab	1
KIN	585	Emergency First Responder	4
KIN	620	Physiology of Exercise	4
KIN	652	Clinical Kinesiology	3
KIN	653A	Musculoskeletal Assessment	2
KIN	658	Evaluation & Care of Athletic Training Injury I	4
KIN	658L	Evaluation/Care of Athletic Training Injury I Lab	1
KIN	659	Evaluation & Care of Athletic Training Injury II	4
KIN	659L	Evaluation/Care of Athletic Training Injury II Lab	1
KIN	660	Therapeutic Exercise in Athletic Training	4
KIN	661	Therapeutic Exercise Lab	1
KIN	662	Therapeutic Modalities in Athletic Training	4
KIN	663	Therapeutic Modalities Lab	1
KIN	665	Laboratory Practicum in Athletic Training	
	665A	Level I	2
	665B	Level II	2
	665C	Level III	2
	665D	Level IV	2
	665E	Level V	2

KIN	667	Pharmacology in Athletic Training	2
KIN	670	General Medical Conditions in Athletics	4
KIN	710	Organization/Admin of Athletic Training Programs	4
KIN	715	Seminar in Athletic Training	4
KIN	718	Career Preparation of Athletic Training	4
KIN	780	Psychological Factors in Sport	4

#### University Required Courses

Abbreviation	Course Number	Title	Credits
NUTR	400	Nutrition in Health and Well Being	4
PSYC	401	Introduction to Psychology	4
Statistics Course			4
BMS	507-508	Human Anatomy and Physiology	8

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## Communication Sciences and Disorders (COMM) ▼

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*Chairperson:* Penelope E. Webster

*Professor:* Stephen N. Calculator

*Associate Professor:* Steven P. Bornstein, Penelope E. Webster

*Assistant Professor:* Dana Moser, Bryan M. Ness

*Clinical Associate Professor:* Jeanne H. O'Sullivan, Ruth E. Peaper, Amy S. Plante, Rae M. Sonnenmeier

*Clinical Assistant Professor:* Sheryl Gottwald, Mary Jane Sullivan

*Lecturer:* Pamela E. Broido, Kevin J. Fleese, Donna Schefer, Michael Wallace

Communication Sciences and Disorders is the profession devoted to helping people overcome disabilities of speech, language, and hearing. The study of communication sciences and disorders may begin in the freshman or sophomore year. Students learn about speech, language, and hearing disorders in the classroom and are involved in clinical observation in the on-campus Speech-Language-Hearing Center. Students are encouraged to take elective

courses in linguistics, human development, learning theory, early childhood, health administration, special education, and various aspects of rehabilitation.

Students are advised to continue their professional education at colleges or universities offering graduate programs leading to a master's degree and to subsequent certification by the American Speech-Language-Hearing Association. Certified clinicians find employment opportunities in hospitals, schools, community speech and hearing clinics, and private practice. Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of Communication Science and Disorders.

The required courses in communication sciences and disorders that all students in the program must successfully complete are COMM 520, Survey of Communication Disorders; COMM 521, Anatomy and Physiology of the Speech and Hearing Mechanism; COMM 522, The Acquisition of Language; COMM 524, Clinical Phonetics; COMM 630, Organic Pathologies; COMM 631, Articulation and Language Disorders in Children; COMM 635, Professional Issues in Speech-Language Pathology; COMM 704, Basic Audiology; COMM 705, Introduction to Auditory Perception and Aural Rehabilitation; and COMM 777, Speech and Hearing Science. Students also must complete KIN 706, FS 525 or equivalent in human development, Neurology and a course in statistics. Other elective courses are available. All students must also complete 15 hours of clinical observation.

Students must have a grade-point average of 3.2 at the end of their sophomore year to continue in the major. A 3.2 grade-point average is also required to transfer into the major. Students interested in this program should consult with the chairperson, Stephen N. Calculator.

#### *Minor in Deaf and Hard of Hearing Studies*

The minor in deaf and hard of hearing studies is intended to provide students with courses leading to specialized knowledge related to the fields of deafness and hearing loss. It will be of interest to students who intend to engage in teaching, counseling, rehabilitation, social work, and other professions in which contact with individuals who are deaf or hard of hearing may be expected. There may be some interest as well on the part of students majoring in TESOL and linguistics due to the bilingual aspect of the field. Finally, it will be a good option for those students who wish to move on to graduate study in the fields of deaf education, rehabilitation counseling, speech-language pathology, and audiology. Minor coordinator: Mary Jane Sullivan.

#### **Curriculum and Requirements**

The minor in deaf and hard of hearing studies will require the following for a minimum of 20 credits:

*Three required courses:*

COMM 401, American Sign Language I  
COMM 536, Introduction to Deaf Studies  
COMM 575, Fundamentals of Hearing Loss

Two electives from the list of electives, below:

COMM 402, American Sign Language II  
COMM 704, Basic Audiology\*  
COMM 705, Auditory Perception and Aural Rehabilitation\*  
COMM 725, Cued Speech  
COMM 734, American Sign Language III  
COMM 735, American Sign Language IV  
COMM 738, Linguistics of American Sign Language  
COMM 779, Internship in Deaf/Hard of Hearing Studies (permission required)  
COMM 798, Special Topics (offerings vary)

\* required of CSD majors

Communication sciences and disorders majors may not use a course required of their major to fulfill both major and minor requirements.

Students in the minor must earn a grade of C- or better in each course in order to receive credit for the course in the minor. A maximum of eight credits will be accepted in transfer.

### **Senior Capstone Experience**

Students consult with their academic advisers to identify one of four ways of satisfying the requirement of a capstone experience in Communication Sciences and Disorders: (A) Clinical internship that encourages synthesis and application of disciplinary knowledge and skills and demonstrates emerging professional competencies; (B) Senior Honors Thesis; (C) A comprehensive review of literature in an area that may or may not have been explored in previous clinical or academic coursework; (D) A descriptive or experimental study that addresses a unique issue or problem.

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## **Family Studies (FS) ▼**

» <http://www.chhs.unh.edu/fs/>



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*Chairperson:* Elizabeth M. Dolan

*Associate Professor:* Elizabeth M. Dolan, Barbara R. Frankel, Michael F. Kalinowski, Kerry Kazura, John W. Nimmo, Corinna Jenkins Tucker

*Assistant Professor:* Lisa Porter Kuh, Erin Hiley Sharp

*Clinical Associate Professor:* Mark Moses

*Extension Educators:* Charlotte W. Cross, Paula J. Gregory, Suzann E. Knight

*Extension Associate Professor:* Malcolm L. Smith

The department's mission is to support the well-being of individuals and families through research, teaching, and service. Programs emphasize both theoretical and practical knowledge about lifespan development, the social and economic roles of families, child advocacy, teacher and parent education, and intervention programs that support families. The department is committed to acknowledging and supporting diversity, to providing an educational environment that stresses excellence and innovation, and to developing exemplary programs to serve both students and the larger community.

Students learn about families through integration of developmental, theoretical, and empirical information. The department offers a B.S. degree in family studies. Each student selects from one of four specializations, each of which offers unique opportunities. Students prepare for positions in family service organizations, educational settings and programs, corporations, and government agencies. Each specialization has entry-level criteria and specific course requirements. All require close consultation with a faculty advisor. Any changes or updates are posted on our website.

The preschool/third grade teaching certification (P-3) and the Certified Family Life Educator (CFLE) programs are highly structured and may have limited enrollment. Acceptance to these programs and to internships and practica is restricted to students demonstrating exceptional potential for working with children and families.

### **Child Advocacy & Family Policy Specialization**

This specialization focuses on analyzing and solving problems related to children and their families, with a primary emphasis on unmet needs. The goal is for students to complete their degree with a detailed understanding of human development, family relations, educational and government initiatives and regulations, cultural differences, statistics, politics, and effective communication strategies. The Child Advocacy and Family Policy specialization is designed to prepare students for entry-level positions as advocates or policy generalists, or to pursue a

graduate degree.

### Discovery Program/General Education

Please see the Family Studies website for guidelines regarding Discovery/General Education courses.

### Internships

Internships are chosen under the guidance of the specialization coordinator, and placement will be made with a state advocacy-related office. Some organizations may require a criminal background check before intern placement is finalized. Arrangements for criminal background checks are the responsibility of the student and the requesting organization, not the Department of Family Studies.

### Capstone Courses

The FS 712/714 internship serves as the senior capstone experience for the Child Advocacy and Family Policy specialization.

### Departmental Requirements

Abbreviation	Course Number	Title
FS	525	Human Development
FS	545	Family Relations
FS	760	Family Programs and Policies
FS	772	International Approaches to Child Advocacy
FS	773	International Perspectives on Families and Young Children
FS	712/714	Internship*

\*Spring or summer semester; 712 is 4-8 credits, 714 is 2 credits.

### One Course from Each of the Following Groups:

Abbreviation	Course Number	Title
1.	FS 553	Personal and Family Finance for Family Life Educators - OR -
	FS 653	Family Economics

2.	FS 623	Developmental Perspectives on Infancy and Early Childhood - OR -
	FS 624	Developmental Perspectives on Adolescence and Early Adulthood
3.	FS 641	Parenting Across the Lifespan - OR -
	FS 746	Human Sexuality - OR -
	FS 757	Race, Class, Gender, and Families
4.	FS 776	Children, Adolescents, and the Law* - OR -
	FS 794	Families and the Law

\* Not offered every year

#### Major Requirement - One Course in Statistics

Abbreviation	Course Number	Title
PSYC	402	Statistics in Psychology - OR -
SOC	502	Statistics - OR -
HHS	540	Statistics for Health and Human Service Professionals

#### Supporting Courses - Choose ONE from Each Group:

Abbreviation	Course Number	Title
1.	ENGL 502	Professional and Technical Writing - OR -
	ENGL 503	Persuasive Writing - OR -
	CMN 456	Propaganda and Persuasion
2.	CSL 401	Introduction to Community Service and Leadership - OR -
	CSL 402	Introduction to Nonprofit Organizations - OR -
	CSL 404	Managing Change and Conflict in Communities - OR -
	CSL 508	Essentials of Fundraising for Community-Based Organizations - AND -
	CSL 509	Essentials of Grant Writing for Community-Based Organizations
3.	SW 705	Child and Adolescent Risks and Resiliency: Program, Policy & Practice - OR -
	PSYC 581	Child Development
4.	FS 635	Teaching and Learning in Early Childhood Settings - OR -
	EDUC 500	Exploring Teaching - OR -

	EDUC 507	Mentoring Adolescents
	AND	Electives as approved by student's advisor

### **Family Support/Provisional CFLE Specialization**

This specialization is intended for students interested in working with children, adolescents, and adults, either as individuals or as families. Students in the Family Support specialization develop knowledge and skills to prepare them to provide family support, direct services, and family life education.

### **Certified Family Life Educator**

Students in the Family Support specialization are encouraged to participate in the provisional Certified Family Life Educator (CFLE) component. The National Council on Family Relations (NCFR) has approved the Department of Family Studies' undergraduate program as meeting the standards and criteria required for the *provisional* CFLE designation. Certified Family Life Educators work in a variety of settings including social services, health services, child care, family support, youth programs, parent education, junior and senior high schools, and universities and colleges. The CFLE designation recognizes expertise in a broad range of issues that constitute family life education and increases credibility by validating the individual's education and experience. Students may apply to NCFR for provisional CFLE designation upon completion of required course work.

### **Discovery Program/General Education**

Please see the family studies website for guidelines regarding Discovery/General Education courses.

### **Internship**

***Students accepted into the CFLE program are required to complete the Family Internship, including the Family Internship courses.*** Students who are not in the CFLE program may also choose to complete the Family Internship.

In the Family Internship (FS 782), students will apply knowledge gained from their academic studies in a supervised environment. The optional internship involves a commitment of sixteen hours per week for two semesters, plus a three-hour seminar (FS 792) every other week. In addition, some organizations may require a criminal background check before placement is finalized. Arrangements for criminal background checks are the responsibility of the student and the requesting organization, not the Department of Family Studies.

**If you are planning to study abroad as well as complete the Family Internship, you must**

**Speak with Corinna Tucker or Elizabeth Dolan prior to making plans to go abroad.**

Students apply for the internship during the spring semester of their junior year. Internship applicants must have completed 20 credits of departmental course work prior to their senior year with a minimum overall grade-point average of 3.0 and a departmental grade-point average of 3.2 or higher. Internship courses (782/792) count toward the 20 credits required in supporting courses.

### Capstone Courses

#### Departmental Requirements

Abbreviation	Course Number	Title
FS	525	Human Development*
FS	545	Family Relations*
FS	641	Parenting Across the Lifespan*
FS	746	Human Sexuality*
FS	757	Race, Class, Gender, and Families*
FS	760	Family Programs and Policies*
FS	794	Families and the Law*

\* Required for provisional CFLE designation.

#### ONE Course from Group 1 & ONE Course from Group 2 OR Group 3

Abbreviation	Course Number	Title
1.	FS 553	Personal and Family Finance for Family Life Professionals* - OR -
	FS 653	Family Economics*
2.	FS 623	Developmental Perspectives on Infancy and Early Childhood - OR -
	FS 624	Developmental Perspectives on Adolescence and Early Adulthood - OR -
3.	FS 772	International Approaches to Child Advocacy - OR -
	FS 773	International Approaches to Families and Young Children - OR -
	FS 797	Special Topics (as approved by adviser)

\* Required for provisional CFLE designation.

**Major Requirement - One Course in Statistics**

Abbreviation	Course Number	Title
PSYC	402	Statistics in Psychology - OR -
SOC	502	Statistics - OR -
HHS	540	Statistics for Health and Human Service Professionals

**Supporting Courses**

Abbreviation	Course Number	Title
FS	776	Children, Adolescents, and the Law (not offered every year)
FS	782	Family Internship*
FS	792	Seminar for Family Interns*
		Gerontology Minor
		Research Methods (such as PSYC 502)
CMN	730	Family Communication (OR PSYC 762)
NURS	535	Death and Dying
PSYC	552	Social Psychology
PSYC	582	Adult Development and Aging
PSYC	762	Counseling (OR CMN 730)
SOC	525	Juvenile Crime and Delinquency
SOC	540	Private Troubles, Public Issues: Contemporary Social Problems
SOC	675	Sociology of AIDS
SW	525	Social Welfare Policy: History of Social and Economic Justice
SW	697A, B, or C	Special Topics in Social Welfare

\* Required for provisional CFLE designation.

**Individual & Family Development Specialization**

This specialization is intended for students with a broad interest in working with families. The individual and family development specialization provides knowledge about specific life stages of individuals within the context of family systems with a focus on system dynamics, diverse

family systems, gender, and cultural differences. This plan of study is designed particularly for those expecting to attend graduate school and those who desire a general background in life span development and family dynamics.

### Senior Capstone Course

FS 757, Race, Class Gender and Families

### Departmental Requirements

Abbreviation	Course Number	Title
FS	525	Human Development
FS	545	Family Relations
FS	623	Developmental Perspectives on Infancy and Early Childhood
FS	624	Developmental Perspectives on Adolescence and Early Adulthood
FS	641	Parenting Across the Lifespan
FS	653	Family Economics
FS	746	Human Sexuality
FS	757	Race, Class, Gender, and Families
FS	794	Families and the Law

### Major Requirement - One Course in Statistics

Abbreviation	Course Number	Title
PSYC	402	Statistics in Psychology - OR -
SOC	502	Statistics - OR -
HHS	540	Statistics for Health and Human Service Professionals

### Supporting Courses

Abbreviation	Course Number	Title
FS	760	Family Programs and Policies
FS	776	Children, Adolescents, and the Law (not offered every year)
FS	782	Family Internship
FS	792	Family Internship Seminar

		Research Methods (such as PSYC 502)
NURS	535	Death and Dying
PSYC	552	Social Psychology
PSYC	581	Child Development
PSYC	582	Adult Development and Aging
SOC	540	Private Troubles, Public Issues: Contemporary Social Problems
		One Foreign Language
		Work with the Institute on Disability

### Young Child Specialization

This specialization is intended for students who have a broad interest in working with young children ranging in age from birth to age eight. The young child specialization has four major foci: child development, teaching methodology and curriculum development, developmentally appropriate learning environments for young children, and home-school-community relations.

### Senior Capstone Course

**The senior capstone course for Young Child students who do not enter the P-3 program is FS 743 - Families, Schools, and Community**

### Departmental Requirements

Abbreviation	Course Number	Title
FS	525	Human Development
FS	545	Family Relations
FS	623	Developmental Perspectives on Infancy and Early Childhood
FS	635	Teaching and Learning in Early Childhood Settings
FS	708/709	Advanced Child Development Internship
FS	733	Supervising Programs for Young Children
FS	734	Curriculum for Young Children
FS	743	Families, Schools, and Community
FS	771	Observation and Assessment of Young Children

### Major Requirement - One Course in Statistics

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Abbreviation	Course Number	Title
PSYC	402	Statistics in Psychology - OR -
SOC	502	Statistics - OR -
HHS	540	Statistics for Health and Human Service Professionals

### Supporting Courses

Abbreviation	Course Number	Title
FS	757	Race, Class, Gender, and Families
FS	760	Family Programs and Policies
FS	772	International Approaches to Child Advocacy
FS	773	International Perspectives on Families and Young Children
FS	794	Families and the Law
FS	797	Families in Poverty
EDUC	500*	Exploring Teaching
EDUC	703F	Alternative Teaching Models - Elementary School Science
EDUC	703M	Alternative Teaching Models - Elementary School Social Studies
EDUC	706	Introduction to Reading in the Elementary School
EDUC	733	Introduction to the Teaching of Writing
EDUC	734	Children's Literature
EDUC	741	Exploring Mathematics with Young Children (OR MATH 601)
EDUC	750	Introduction to Exceptionality
EDUC	751A	Educating Exceptional Learners: Elementary
EDUC	760	Introduction to Young Children with Special Needs
KIN	600	Movement and Gymnastics Exploration - OR -
KIN	675	Motor Development and Learning
MATH	601	Exploring Mathematics for Teachers (OR EDUC 741)
PSYC	581	Child Development
PSYC	780	Prenatal Development and Infancy
PSYC	783	Cognitive Development
PSYC	785	Social Development
SOC	520	Family
SOC	525	Juvenile Crime and Delinquency

SOC	540	Private Troubles, Public Issues: Contemporary Social Problems
SW	705	Child and Adolescent Risks and Resiliency: Program, Policy and Practice
THDA	622	Storytelling, Story Theatre, and Involvement Dramatics

\* May substitute FS 708 or FS 709 if student is not planning to apply to the P-3 program.

### **Young Child: Preschool - Third Grade Teaching Certification**

The Early Childhood Education Teacher Certification (P-3) program prepares students for a career in teaching young children. Course work for this program is designed to maximize in-classroom mentorship and to provide a broad range of exposure across the preschool to 3rd-grade levels. However, student teaching will be in preschool and kindergarten settings. This competitive program within the Young Child Specialization in the Family Studies Department is approved by the New Hampshire State Board of Education. Reciprocity of the P-3 certification with other states varies. Students interested in teaching in other states should contact each state directly.

This program requires 76 credits of pre-approved departmental and supporting course work. Requirements and instructions for the application process for this program are detailed below. Students who wish to be considered for the P-3 Teacher Certification Program must indicate their interest at the time of application to the major so that an appropriate plan of study can be arranged.

#### **Application Requirements**

Juniors in the Young Child Specialization who have maintained a minimum overall GPA of 2.8 and a departmental GPA of 3.0 are eligible to apply. Please note that this is a competitive program with limited enrollment. Those accepted into the program must maintain this level of achievement throughout the program. Students must be prepared to have their own transportation for off-campus placements as needed.

Applications are available through the family studies departmental website, and are due by February 15 of each year. Completed applications will be reviewed by the Young Child faculty. Admission decisions will be made by mid-March. Provisional admission may be given to those who have not yet taken and passed the PRAXIS I tests at the time of application in mid-February. Final admission will be given pending the submission of passing PRAXIS I test scores by the last day of final exams at the end of the junior year (see additional certification information below).

## **Senior Capstone Course**

FS 788 - Student Teaching of Young Children

### **A Note About Obtaining State Teacher Certification**

Provisionally admitted P-3 teacher candidates are expected to submit passing PRAXIS I test scores by the last day of the UNH spring final exams of their junior year. All P-3 program teacher candidates are expected to take the PRAXIS II for ECE CONTENT prior to graduation. PLEASE NOTE that without the required set of passing PRAXIS I and II test scores, although students may graduate from UNH with a bachelor's degree in family studies and have completed the P-3 coursework along with all student teaching requirements, they will not be eligible to apply for the New Hampshire State P-3 Teaching Certificate. This is a State of New Hampshire requirement; not a condition for graduation from UNH. Information on the PRAXIS Tests is available on [www.ets.org/praxis](http://www.ets.org/praxis).

In order to fulfill a teaching contract with a public school district, a prospective teacher must be certified by the state in which he/she is to be employed. Certification by the state is not an automatic event upon graduation and must be initiated by the teacher candidate. If certification by the State of New Hampshire is desired, P-3 teacher candidates must complete and mail in the necessary forms which will be given to them at the end of the successful student teaching experience by the UNH Certification Officer. Issuance of a teaching certificate in many states is based upon the specific certificate received in the home state. If application is not made in a timely manner upon graduation, the teacher candidate is subject to any new requirements in place at the time of application.

### **P-3 Internship Course Descriptions**

FS 785 is a fall semester seminar-based course intended to prepare students, as teacher candidates, for the student teaching experience in the spring semester. This course emphasizes students' continued development as learners, researchers, and collaborators. Discussions and projects focus on the ways in which these three roles are developed within the classroom and school community. Students meet as a cohort in weekly/bi-weekly seminars on campus. Students should expect to spend a minimum of three hours per week in their assigned classroom (42+ hours) and become first aid/CPR certified. Other expectations for this course include, but are not limited to, preparing a résumé, observing at other sites, attending professional conferences, starting a professional portfolio to document their achievement of professional teaching standards, and completing additional assignments and readings.

FS 786 and 788 provide the capstone student teaching experience in the spring semester of the senior year. Students should expect to spend a minimum of 24 hours per week (a minimum

of 300 hours total) in their assigned classrooms, gradually assuming increasing teaching responsibilities, culminating in the assumption of two to three lead-teaching weeks. Additional hours outside of actual classroom/program operation hours are expected for meeting and planning with cooperating teachers, preparing for teaching, and attending parent conferences and other school functions, as well as attending professional conferences. Seminars provide continued opportunity for reflection on students' development as teacher candidates, reflecting on classroom practices, identifying teaching strengths and weaknesses, and planning for their first professional appointment as teachers of young learners. Students should be prepared to meet weekly or bi-weekly on campus after school hours and to complete and present their professional portfolio to faculty and related professionals in the field.

### **P-3 Program Requirements (48 FS and 28 Supporting Credits)**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>
FS	525	Human Development
FS	545	Family Relations
FS	623	Developmental Perspectives on Infancy and Early Childhood
FS	635	Teaching and Learning in Early Childhood Settings (56 classroom hours)
FS	708/709	Child Development Internship at CSDC (140 classroom hours)
FS	734	Curriculum for Young Children
FS	743	Families, Schools, and Community
FS	771	Observation and Assessment of Young Children

### **Major Requirement - One Course in Statistics**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>
PSYC	402	Statistics in Psychology - OR -
SOC	502	Statistics - OR -
HHS	540	Statistics for Health and Human Service Professionals

### **Required P-3 Senior Year Internship (12 Credits)**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>
FS	785	Seminar for Student Teachers - Fall Semester
FS	786	Seminar for Student Teachers - Spring Semester

FS	788	Student Teaching of Young Children - Spring Semester
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#### Other Required Courses for P-3 Certification\*

Abbreviation	Course Number	Title
KIN	675	Motor Development and Learning (OR KIN 600)
THDA	622	Storytelling (OR THDA 583)
EDUC	500	Exploring Teaching (with placement in 1st, 2nd, or 3rd grade)
EDUC	741	Exploring Mathematics with Young Children (OR MATH 601)
MATH	601	Exploring Math for Teachers (OR EDUC 741)
EDUC	706	Introduction to Reading in the Elementary School (with practicum in 1st, 2nd, or 3rd grade)
EDUC	760	Introduction to Children with Special Needs
EDUC	703M	Teaching Elementary School Social Studies (with focus on 1st, 2nd, or 3rd grade)
EDUC	703F	Teaching Elementary School Science (with focus on 1st, 2nd, or 3rd grade)

\* These courses are subject to change to meet state certification requirements in subsequent years.

#### Family Internship

The Family Internship is available to students in the family support and individual & family development specializations.

Internship students apply knowledge gained from their academic studies in a supervised environment. The Family Internship involves a commitment of 15 hours per week for two semesters, plus a 3-hour seminar every other week. A current listing of internship sites is available in the departmental office.

Students apply for the internship during the spring semester of their junior year. Internship applicants must have completed 20 credits of departmental course work prior to their senior year with a minimum overall grade-point average of 3.0 and a departmental grade-point average of 3.2 or higher. Internship requirements vary depending on specialization. Internship courses are counted toward the 20 credits required in supporting courses.

**Minor - Child Life**

The interdisciplinary child life minor is offered by the Department of Family Studies and the therapeutic recreation option of the Department of Recreation Management and Policy. Upon completion of course requirements for the minor, students are able to sit for the Child Life Specialist exam.

**Family Studies Majors Minor in Child Life - Core Courses**

Abbreviation	Course Number	Title
FS	525	Human Development
FS	623	Introduction to Child Life*
RMP	502	Foundations of Therapeutic Recreation

\* Offered every other spring.

**FS Majors Minor in Child Life - Choose Two Electives:**

Abbreviation	Course Number	Title
RMP	501	Leisure Services for Individuals with Disabilities
RMP	503	Therapeutic Recreation: Rehabilitation and Interventions
RMP	504	Therapeutic Recreation: Mental Health
RMP	603	Assessment and Treatment Planning in TP with RMP 602 Clinical Treatment Lab 1
RMP	604	Therapeutic Communication and Facilitation Techniques in TR with RMP 605 Clinical Treatment Lab II

**Internship**

Abbreviation	Course Number	Title
FS	710D	Internship under the Supervision of a Certified Child Life Specialist

**Minor - Adolescence**

The interdisciplinary minor in adolescent and youth development is offered by the Department of Family Studies and the Department of Recreation Management and Policy. The minor is designed to provide students an opportunity to develop knowledge and skills regarding adolescence and youth development.

Required courses offer a foundation in theory, research, and practice for all minors. Students select three additional courses from a wide array of more specialized offerings from collaborating departments. To assist students in developing a cohesive plan of study for their minor, a simple application process is required. Only students who have submitted an application, been accepted into the minor, and completed the required coursework will be identified as having achieved a minor in adolescent and youth development.

**Required Courses:**

Abbreviation	Course Number	Title
FS	624	Developmental Perspectives on Adolescence and Early Adulthood
RMP	668	Youth Culture and Programs

**Select THREE of the Following Courses:\***

Abbreviation	Course Number	Title
EDUC	507	Mentoring Adolescents
EDUC	710C	Youth Organizations
EDUC	797	Seminar in Early Adolescent Development
EDUC	717	Growing Up Male in America
EDUC	735	Young Adult Literature
FS	797	Special Topics in Family Studies - Approved Sections Only
JUST	701	Special Topics - Approved Sections Only
KIN	565	Principles of Coaching
PSYC	791	Adolescent Psychology
RMP	558	Program Supervision and Leadership
RMP	560	Recreational Sport Management
RMP	730	Camp Administration and Leadership
RMP	760	Community Sports Organizations: Administration & Development
SOC	525	Juvenile Crime and Delinquency

SOC	773	Sociology of Childhood
SW	705	Adolescent Risk and Resiliency
RMP	563	Practicum**
RMP	707	Practicum**

\* Some courses may require prerequisites or permission.

\*\* Only one practicum may be applied toward the minor.

### **Minor - Family Studies**

The department offers a minor in family studies to interested students in related majors. Minor requirements include FS 525, Human Development; FS 545, Family Relations; and three additional courses chosen in consultation with a departmental advisor.

Individual course grades must be C or above, and the overall grade-point average for the 20 Family Studies credits must be at least 2.0. Students who wish to minor in family studies are advised to consult with the department's administrative manager as early as possible in their undergraduate studies.

### **Major Requirements**

Core courses required of each Family Studies major are:

1. FS 525, Human Development
2. FS 545, Family Relations
3. A minimum of nine family studies courses, at least two of which must be at the 700 level.
4. A senior capstone experience; each family studies specialization has a capstone experience incorporated into the program.
5. Twenty credits of supporting coursework, selected in consultation with the advisor. Supporting courses must be 500 level or above, and supporting coursework must include at least 12 credits in courses outside the department.
6. An undergraduate statistics course.

Each specialization has required or recommended supporting courses. Some departmental



specializations may specify Discovery/General Education courses because they enhance the plan of study.

Candidates for a degree must satisfy all of the University Discovery or General Education Program requirements in addition to satisfying the requirements of their family studies specialization.

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## Health and Human Services (HHS) ▼

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## Health Management and Policy (HMP) ▼

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*Chairperson:* James B. Lewis

*Professor:* Barbara Arrington, Charles Drum, Leslie N.H. MacLeod, John W. Seavey, Lee F. Seidel, Robert S. Woodward

*Associate Professor:* Rosemary M. Caron, Marc D. Hiller, James B. Lewis

*Research Associate Professor:* Patrick B. Miller

*Assistant Professor:* Semra A. Aytur, Robert J. McGrath

*Research Assistant Professor:* David J. Laflamme

*Clinical Professor:* Edgar J. Helms Jr.

Undergraduates majoring in the Health Management and Policy program are prepared to embark upon management careers in a wide range of health care delivery and financing organizations, public health, and health policy. Graduates work in many settings, including health care delivery systems, hospitals, nursing homes, health maintenance and other managed care organizations, public health departments, community-based and home-health agencies, mental health facilities, regulatory bodies, consulting companies, and insurance companies.

The academic program is interdisciplinary, with undergraduates taking courses in many academic units of the University. Students gain a broad view of health and health care while developing analytical skills in health care management and policy. The department uses a

computer laboratory that is integrated throughout the curriculum.

The department's undergraduate program maintains full certification by the Association of University Programs in Health Administration (AUPHA). Students have the opportunity to become student members in the American College of Healthcare Executives (ACHE) and the American College of Health Care Administrators (ACHCA), both of which are represented by student chapters at the University. There also is an organization for students interested in public health issues. The department curriculum is approved under the New England Regional Student Program.

### Academic Program

Competencies are achieved through three components of the curriculum: University Discovery program requirements, HMP collateral courses, and the HMP courses, which include a field practicum and a capstone course. Students work closely with their assigned faculty advisers to develop a plan of study to achieve completion of each of these components. Upper-division HMP courses are sequenced in a two-year progression as described in departmental handouts to all majors. Students are expected to follow this sequence; any exceptions are made by petition. Late transfers may have to plan for an extra year. All HMP students are required to take a core of introductory courses generally completed before their junior year in the major.

#### HMP Introductory Core Courses - Required of All Majors

Abbreviation	Course Number	Title	Credits	Fall	Spring
ECON	402	Microeconomics	4	X	X
MATH	420	Finite Math	4	X	X
HMP	401	U.S. Health Care Systems	4	X	X
HMP	501	Epidemiology and Community Medicine	4	X	X

Any UNH statistics course satisfies the requirement.

For HMP majors only: HMP 401 will not meet the social sciences requirement.

#### HMP Program Options:

HMP has two options: health management and public health; the options are outlined in the

following tables. Students should complete the introductory core courses prior to their junior year in the major. All students are required to meet with their departmental academic adviser to ensure appropriate scheduling of classes within the major.

### Health Management Option:

This option provides students with the tools to obtain entry level analytical or management positions in the health care industry. Health care management presents numerous opportunities to integrate skills such as finance, marketing and management into organizations whose mission is to improve the lives of others. Students in this option will complete a capstone course, HMP 742 Strategic Management for Health Care Organizations.

### Required Courses - Health Management Option

Abbreviation	Course Number	Title	Credits	Fall	Spring	Summer
HMP	740	Health Care Financial Management I	4	X		
HMP	721	Managing Health Care Organizations I	4	X		
HMP	711	Health Systems Research I	4	X		
HMP	621	Pre-Practicum	2	X		
HMP	741	Health Care Financial Management II	4		X	
HMP	722	Managing Health Care Organizations II	4		X	
HMP	723	Health Planning	4		X	
HMP	712	Health Systems Research II	4		X	
HMP	622	Field Practicum	3			X
HMP	744	Health Care Ethics & Law	4	X		
HMP	746	Health Policy	4	X		
HMP	735	Social Marketing	4	X		
HMP	624	Post Practicum	2	X		
HMP	630	Health Issues Seminar I	1	X		
HMP	642	Health Economics	4		X	
HMP	742	Strategic Management for Health Care Organizations	4		X	
HMP	631	Health Issues Seminar II	1		X	

**Public Health Option:**

This option provides students with the knowledge and skills for entry-level positions within the public health workforce. The public health field is emerging as a key area for the protection of population health. This option provides students with an introduction to many of the foundation areas of public health and gives basic exposure to key concepts and skills in the five core disciplines of public health as articulated by the Council on Education for Public Health. Students in this option will complete a capstone course, HMP 748 Health Policy Analysis.

**Required Courses - Public Health Option**

Abbreviation	Course Number	Title	Credits	Fall	Spring	Summer
HMP	403	Introduction to Public Health	4	X	X	
HMP	740	Health Care Financial Management I	4	X		
HMP	721	Managing Health Care Organizations I	4	X		
HMP	711	Health Services Research I	4	X		
HMP	621	Pre-Practicum	2	X		
HMP	712	Health Services Research II	4		X	
HMP	569	Human Behavior & Public Health	4		X	
HMP	723	Health Planning	4		X	
HMP	715	Environmental Health	4		X	
HMP	622	Field Practicum	3			X
HMP	744	Health Care Ethics & Law	4	X		
HMP	746	Health Policy	4	X		
HMP	735	Social Marketing	4	X		
HMP	630	Health Issues Seminar I	1	X		
HMP	624	Post Practicum	2	X		
HMP	642	Health Economics	4		X	
HMP	748	Health Policy Analysis	4		X	
HMP	631	Health Issues Seminar II	1		X	

### **Field Practicum:**

Field Practicum: A full-time practicum (or administrative internship) that integrates class work with a supervised field experience constitutes an essential part of the academic program, and is required of all majors. It allows students to explore an area of special interest in depth. Courses comprising this component of the major include: HMP 621, Pre Practicum Seminar; HMP 622A, HMP 622B, HMP 622C, Field Practicum; and HMP 624, Post Practicum Seminar. The field experience is divided into three concurrent components: HMP 622A. Field Practicum Organizational Analysis; HMP 622B. Field Practicum Management Skills Development; and HMP 622C. Field Practicum Project Analysis. Field practicum sites are selected by faculty with student involvement and are concentrated in central and Northern New England. Given sufficient timing of student requests, efforts will be made to arrange practica at distant sites based on special needs.

HMP field practica occur during the summer between the junior and senior year within the curriculum. They begin in late May and end in late August and require a full-time commitment of a minimum of 400 hours.

### **Academic Requirements:**

HMP majors must obtain a minimum of a C- in all HMP core courses and must pass all HMP-required collateral courses. Majors must have an overall grade-point average of 2.5 by the end of the semester preceding their practicum. Students not maintaining an overall grade-point average of 2.5 are reevaluated by the faculty and may be counseled into another major at the University.

The faculty reviews student performances during the semester before the practicum to determine each student's readiness. Students who do not successfully complete prerequisite courses may not be permitted to advance through subsequent courses in the major.

### **Applications for Major:**

Students interested in additional information or in applying for admission to the health management and policy major should contact the department's director of undergraduate studies. Efforts should be made to complete this process during the freshman year or early in the sophomore year to ensure sufficient time to complete all of the required collateral courses as well as those in the major in a timely manner. Students can apply to the major at any time, and admission decisions are made at the end of the semester in which the student applies. In

general, admitted students have a cumulative GPA of over 2.75.

### **Honors-in-Major:**

The department offers an honors-in-major program. To qualify, students must meet the department's requirement of having an overall 3.4 grade-point average at UNH and a 3.4 grade-point average for required HMP courses taken by the end of the junior year. Honors in major students take honors courses during the last half of junior year and senior year and complete an honors project. Students work with a faculty member in the department in the development of the honors project. Students should contact the department's honors in major adviser for further information.

### **Academic Minors:**

HMP offers two academic minors.

### **Academic Minor in Health Management:**

The department offers an integrated minor in health management designed for students in any major. Students seeking to minor in health management must meet with the department's director of undergraduate studies before commencing the minor. The health management minor includes the following courses:

#### **Academic Minor in Health Management**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>
HMP	401	U.S. Health Care Systems	4	X	X	
HMP	501	Epidemiology and Community Medicine	4	X	X	
HMP	735	Social Marketing	4	X		
HMP	721	Managing Health Care Organizations I	4	X		
HMP	740	Financial Management of Health Care Organizations I	4	X		
HMP	710	Financial Management For Clinicians	4		X	

Student may take HMP 740 Financial Management of Health Care Organizations I - fall semester or HMP 710 Financial Management For Clinicians - spring semester.

### Academic Minor in Public Health:

The department offers a minor in public health. Public health deals with the health of populations and focuses on health promotion and disease prevention as well as access to the medical system. The minor introduces students to many of the foundation areas of public health, and provides a basic exposure to key concepts and skills in the five core disciplines of public health, as articulated by the Council on Education for Public Health. The minor is open to any baccalaureate student at UNH. The public health minor includes the following courses:

#### Academic Minor in Public Health

Abbreviation	Course Number	Title	Credits	Fall	Spring	Summer
HMP	403	Introduction to Public Health	4	X	X	
HMP	501	Epidemiology and Community Medicine	4	X	X	
HMP	569	Human Behavior and the Public Health	4		X	
HMP	505	History of Public Health	4	X	X	
HMP	715	Environmental Health	4		X	

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### International Affairs (dual major) ▼

For program description, see [Special University Programs](#).

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### Kinesiology (KIN) ▼

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*Chairperson:* Ronald V. Croce

*Professor:* Ronald V. Croce, Michael A. Gass, Stephen H. Hardy, Steven C. Wright

*Associate Professor:* Heather Barber, Karen E. Collins, John P. Miller, Timothy J. Quinn, Erik E. Swartz, Neil B. Vroman

*Assistant Professor:* Brent J. Bell, Summer Cook, Michelle A. Grenier, Dain LaRoche, Jayson O. Seaman

*Clinical Associate Professor:* Daniel R. Sedory

*Clinical Assistant Professor:* Tara Flippo, Laurie Gullion, Pam McPhee, Melissa Rodgers

*Instructor:* Karen N. Henny

*Senior Lecturer:* Thomas W. Ashwell

The mission of the Department of Kinesiology is to generate, transmit, and apply knowledge about the role of physical activity (including exercise, movement, outdoor adventure experiences, and sport) in the advancement of health in society. The department has several teaching, research, and service functions that support this mission, including the preparation of professionals in the one major and four options described below. While programs vary in emphasis, each curriculum offers students fundamental knowledge in the following areas: the biological, psychological, and sociocultural foundations and consequences of physical activity; the pedagogical and rehabilitative aspects of physical activity; and the management and marketing of delivery systems in the field. Each program makes extensive use of field experiences and internships that blend theory with practice.

The department offers five areas of study for majors: athletic training, exercise science, outdoor education, sport studies, and physical education pedagogy. Candidates for degree requirements in any of the department majors or options must satisfy all University Discovery Program requirements in addition to satisfying specific program requirements.

### **Athletic Training Major**

For further information please see [Athletic Training](#).

### **Exercise Science Option**

This curriculum prepares individuals for career opportunities in health and fitness promotion and education programs in hospitals, sports medicine centers, wellness clinics, universities, and rehabilitation facilities. Students are also prepared for advanced degree programs in the health professions, basic biology fields, medicine, or other health-related fields. Students must earn a grade of C (2.0) or better in every required course. All required courses must be completed before enrolling in KIN 650A, Internship in Exercise Science. Interested students



should consult with the option coordinator, Timothy J. Quinn.

Students in exercise science complete the series of **KIN 736, Fitness and Graded Exercise Testing, KIN 737, Exercise Prescription and Leadership, and KIN 650A, Internship in Exercise Science as capstone courses** for the major. These courses give the students practical experience in evaluating health and fitness and prescribing exercise to a wide range of clients. Specifically, students assess a number of disease risk factors, including, blood pressure, blood chemistry and body composition measures, perform maximal graded exercise tests complete with electrocardiogram monitoring, as well as measure strength and flexibility. Students ultimately develop individualized exercises prescriptions for their clients and work with them one-on-one to improve their health and fitness. The internship experience is an off-campus, 10-week, 40 hours per week, full-time experience and can only be taken **after ALL** University and departmental courses are completed. Typically, this is taken during the summer after the student's senior spring academic term.

#### Required Courses

Abbreviation	Course Number	Title	Credits
KIN	585	Emergency First Responder	4
KIN	620	Physiology of Exercise	4
KIN	621	Exercise Laboratory Techniques	4
KIN	650A	Exercise Science Internship	8
KIN	652	Clinical Kinesiology	4
KIN	653A	Musculoskeletal Assessment	2
KIN	704	Electrocardiography	4
KIN	705	Topics in Applied Physiology	4
KIN	720	Science & Practice of Strength Training	4
KIN	724	Metabolic Adaptations to Exercise	4
KIN	736	Fitness and Graded Exercise Testing	4
KIN	737	Exercise Prescription and Leadership	4
KIN	794	Cardiopulmonary Pathologies	4
KIN	795	Practicum in Cardiac Rehabilitation	2

#### University Required Courses

Abbreviation	Course Number	Title	Credits
NUTR	400	Nutrition in Health and Well	4

		Being	
PSYC	401	Introduction to Psychology	4
BMS	507-508	Human Anatomy and Physiology	8
One course chosen from	SOC 502, PSYC 402, or HHS 540		4
CHEM	403-404	General Chemistry	8
CS	403	Online Network Applications	4

### Outdoor Education Option

The outdoor education option is an accredited, award-winning, internationally recognized program preparing individuals for careers in outdoor education, adventure programming, wilderness therapy, and other educational/organizational settings. In addition to providing rich course content, this interdisciplinary program gives ample opportunity for practical application and field experience in the New Hampshire seacoast and White Mountains areas. Students must earn a grade of C (2.0) or better in every major course. In addition, they must complete 100 days of documented leadership experience prior to beginning a required internship. Interested students should contact the undergraduate curriculum coordinator, Laurie Gullion, e-mail [lgullion@unh.edu](mailto:lgullion@unh.edu).

Students in outdoor education complete **KIN 650B, Internship in Outdoor Education, as the capstone course for the option**. This course integrates the knowledge and skills learned in all previous option courses and experiences into practical applications the students will use as they prepare to enter the profession. Students complete their internships at organizations regionally and nationally, upon completion of all other courses and prerequisites.

### Required Courses

Abbreviation	Course Number	Title	Credits
KIN	540	Top Rope Rock Climbing	4
KIN	541	Management of Initiatives and Challenge Courses	4
KIN	543	Winter Adventure Programming	2
or			
KIN	548	Winter Expedition Programming	4
KIN	550	Outdoor Education Philosophy and Methods	4

KIN	551	Adventure Programming: Backcountry-Based Experiences	3
KIN	552	Adventure Programming: Water-Based Experiences	3
KIN	682	Outdoor Leadership	4
KIN	686	Wilderness Emergency Medical Care	4
KIN	687	Leadership Practicum	4
KIN	786	Organization/Administration of Outdoor Education	4
KIN	787	Theory of Adventure Education	4
KIN	650B	Internship*	(2-4) Cr/F

\*Note: Proof of 100 days of leadership experience is required prior to taking this course.

#### University Required Courses

Abbreviation	Course Number	Title	Credits
ENGL	501, 502, or 503	Intro to Prose, Technical, or Persuasive Writing	4

Other: Core of courses (16 credits) emphasizing the particular area or population in outdoor education of interest to student, e.g., business, education, psychology, social work—selected with assistance of an adviser.

#### Elective Courses (must successfully complete at least one)

Abbreviation	Course Number	Title	Credits
KIN	542	Sea Kayaking	2
KIN	545	High Angle Rescue	2
KIN	546	Whitewater Canoeing	3
KIN	547	Lead Rock Climbing	3
KIN	549	Wilderness Navigation	4
KIN	693C	Teaching Assistantship	2
KIN	782	Therapeutic Applications of Adventure Programming	4
KIN	798	Special Topics	Var.

## Physical Education Pedagogy Option

Pedagogy is the art and science of teaching. This option integrates a general education background with the theoretical and process knowledge involved in teaching within movement-based elementary and secondary physical education programs. Extensive practicum experiences prepare students to teach preschool children, school-aged youth, and young adults, including students with developmental disabilities.

The physical education pedagogy option provides the foundation for public school teacher certification through either the department's four-year certification program, or, if a student chooses to pursue a master's degree with certification, the Department of Education's Fifth-Year Program. All fifth-year candidates must meet the requirements for admission to graduate school (e.g., grade-point average of roughly 2.8 or above and 'minimum' scores on the Graduate Record Examination). Internal transfer candidates must have a minimum GPA of 2.67 and pass the Praxis I state licensure exam before admission to the option. All physical education pedagogy option students must receive a "C" grade (2.0) or better in all KIN required courses, including: KIN 655, Middle School and Secondary PE Pedagogy; KIN 666, Middle School and Secondary PE Practicum; KIN 610, Elementary PE Pedagogy; KIN 781, Inclusion in PE; and KIN 570, Elementary PE Practicum. Freshmen pedagogy majors are admitted with conditional status. In order to obtain full-time status in the option, majors must pass the Praxis I state licensure exam before classes begin in the fall of their sophomore year and maintain at least a 2.67 overall GPA at the start of their junior year. For questions about this program, contact the option coordinator, Steven Wright, at (603) 862-4408, or e-mail

[Steven.Wright@unh.edu](mailto:Steven.Wright@unh.edu).

**KIN 694: Supervised Teaching in Physical Education (student teaching) is the culminating capstone experience** before a student can be certified to teach physical education (K-12). Students will be required to spend eight weeks in an elementary school setting and eight weeks in a middle and/or secondary school setting observing, assisting and teaching various physical activities and grade levels. Students will also be required to attend seminars and complete a portfolio for this credit/fail 'course.'

### Required Courses

Abbreviation	Course Number	Title	Credits
KIN	500	Historical/Contemporary Issues Physical Education	4
KIN	501	First Aid: Responding to Emergencies	2

KIN	570	Elementary Physical Education Practicum	4
KIN	600	Movement and Gymnastics Exploration	4
KIN	601	Lifetime Sports	3
KIN	603	Team Sports	3
KIN	610	Elementary Physical Education Pedagogy	4
KIN	620	Physiology of Exercise	4
KIN	648	Current Issues in Health	4
KIN	652	Clinical Kinesiology	4
KIN	653B	Biomechanical Analysis of Movement	2
KIN	655	Middle School/Secondary Physical Education	4
KIN	666	Middle/Secondary Physical Education Practicum	4
KIN	675	Motor Development and Learning	4
KIN	676	Adventure Activities	3
KIN	780	Psychological Factors in Sport	4
KIN	781	Inclusion in Physical Education	4

#### Required Education Courses

Abbreviation	Course Number	Title	Credits
EDUC	700/800	Educational Structure and Change	4
EDUC	705/805	Alternative Perspectives/Nature of Education	4
KIN/EDUC	694	Courses in Supervised Student Teaching	8
or			
EDUC	900/901	Internship and Seminar in Teaching	12

#### Sport Studies Option

Sport studies is an interdisciplinary option in the Department of Kinesiology that provides a foundation for a variety of career paths in school and college athletics, including coaching, administration, marketing, and sports information. The major also prepares students for further graduate study in areas such as sport psychology. Some sport studies courses are appropriate for students with career interests in other industry segments (e.g., pro-sports, broadcasting), but those students must choose other majors (e.g., business or journalism). Majors take a core of foundation courses (e.g., The Sport Industry) as well as electives in applied areas such as sport marketing, athletic administration, and sport psychology. Majors must earn a grade of B-

(2.67) or better in KIN 565 and KIN 580 and a grade of C (2.0) or better in each required University and KIN course. All majors must complete 20 credits of prior-approved coursework in supporting areas such as business, psychology, or education. In addition, an internship experience or independent study is required. An internship experience is strongly recommended since it is often critical to career development. Interested students should consult with the option coordinator, Karen Collins.

### Required Courses

Abbreviation	Course Number	Title	Credits
KIN	560	Sport Psychology	4
KIN	562	Sports Media Relations	4
KIN	565	Principles of Coaching	4
KIN	580	The Sport Industry	4
KIN	741	Social Issues in Contemporary Sports	4
KIN	761	Senior Seminar in Sport Studies*	4

\*Majors must complete a minimum of 150 hours of industry experience before they can take KIN 761. See adviser for details.

**Electives.** Sixteen credits of approved KIN electives to include KIN 650 or KIN 696.

### University Required Courses

Abbreviation	Course Number	Title	Credits
CS	401	Computer Applications	4
PSYC	401	Introduction to Psychology	4
One approved statistics course			4

**Cognate Requirement (outside of Department of Kinesiology).** Students must complete a minimum of 20 credits of coursework in other departments. Each course must be approved in advance by the faculty adviser.

### Minors in Kinesiology

#### Kinesiology Minor

The Department of Kinesiology offers an interdisciplinary curriculum for nonmajors, which is designed to provide students with the basic knowledge of movement and sport sciences. The

minor consists of courses offered by several options within the department. A list of minor requirements and available classes is available at the Kinesiology Department Office, Room 107, New Hampshire Hall.

### Coaching Minor

The Department of Kinesiology: sport studies option offers a coaching minor. The coaching minor is an interdisciplinary curriculum designed to provide students interested in coaching at the youth, high school or college levels with basic knowledge and skills necessary for competence in coaching. The minor consists of courses offered by several options within the Department of Kinesiology and recreation management and policy. The proposed coursework lays a theoretical and practical framework for students interested in coaching.

### Description of Curriculum and Requirements of Coaching Minor

Admission to the minor is based on successful completion of KIN 565 Principles of Coaching (grade of C or better) and a minimum GPA of 2.0.

### Required Courses

Abbreviation	Course Number	Title
KIN	565	Principles of Coaching
KIN	505	Prevention and Care of Athletic Injuries
KIN	521, 522, 523, 525, 528, 529	Sport-Specific Coaching Theory Course (minimum of two) (each course is 2 credits)
KIN	650D	Internship in Coaching (one 4-credit internship or two 2-credit internships)

### Select at least one of the following:

Abbreviation	Course Number	Title
KIN	527	Scientific Foundations of Health and Fitness
KIN	560	Sport Psychology
RMP	560	Recreational Sport Management
KIN	562	Sport Media Relations
KIN	675	Motor Development and Learning
KIN	740	Athletic Administration
KIN	780	Psychological Factors in Sport and Exercise
RMP	760	Community Sport Organizations: Administration and Development

Students will not be permitted to enroll in KIN 650D Internship until they have been accepted into the minor and completed KIN 565 Principles of Coaching, KIN 505 Prevention and Care of Athletic Injuries and at least one Theory of Coaching class.

To graduate with a coaching minor, individuals must earn a grade of C or better in all courses associated with the minor.

Individuals will not be permitted to count coaching minor classes toward their major regardless of the major/degree program.

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## Nursing (NURS) ▼

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*Associate Professor:* Pamela P. DiNapoli, Susan J. Fetzer, Joan E. Hahn, Gene E. Harkless, Carol L. Williams-Barnard

*Assistant Professor:* Paula L. McWilliam, Christine W. Saltzberg, Joanne G. Samuels, Carolyn L. Tobin, Gerard A. Tobin, Susanne M. Tracy

*Clinical Associate Professor:* Donna Marie Pelletier

*Clinical Assistant Professor:* Elizabeth J. Evans, Kimberly Gibbons, Deborah Leveille, Patricia Puccilli

*Lecturer:* Karen S. Niland

The nursing program is nationally accredited by the Commission on Collegiate Nursing Education, One Dupont Circle NW, Suite 530, Washington, DC 20036-1120. It reflects the mission and goals of the University and focuses on the uniqueness of each individual. The mission of the Department of Nursing is to enhance the health of individuals, families, groups, and communities. The philosophy expresses the beliefs of the faculty regarding person, environment, health, nursing, and education. Its goals are to help nursing students develop knowledge and skills essential to the present and future practice of nursing. Graduates of the program are prepared to provide care to individuals and groups, help people identify and meet their health care needs, be effective colleagues on the health care team, and shape the future of health care.

The curriculum is divided into biological, social sciences, and humanities as a foundation for



courses in the major; and nursing courses, which emphasize relationship-based care, reflective thinking, clinical decision making, and the use of evidence-based guidelines to develop quality and safe clinical skills. Clinical experiences are offered in area hospitals and in community health agencies. The senior year culminates in a **capstone practicum NURS 721, Integrating Professional Nursing Practice**, in which students apply curriculum concepts in a precepted clinical experience. Candidates for the nursing degree must satisfy all of the University Discovery Program requirements in addition to satisfying major requirements.

The faculty of the nursing program believe learning is a creative process wherein students are active participants in their education, growth, and development as professional nurses. Faculty members are facilitators and mentors to students within a supportive, scholarly environment.

Honors-in-major courses are offered to interested nursing students who have achieved a minimum grade-point average of 3.40 in NURS courses at the end of the sophomore year in nursing.

A grade of C or better in high school chemistry is required as well as biology or physics. The following prerequisite courses must be completed successfully prior to enrollment in NURS 500: ENGL 401; BMS 507-508; NUTR 400; and PSYC 401. BMS 501 must be taken prior to or concurrent with NURS 500. A course in statistics must be completed prior to, or taken concurrent with, NURS 641.

Prerequisite courses require grades of C or better and only one prerequisite course may be repeated one time in order to progress. Most of the prerequisite courses also meet discovery requirements. Major courses require a minimum grade of C. Nursing courses may not be repeated. A cumulative grade-point average of 2.50 must be maintained throughout the program.

Students are responsible for their own transportation to clinical agencies, uniforms, professional equipment, health insurance coverage, criminal background checks through approved vendor, drug and alcohol screening through approved vendor, fingerprinting, and select immunizations. Students must be certified in cardiopulmonary resuscitation at the Healthcare Provider or Professional Rescuer level only. All clinical documents must be received by July 1st before their sophomore year and remain up to date as necessary until graduation. Clinical documents cannot expire during the academic year. Students will be assessed a late fee if clinical documents are not received by the due date and will be dropped from the major if documentation is not received by the first day of class. Additional costs associated with the program include, but are not limited to, laboratory fees each semester beginning in the sophomore year and fees associated with attendance at professional meetings.

**Freshman Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
BMS	507-508	Human Anatomy and Physiology	4	4
NUTR	400	Nutrition in Health and Well Being	4	-
ENGL	401	First-Year Writing	4	-
PSYC	401	Introduction to Psychology	-	4
Inquiry/Discovery (3)			4	8
<b>Total</b>			<b>16</b>	<b>16</b>

**Sophomore Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
BMS	501	Microbes in Human Disease	4	-
NURS	500	Introduction to Professional Nursing	2	-
NURS	504	Diseases and Drugs 1	4	-
NURS	512	Introduction to Nursing Assessments and Interventions	4	-
Inquiry/Discovery			4	--
NURS	506	Human Development, Interaction, and Learning Across the Lifespan		4
NURS	505	Diseases and Drugs 2	-	4
NURS	601	Function and Well-Being of Older Adults	-	4
One course in statistics*			-	4
<b>Total</b>			<b>18</b>	<b>16</b>

\*HHS 540, PSYC 402, SOC 502

**Junior Year**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Fall</b>	<b>Spring</b>
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NURS	611	Care of the Adult with Acute Illness 1	4	-
NURS	611C	Care of the Adult With Acute Illness 1 Clinical	2	-
NURS	621	Mat'l & Newborn Nurs. OR NURS 616 RCC: Living w/Mental Illn	4	-
NURS	626	Clinical Judgment in Nursing 1	4	-
NURS	641	Translating Research for Practice	4	-
NURS	612	Care of the Adult with Acute Illness 2	-	4
NURS	612C	Care of the Adult with Acute Illness 2 Clinical	-	2
NURS	616	RCC: Living w/Mental Illn OR NURS 621 Mat'l & Newborn Nurs	-	4
NURS	627	Clinical Judgment in Nursing 2	-	2
Discovery/Elective			-	4
Total			18	16

### Senior Year

Abbreviation	Course Number	Title	Fall	Spring
NURS	702	Child Health Nursing	2	-
NURS	704	21st Century Public Health Nursing	4	-
NURS	704C	21st Century Public Health Nursing Clinical	4	-
		Elective	4	-
NURS	705	Contemporary Leadership within Health Care Systems	-	4
NURS	721	Integrating Professional Nursing Practice	-	8
Discovery/Elective			-	2-4
Total			14	14

### R.N. Baccalaureate Program

Registered nurses with an unencumbered registered nurse license who meet University admission criteria may pursue, on a full- or part-time basis, a bachelor of science degree with a major in nursing. Nursing major courses are offered using on line, hybrid, and face to face

formats. Face to face courses may be held on the Durham campus or select off campus sites.

Curriculum requirements may be met through transfer credits, course enrollments, and challenge examinations. Students from an associate's degree program are allowed to transfer up to 64 credits from a two year program. A maximum of 96 credits may transfer in from all programs.

The nursing component is based on the belief that RN students enter the program with knowledge and competence gained through previous educational and work experiences. This knowledge and competence can be demonstrated through completion of required baccalaureate-level nursing courses. Individualized plans of study are developed to enable completion of nursing content.

Honors-in-major courses are offered to interested RN-BP students who have achieved a minimum grade-point average of 3.40 in nursing courses.

The RN student must earn a minimum of 128 credits and have a 2.5 cumulative grade-point average throughout their coursework. A minimum grade of C is required in each pre-requisite and nursing course. Permission from academic adviser is required to register for all nursing courses to ensure pre-requisites were met; prior approval is required for courses taken outside UNH. Students must maintain continuous enrollment by registering for course work at UNH or NURS 400, Nursing Continuing Enrollment, to remain active until degree is conferred.

Students who are candidates for a bachelor's degree must attain the last one-quarter (32 credits) of total credits for the degree in residence (at UNH) unless granted permission by the Academic Standards and Advising Committee to transfer part of this work from other accredited institutions.

#### **RN-BP Courses**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
NURS	606	Seminar on Professional Nursing	7
NURS	617	Nursing and Healthcare Policy	3
NURS	622	Clinical Decision Making II	4
NURS	645W	Research	4
NURS	655	Community Health Nursing I	3
NURS	656	Comm Hlth Nurs II: Individ, Fam, & Aggregates	2

NURS	656C	Community Health Nursing II/Clinical	1
NURS	703W	Nursing Leadership/Mgmt and Org Context	4
NURS	719	Professional Nursing Practice: Transitions	7

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## Occupational Therapy (OT) ▼

» <http://www.chhs.unh.edu/ot/>

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*Chairperson:* Shelley E. Mulligan

*Associate Professor:* Lou Ann Griswold, Shelley E. Mulligan, Barbara Prudhomme White

*Assistant Professor:* Sajay Arthanat, Douglas C. Simmons, Kerryellen Vroman

*Clinical Assistant Professor:* Donna T Downing, Susan C. Merrill, Elizabeth A. Stewart, Kate Stimmell, Therese Willkomm

Occupational therapy enables people to participate in daily life activities including leisure, work, self-care, and home management. Occupational therapists work with people of all ages to gain or regain skills and abilities or adapt tasks within their natural environment. Occupational therapy education includes studies in liberal arts, biological, behavioral, and health sciences, and occupational science and occupational therapy.

The occupational therapy program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE). ACOTE is located at the American Occupational Therapy Association, 4720 Montgomery Lane, P.O. Box 31220, Bethesda, MD 20824-1220, (301) 652-2682. Graduates from an accredited program are eligible to sit for the certification examination for the occupational therapist administered by the National Board for Certification in Occupational Therapy, Inc. (NBCOT). After successful completion of this exam, the individual will be a registered occupational therapist (OTR). Most states require licensure in order to practice; however, state licenses are usually based on the results of the NBCOT certification examination.

### **Combined Bachelor of Science/Master of Science Program**

Graduates of professional programs must complete a professional master's degree in occupational therapy in order to enter the field. The University of New Hampshire Department of Occupational Therapy offers a combined bachelor's degree/master's degree program.

Students may enter as first-year students or transfer into the B.S./M.S. program at the end of the sophomore year, space permitting in the program. Students interested in transferring into this program should contact the Department of Occupational Therapy for information about transfer requirements and application deadlines.

### **Pre-Professional Curriculum**

Students begin the B.S./M.S. curriculum with three years of pre-professional courses, which include courses in biological and social sciences as well as occupational therapy. In addition to University Discovery Program requirements students take the following core courses during their first three years:

ENGL 401, First-Year Writing

PSYC 401, Introduction to Psychology

BMS 507 and 508, Human Anatomy and Physiology

Social Sciences: three courses in the social sciences, such as history, sociology, psychology, economics, anthropology

OT 500, The Behavior and Development of Children

OT 501, Development Tasks of Adulthood

OT 510, Exploring Occupational Therapy and Occupation

OT 610, Occupation, Identity, and Disability

OT 685, Psychosocial Disorders and Everyday Life

KIN 706 and 707, Neurology and Neurology Lab

Statistics

**Additional requirements (Details on satisfying these requirements are provided by the students' academic adviser and are outlined in the *OT Department Policy and Procedure Manual*):**

An experiential learning/occupation-based learning course for 4 credits;

A health or social policy course;

A minor or self-designed concentration area that relates to health and human services for a total of 20 credits;

Four-hour OT shadow/observation experiences in three different practice settings;

Volunteer or work experience in a health and human service organization is recommended, although not required.

### **Professional Curriculum**

Students in the B.S./M.S. curriculum begin the professional program in the **senior year** and complete the following courses:

OT 741 Human Occupation

OT 710 OT Practice and Professional Roles

OT 751 Mind Body Systems Neurologically Based Function and Dysfunction

OT 752 Human Movement and Environmental Effects on Everyday Occupations (with co-requisite lab, OT 752L)

OT 792 Level I Fieldwork (January-term)

OT 760 Psychosocial Evaluation and Intervention (with co-requisite lab, OT 760L)

OT 785 Research Methods and Application to Practice

OT 745 Administration and Policy for OT Practice

One of the following two courses:

OT 771 Enabling Participation in Community Groups (with co-requisite lab, OT 771L) OR

OT 730 Assistive Technology for Enhancing Occupational Performance (with co-requisite lab, OT 730L)

The Discovery Program Capstone requirement is satisfied through the completion of coursework for OT 741 Human Occupation or OT 791H Senior Honors Thesis.

At the end of this year, students are awarded a bachelor of science degree in occupational science. Students then apply to the Graduate School as advanced-standing students in the professional master's program. An overall minimum grade point of 3.0 is required for admission to the master's degree program, and students must attain a minimum grade of B- in all OT classes, and meet professional behavior expectations. Students must also have no more than 8 credits of B- coursework in OT senior-level courses. Please refer to the *Graduate Catalog* for additional information about the master's program and the final 1.5 years (three semesters) of the professional occupational therapy curriculum, including fieldwork requirements.

Students entering as first-year students, have 5.5 academic years (11 semesters) to complete the professional curriculum, including level II fieldwork. They then will be eligible to sit for the certification examination administered by the National Board of Certification of Occupational Therapists (NBCOT). Consistent with NBCOT, students must sit for the certification examination within two years of completion of coursework and fieldwork. A felony conviction may affect a graduate's ability to sit for the NBCOT certification examination and/or obtain state licensure.

Students are responsible for transportation to off-campus practicum and fieldwork locations and must purchase personal liability insurance for coverage for the practical components of the curriculum.

Curriculum review and revision is undertaken annually. The department works closely with

students during academic advising sessions and shares information about any policy and requirement changes during registration periods as well as throughout the academic year. Students also are expected to take an active role in verifying expectations and should check with their department advisers each September for updated policies and requirements. Program requirements and policies for retention in the major are in the *OT Department Policy and Procedure Manual*, which is available on Blackboard.

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## Recreation Management and Policy (RMP) ▼

» <http://www.unh.edu/rmp/>

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*Chairperson:* Janet R. Sable

*Professor:* Janet R. Sable

*Associate Professor:* Ann L. Morgan

*Assistant Professor:* Patricia J. Craig, Chris Harrist, Charles Boyd Hegarty, Nate Trauntvein, Allison Wilder

*Affiliate Assistant Professor:* James Hilton, Cari A. Moorhead

*Clinical Assistant Professor:* Jill Gravink

*Clinical Instructor:* Tom Carr, David Lee

As the fabric of life in contemporary society grows in complexity, people are increasingly turning to leisure and recreation services to find meaning, renewal, and enrichment. Recreation services can improve the public health, promote sustainable environments, develop a sense of community, and enhance the quality of life of all citizens. Recreation professionals work in diverse settings, including human services, health care, natural recreation resource areas such as parks, and commercial recreation businesses. Graduates are employed in a broad range of settings, such as community recreation agencies, resorts, conference centers, youth services agencies, hospitals, rehabilitation centers, and long-term care facilities. Population and economic projections suggest that recreation service industries will continue to expand and thereby continue to provide numerous professional career opportunities. The Department of Recreation Management and Policy is nationally accredited by the Council on Accreditation for Recreation Park Resources, and Leisure Services. The department's curriculum supports a



broad-based liberal education and an opportunity to acquire specialized professional knowledge and skills.

### **Curriculum Structure**

Students entering the major may choose either an option in program administration, which includes the professional core and required courses related to program administration, or a specialized option in therapeutic recreation, which includes the professional core and required courses in therapeutic recreation. Candidates for a degree in recreation management and policy must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major option.

### **Study Abroad Opportunities**

The University of New Hampshire Approved Study Abroad Program list is available on the Center for International Education website: [http://www.unh.edu/cie/studyabroad/programs\\_approved.html](http://www.unh.edu/cie/studyabroad/programs_approved.html). This site includes a wide variety of destinations, course work, and activities to meet the diverse needs of UNH students. Students who wish to attend a program not included in the approved list must complete a UNH One-time Study Abroad Approval Petition. Interested students in the major should consult with their Recreation Management and Policy academic advisor about sites, timing and course work that may be most compatible with degree requirements.

### **Core Courses**

All majors must complete a core curriculum of eight courses: RMP 490, Recreation and Leisure in Society; RMP 501, Recreation Services for Individuals with Disabilities; RMP 557, Recreation Services Program Design and Planning; RMP 563, Recreation Management and Policy Practicum; RMP 654, Professional Development and Ethics; RMP 663, Management and Policy in Leisure Services; RMP 664 Professional Internship; and RMP 724, Grantsmanship, Evaluation, and Research; (RMP majors cannot count RMP 490 toward the University social sciences requirement.)

A supervised internship (RMP 664) is required of all majors and serves as their **major capstone requirement**. The internship is designed to create a bridge between theory and practical application. Students working with their advisers and the internship coordinator select an appropriate setting based on their professional and career interests. They must complete a 14-16 week full-time internship under the supervision of a qualified professional. Specific requirements are identified in the *Internship Manual* available from the Department of Recreation Management and Policy.

### **Program Administration Option**

This option prepares students for managerial positions in commercial, public, and nonprofit organizations that provide recreation and leisure services. Curriculum design emphasizes the effective and efficient planning, delivery, and evaluation of leisure-based programs, services, and enterprises. Applied experience is a component of most courses, in addition to a required practicum and the 14–16 week full-time internship under professional supervision. Depending upon the RMP electives and the career support emphasis or minor chosen, students may expect to find employment in a broad range of settings. Recent graduates have found employment in the areas of conference and event planning, municipal park and recreation services, recreational sports, commercial/entrepreneurial recreation businesses, youth serving agencies, resorts, and natural resource management positions in state and federal agencies.

In addition to the required core courses, students who pursue the program administration option must complete the following departmental requirements: RMP 558, Program Supervision and Leadership; RMP 665, Applied Marketing and Communication in Recreation Services; RMP 770, Management and Design of Recreation and Park Facilities; RMP 772, Law and Public Policy in Recreation Services, two RMP course electives; CS 401, Computer Applications, or an approved equivalent; SOC 502 or other descriptive statistics; PSYC 401, Introduction to Psychology; FS 525, Human Development; or SW 550. Program administration students must complete a minor or emphasis area of 18–20 credits to support their specific career goals. (RMP majors specializing in Natural Resources Recreation or Parks can count RMP 511 toward their major or a Discovery requirement, not both.)

### **Therapeutic Recreation Option**

Therapeutic recreation utilizes recreation to help people with disabilities or illnesses to develop and use their leisure in ways that enhance health, independence, and well-being. Therapeutic recreation recognizes the importance of quality of life and uses activities to remediate or rehabilitate functional abilities. Therapeutic recreation services are provided in a variety of settings, including hospitals, long-term care facilities, residential treatment facilities, schools, home health care, community recreation, correctional facilities, rehabilitation centers, camp and outdoor education centers, and adult day programs. Observation and applied experience is a component of several courses. Students complete a 14-16-week full-time clinical internship under the supervision of a certified therapeutic recreation specialist (CTRS). The Bureau of Labor Statistics occupational outlook reports the "employment of recreational therapists is expected to increase 15 percent from 2008 to 2018, faster than the average for all occupations" (<http://www.bls.gov/oco/pdf/ocos082.pdf>). Upon successful completion of this option, students are prepared to meet sitting requirements for the National Council for Therapeutic Recreation Certification Examination and are eligible for licensure in the state of New Hampshire.

In addition to required core courses, students who choose this option must complete the following departmental requirements: RMP 502, Foundations of Therapeutic Recreation; RMP 503, Therapeutic Recreation Rehabilitation Principles and Interventions; RMP 504, Therapeutic Recreation Mental Health Principles and Interventions; RMP 612, Therapeutic Communication and Facilitation Techniques in Therapeutic Recreation, RMP 613, Interventions and Documentation Therapeutic Recreation; RMP 614, Assessment and Treatment Planning in Therapeutic Recreation; RMP 615, Clinical Lab in Therapeutic Recreation; RMP 705, Management and Policy in Therapeutic Recreation; CS 401, Computer Applications or approved equivalent; HHS 540, Statistics, or equivalent; PSYC 401, Introduction to Psychology; PSYC 561, Abnormal Behavior; FS 525, Human Development; BMS 507-508, Human Anatomy and Physiology; KIN 652, Clinical Kinesiology, and KIN 653A, Musculoskeletal Assessment.

### **Criteria for Admission and Retention**

Internal transfer students interested in applying to the major must meet with an RMP faculty member prior to receiving an application for admission to the major. Transfer applications are accepted throughout the academic year. Applications can be obtained from the Department of Recreation Management and Policy. Students within the major are required to maintain a minimum 2.5 semester grade-point average every semester to retain good academic standing within the major. In addition, student majors must obtain a grade of C (2.0) or better in RMP courses and a grade of C- (1.67) or better in all other courses specifically required by the department.

### **Child Life Minor**

This interdisciplinary minor is offered to a limited number of students by the therapeutic recreation option in the Department of Recreation Management and Policy and the Department of Family Studies. Upon completion of course requirements, students will be able to sit for the Child Life Specialist exam. All students complete three core courses: RMP 502, RMP 565 and FS 525. Therapeutic Recreation students will select two courses from the following: FS 623, FS 635, FS 641, FS 709, FS 734, and FS 772. Students will complete an internship that will entail a minimum of 480 hours of experience and be supervised by a certified Child Life Specialist.

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## Social Work (SW) ▼

» <http://www.chhs.unh.edu/sw/>

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*Chairperson:* Cynthia Anne Broussard

*Associate Professor:* Mary Banach, Linda Rene Bergeron, Cynthia Anne Broussard, Vernon Brooks Carter, Robert E. Jolley, Jerry D. Marx, Patrick Shannon, Melissa Wells, Sharyn J. Zunz

*Assistant Professor:* Pablo Arriaza, Susan A. Lord, Sharon B. Murphy, Karen R. Oil, Anita Tucker

*Clinical Assistant Professor:* Gretchen Bean, Martha A. Byam, Kim Kelsey, Lee P. Rush

The Department of Social Work's undergraduate program offers both a major and a minor in social work. It is a specialized degree that prepares graduates for generalist social work practice with a solid foundation in the liberal arts and in the knowledge, skills, and value base of social work. Through the mastery of core competencies, social work graduates apply their education working with individuals, families, groups, organizations, and communities. In addition, the program prepares qualified students to pursue graduate education in schools of social work and other human services fields.

The baccalaureate program at the University of New Hampshire is accredited by the Council on Social Work Education (CSWE) and must meet rigorous academic standards to retain this accreditation. Social work majors pursue a program that encompasses the professional social work competencies of professional identity, critical thinking, knowledge of diversity and human rights, social and economic justice, social welfare policy and services, social work practice with all client system sizes, human behavior in the social environment, research and ethics.

To connect the theoretical and conceptual contribution of the classroom with the practice world, students complete an introductory-year, 20-hour service learning experience in the first course, as well as a 450-hour social work internship over two semesters during the senior year. This is the **senior capstone experience**. The field placement in the final year of the baccalaureate program is arranged between the student and the field education coordinator. Evaluation of this senior field placement is one tool that measures student achievement of program competencies. Students are required to pay a liability insurance fee for their off-campus field education experience. In compliance with CSWE accreditation standards, the B.S. in social work program does not grant social work course credits for life experience or work experience.

Social work majors earn a B.S. degree in social work. Graduates are eligible for practice in a variety of social work settings throughout the United States. In addition, qualified graduates may be eligible for advanced standing in M.S.W. programs that offer advanced standing.

### **Academic Program**

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of the social work major. Social work majors are required to take SW 424, 525, 550, 551, 601, 622, 623, 625, and the **senior capstone course sequence** 640, 640A, 641, 641A. In addition, students are expected to successfully complete four courses taken from the disciplines of anthropology/sociology, zoology, philosophy, and psychology. Many of these also may fulfill Discovery Program requirements. Students wishing to minor in social work are required to take SW 424, SW 525, and any three other courses offered by the department, excluding SW 640, 641. Students interested in either a major or minor in social work should consult with the undergraduate program coordinator, Martha Byam, Pettee Hall, Room 231, (603) 862-1077.

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### College of Liberal Arts

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## Undergraduate Course Catalog 2011-2012

### College of Liberal Arts ▼

» <http://www.unh.edu/liberal-arts/>

*Dean:* Kenneth Fuld

*Associate Dean:* John T. Kirkpatrick

*Senior Faculty Fellow:* Peggy A. Vagts , Alasdair D. Drysdale

### Introduction ▼

It is the purpose of the College of Liberal Arts, as a center of learning and scholarship, to help students achieve an understanding of the heritage of civilization and to educate them in the tradition of the past and realities of the present so they may recognize and act upon their obligations to the future.

The college seeks to meet the educational needs of each student through the development of interests and skills, which, combined with the individual's potential, make possible a richer, more useful life.

### Combined Programs of Study

In addition to pursuing a single major, students may combine programs of study as follows:

*Minors:* See [University Academic Requirements](#), [Liberal Arts Interdisciplinary Programs](#), and [University Interdisciplinary Minors](#).

*Interdisciplinary majors:* See [Liberal Arts Interdisciplinary Programs](#)

*Second majors:* See [University Academic Requirements](#).

*Dual-degree programs:* See [University Academic Requirements](#).

*Student-designed majors:* See [Special University Programs](#).

*Other combined programs and interdisciplinary opportunities:* See [Special University Programs](#).

## Proficiency in a Foreign Language ▼

Please see the explication of this University requirement under [Degree Requirements: Bachelor of Arts](#).

Within the College of Liberal Arts, only those students majoring in linguistics, psychology, or theatre and dance may use American Sign Language (ASL) to fulfill their foreign language proficiency requirement. English teaching majors who plan to pursue deaf studies may petition the English department to use ASL to fulfill their foreign language proficiency requirement.

## Liberal Arts Study Abroad ▼

The College of Liberal Arts offers a number of managed study abroad programs that are administered by college faculty and staff. These programs provide opportunities for liberal arts students as well as students in programs throughout the University to experience and learn about different cultures and, in non-English-speaking countries, to increase proficiency in a foreign language.

Because the college administers these programs, registration, finances, and other logistics are streamlined and simple. Students are eligible for federal financial aid, and pay UNH tuition and a single program fee, which covers room, board, and excursions. Most UNH student fees are waived. Students are guaranteed a full semester of credits (16) in the semester-long programs.

Please see the list of eligibility requirements under [Study Abroad Programs](#).

To learn more, contact:

**Cambridge, England:** Summer courses in history, literature, and humanities at Gonville and Caius College, Cambridge University.

Contact: [cambridge.program@unh.edu](mailto:cambridge.program@unh.edu), (603) 862-3962, 53 Hamilton Smith Hall

**London, England:** Fall and/or spring courses in the liberal arts at Regent's College, London.

Contact: [london.program@unh.edu](mailto:london.program@unh.edu), (603) 862-3962, 53 Hamilton Smith Hall

**Brest, France:** Summer intensive language study at the Centre International d'Etudes des Langues.

Contact: [brest.program@unh.edu](mailto:brest.program@unh.edu), (603) 862-3856, 210J Murkland Hall

**Dijon, France:** Academic year, spring, or summer. Students study French language and other liberal arts courses at the Université de Bourgogne, Dijon.

Contact: [dijon.program@unh.edu](mailto:dijon.program@unh.edu), (603) 862-1303, 210E Murkland Hall

**Legon, Ghana:** Spring term program at the University of Ghana, one of West Africa's most prestigious universities.

Contact: [ghana.program@unh.edu](mailto:ghana.program@unh.edu), 603-862-2179, 305 Huddleston Hall

**Budapest, Hungary:** Each fall, UNH students under the supervision of a UNH Justice Studies faculty member will study in residence at Corvinus University.

Contact: [justice.studies@unh.edu](mailto:justice.studies@unh.edu), (603) 862-1716, 202 Huddleston Hall

**Ascoli Piceno, Italy:** Summer, semester, or full-year study in the humanities and social sciences at the UNH-in-Italy campus. Internships and courses at the Università degli Studi da Ascoli Piceno are also available.

Contact: [Piero.Garofalo@unh.edu](mailto:Piero.Garofalo@unh.edu), (603) 862-4005

**Granada, Spain:** Spring semester study in Spanish and other disciplines at the Centro de Lenguas Modernas of the University of Granada.

Contact: [John.Chaston@unh.edu](mailto:John.Chaston@unh.edu), 317 Murkland Hall

### Short Programs

**Belize (Central America):** 4-week summer course: Archaeological Field School in Belize

Contact: [belize.fieldschool@unh.edu](mailto:belize.fieldschool@unh.edu), 603-862-4742, 311 Huddleston Hall

**Montreal, Canada:** January term course.

Contact: [montreal.program@unh.edu](mailto:montreal.program@unh.edu), 603-862-1055, G10B Murkland Hall

**Costa Rica (Central America):** January term course.

Contact: [costarica.program@unh.edu](mailto:costarica.program@unh.edu), 603-862-1406, 314 Horton Social Science Center

**London, England:** January term course: the London Experience.

Contact: [london.experience@unh.edu](mailto:london.experience@unh.edu), 603-862-0667, M313 Paul Creative Arts Center

**Berlin, Germany:** 2-week immersion program offered in January or May.

Contact: [berlin.program@unh.edu](mailto:berlin.program@unh.edu), (603) 862-0063, Murkland Hall

**Moscow, Russia:** January term course.

Contact: [moscow.program@unh.edu](mailto:moscow.program@unh.edu), 603-862-3545, 303 Murkland Hall

## Institutes and Centers ▼

Carsey Institute

[www.carseyinstitute.unh.edu](http://www.carseyinstitute.unh.edu)



The Carsey Institute conducts policy research on vulnerable children, youth, and families and on sustainable community development. Carsey gives policy makers and practitioners the timely, independent resources they need to effect change in their communities.

At UNH, Carsey provides resources and programs to support faculty development for research in the social sciences and health fields. It also provides opportunities for undergraduate and graduate students to participate in interdisciplinary policy research and to engage directly in programs working with families and communities, as well as sustainable community development. There are research scholarships available and events throughout the year to engage with the campus community. The institute, located in Huddleston Hall, was established in 2002 through a generous gift from UNH alumna and noted television producer Marcy Carsey. Questions about working with the Carsey Institute can be directed to Curt Grimm, deputy director.

### **Center for the Humanities**

[www.unh.edu/humanities-center](http://www.unh.edu/humanities-center)

The Center for the Humanities fosters excellence in the humanities, broadly conceived, at the University of New Hampshire. Center resources and programs support faculty research, encourage reflection and inquiry across the university community and beyond, create interdisciplinary initiatives in many forms, and undertake special projects to raise the visibility of the humanities. To accomplish this, the center endeavors to support the highest-quality work by UNH humanities faculty, to build productive collaboration among faculty, to create singular projects that advance its goals, and to be a center of innovation, planning, and inspiration for the humanities at the University of New Hampshire. By pursuing its goals, the center supports the University's research mission in particular, as well as its academic plan.

The center is the sponsor of the Saul O Sidore Memorial Lectures, the James H. and Claire Short Hayes Chair in the Humanities, and the UNH study-abroad program at the University of Ghana. Three interdisciplinary minors—Africana and African American Studies; American Studies; and Race, Culture, and Power—are units of the humanities center, as is the Center for New England Culture. The Center for the Humanities is directed by Burt Feintuch, Professor of Folklore and English.

### **Confucius Institute at UNH**

[www.unh.edu/confucius](http://www.unh.edu/confucius)

The Confucius Institute at UNH (CI-UNH) is a partnership between the University of New Hampshire and Chengdu University in China that engages the life of the University with the

larger community, both locally and globally. The institute offers a full curriculum in Chinese language and culture. It also provides opportunities for cultural learning and exchange for regional schools—primary through post-secondary. At a time when China is the third largest trading partner for New Hampshire, CI-UNH can provide unique opportunities for business and industry in the state. CI-UNH is co-directed by Yige Wang of the UNH Department of Languages, Literatures and Cultures; and Yuexing Xu, the Director of International Cooperation and Exchange at Hanban in China.

### **Crimes Against Children Research Center**

[www.unh.edu/ccrc](http://www.unh.edu/ccrc)

The Crimes Against Children Research Center (CCRC) is concerned with all forms of crimes against children and adolescents, from birth through age 17, both within and outside the family, both known and unknown to law enforcement. These include criminal acts as defined by law, such as sexual assault, abduction, theft, robbery, and aggravated assault against children. But it also includes child abuse in all its forms—physical, sexual, emotional—and child neglect, as well as child-to-child violence, such as peer and sibling assaults and bullying. It also includes indirect victimization, where children witness or are affected by the crime victimization of a family member or friend.

The CCRC, created in 1998, grew out of and expands upon the work of the UNH Family Research Laboratory, which has been devoted to the study of family violence and related topics since 1975. Associated with the Center is an internationally recognized group of experts who have published numerous books and articles concerning the incidence and impact of violence against children.

CCRC staff have contributed to many pioneering national crime studies, including: National Incidence Study of Missing, Abducted, Runaway, and Thrownaway Children; National Family Violence Survey; National Youth Victimization Prevention Survey; National Survey of Sexual Abuse in Day Care; Developmental Victimization Survey; Youth Internet Safety Surveys; and Multi-Site Evaluation of Children's Advocacy Centers.

The CCRC is directed by David Finkelhor, who is also the co-director of the Family Research Laboratory and professor of sociology at the University of New Hampshire. Finkelhor has been researching criminal violence against children since 1978 and is the author and editor of 12 books and more than 100 articles on the subject.

### **Family Research Laboratory**

[www.unh.edu/fri](http://www.unh.edu/fri)

Since 1975, the Family Research Laboratory (FRL) has devoted itself primarily to understanding family violence and the impact of violence in families. As public and professional interest in family violence has grown, so has the need for more reliable knowledge. The FRL seeks to fill that need through comprehensive literature reviews, new theories, and methodologically sound studies. Researchers at the FRL pioneered many of the techniques that have enabled social scientists to estimate directly the scope of family violence. These efforts have brought international recognition to the FRL.

The FRL is unusual among research centers in the field because it addresses all aspects of the family, violence, and abuse. Topics undertaken by the FRL include physical abuse of children, corporal punishment of children, sexual abuse of children, physical abuse of spouses, dating violence, abuse of the elderly, intra-family homicide, rape and marital rape, violence between siblings, peer victimization of children, pornography, and missing and abducted children. This variety of topics is a result of beliefs that have guided FRL research: that various forms of family problems are interrelated, that conflict is as basic to family life as are love and cooperation, and that much of the conflict and violence in the world outside the family can be traced to roots within the family. This holistic view of family violence has contributed both diversity and richness to the FRL's work.

The FRL's prominence in the field is in part a result of the large number, variety, and scope of its publications. In a span of 10 years, FRL staff members have published more than 45 books and more than 740 articles on family violence. A complete list of program publications is updated regularly and available from the [FRL Web site](http://www.unh.edu/fri) at [www.unh.edu/fri](http://www.unh.edu/fri).

The FRL is housed in a suite of offices in the Horton Social Science Center and contains a library of 3,000 books. The FRL is co-directed by David Finkelhor, professor of sociology and director of the Crimes against Children Research Center; and Murray A. Straus, professor of sociology.

### **Justiceworks**

[www.justiceworks.unh.edu](http://www.justiceworks.unh.edu)

Justiceworks is a research and development group in justice studies. Founded in 1999 as a collaborative consortium of academics and professionals, Justiceworks offers an array of balanced, non-partisan services addressing issues in crime, safety, security, and the administration of justice. Within Justiceworks, the Technical Analysis Group (TAG) delivers research products that identify and address critical federal, state, and local law enforcement needs. TAG develops and coordinates law enforcement partnerships, alliances, and relationships nationally in support of the core mission of Justiceworks at the University of New

Hampshire.

Justiceworks is co-directed by John T. Kirkpatrick, associate dean of the College of Liberal Arts and clinical professor of sociology; and Charles Putnam, clinical associate professor of justice studies.

### **Prevention Innovations**

[www.unh.edu/preventioninnovations](http://www.unh.edu/preventioninnovations)

Prevention Innovations is a fee-for-service consulting, training, and research unit that develops, implements, and evaluates cutting-edge programs, policies, and practices that will end violence against women on campus. Prevention Innovations provides community assessments and evaluation research to understand current needs and existing gaps; provides consultations and trainings to improve the implementation of programs, policies, and practices; develops evidence-based prevention materials; builds upon original community-based research to ensure effective results; designs innovative practices and facilitates collaborative regional networks of researchers and practitioners; assembles and maintains a team of accomplished and innovative researchers in the field of campus violence prevention; and adds to scholarship on the causes and prevention of interpersonal violence with a specific focus on college campus communities.

Prevention Innovations is co-directed by Vicki Banyard, Professor of Psychology, and Sharyn Potter, Associate Professor of Sociology. Other team and affiliate members include UNH faculty and staff as well as professionals working in the fields of campus violence prevention, research, and evaluation in the New England region.

### **The Survey Center**

[www.unh.edu/survey-center](http://www.unh.edu/survey-center)

The UNH Survey Center is a full-scale, non-partisan academic survey research center, committed to providing university researchers, government and business leaders, and private organizations with reliable information about public attitudes concerning important policy matters. It is nationally known for its public opinion and political polling for the *Boston Globe*, CNN, Fox News, and WMUR-TV.

The UNH Survey Center has conducted survey research projects at the University of New Hampshire since 1986: state, regional, and national general population surveys based on probability sampling, surveys that target specific populations, surveys that utilize complex

stratified sampling techniques, and panel studies. The Survey Center conducts telephone, mail, and web surveys, as well as focus groups and other qualitative research projects.

The UNH Survey Center is located in Huddleston Hall and features a 28-station Computer-Assisted Telephone Interviewing (CATI) system. The Survey Center is directed by Andrew E. Smith, who is also Associate Professor of Political Science.

## Museum of Art ▼

<http://www.unh.edu/moa>

The Museum of Art serves as the New Hampshire Seacoast's premier public art museum and, for over 50 years, has remained a vital resource for the visual arts, serving the University, local, and regional communities. Visitors and members gather to enjoy a wide variety of changing exhibitions as well as annual exhibitions featuring UNH faculty and student work.

Accompanying programs include gallery talks, lectures, concerts, family programs, and special events. The Lending Library provides educators and students with a wide variety of resource materials for classroom curriculum development and enhancement. The Museum Shop offers a variety of exhibition and art-related merchandise.

The museum's diverse permanent collection includes more than 1,600 works of art, from prehistoric to contemporary. The works are exhibited on a regular basis and are also used by faculty, students, and scholars for research and interdisciplinary study.

Located in the Paul Creative Arts Center, the museum is open to students, faculty, museum members, and the general public free of charge. For more information, call (603) 862-3712 or visit [www.unh.edu/moa](http://www.unh.edu/moa).

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UNH Search:





### College of Liberal Arts

#### Introduction

#### Degrees

- Bachelor of Arts
- Bachelor of Fine Arts
- Bachelor of Music
- Bachelor of Science

#### Interdisciplinary Programs

#### Programs of Study

## Undergraduate Course Catalog 2011-2012

### College of Liberal Arts ▼

» <http://www.unh.edu/liberal-arts/>

### Bachelor of Arts ▼

These programs primarily provide a broad liberal education along with a major in one of the fields listed on this page. Requirements for the bachelor of arts degree and information regarding these majors are presented under [Degree Requirements](#) and [Programs of Study](#).

#### Anthropology

#### Art History

#### Art Studio

#### Classics

#### Communication

Media Practices  
Business Applications

#### English

#### English/Journalism

#### English Literature

#### English Teaching

#### European Cultural Studies

#### French

#### French Studies

#### Geography

#### German

#### Greek

#### History

#### Humanities

#### International Affairs Dual Major

#### Justice Studies Dual Major

#### Latin

#### Linguistics

## **Music**

Music Liberal Studies  
Music Composition  
Performance Study  
Music Preteaching

## **Philosophy**

## **Political Science**

## **Psychology**

## **Russian**

## **Sociology**

## **Spanish**

## **Theatre**

Dance

## **Women's Studies**

## **Bachelor of Fine Arts ▼**

This curriculum provides training for students who plan to enter a professional graduate school. Requirements for the bachelor of fine arts degree are outlined under [Programs of Study/Art and Art History](#).

## **Bachelor of Music ▼**

This curriculum provides professional training in performance, in musical theory, and in music education, and it allows students to develop their talent to a standard equivalent to the one achieved at conservatories of music. Requirements for the bachelor of music degree and information regarding the curriculum are presented in [Programs of Study/Music](#).

Degrees include Music Education, Performance, and Theory.

## **Bachelor of Science ▼**

This curriculum provides strong preparation for entry into graduate programs in neuroscience, behavior, pharmacology, and medicine. Requirements for the bachelor of science degree and

information regarding this major are presented under [Degree Requirements](#) and [Programs of Study/Neuroscience and Behavior](#).

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UNH Search:







### College of Liberal Arts

#### Introduction

#### Degrees

#### Interdisciplinary Programs

- Africana and African American Studies Minor
- American Studies Minor
- Asian Studies Minor
- Cinema Studies Minor
- European Cultural Studies Major and Minor
- History and Philosophy of Science Minor
- Humanities Major and Minor
- Justice Studies Dual Major and Minor
- Latin American Studies Minor
- Linguistics Major and Minor/TESOL Minor
- Middle Eastern Studies Minor
- Neuroscience and Behavior Major
- Queer Studies Minor
- Religious Studies Minor
- Women's Studies Major and Minor

#### Programs of Study

## Undergraduate Course Catalog 2011-2012

### College of Liberal Arts ▼

» <http://www.unh.edu/liberal-arts/>

#### Africana and African American Studies Minor ▼

<http://www.unh.edu/afamstudies/>

The Africana and African American studies minor provides students with an interdisciplinary approach to central issues in African, African Diaspora, Caribbean, and African American history, literature, and culture. The minor permits students to concentrate in one of these areas or to combine courses from among the many offerings to create a distinctive program.

The Africana and African American studies minor encompasses the multidisciplinary and comparative study of African history and culture, and the study of the African Diaspora throughout the world, from Europe to Asia as well as to North and South America. The program recognizes the global and transnational dimensions of contemporary African Diasporic experiences in the United States, the Caribbean, and in Latin American nations. It thus offers a wide variety of courses that are taught across several disciplines in the University. Students are strongly encouraged to select courses reflecting the breadth of offerings in the minor across the University of New Hampshire's undergraduate curriculum.

The program presents strong offerings in Africana studies because an understanding of Africa is central to the study of the African Diaspora. The program also features many courses in African American studies because many aspects of African American history and culture have been central to the development of the United States, highlighting both the nation's problems and its promise, and affecting virtually all areas of academic study through the years, from the humanities and social sciences to the physical sciences. Students are encouraged to take courses from a variety of departments and disciplines. The minor therefore is designed to serve the needs of all students, regardless of their ethnic or cultural background, complementing their work in their major fields of study while serving also as a focused corrective to traditionally marginalized approaches to Africana, African Diasporic, Caribbean, and African American experiences.

Africana and African American studies consists of five 4-credit courses, including one course from a list of introductory courses related to the student's choice of concentration and four other

approved offerings. Students must take at least one course at the 600 or 700 level. The required introductory course provides students with a general understanding of the broad and diverse spectrum of Africana and African American subjects. Electives enable students to develop their understanding in more focused courses (listed below) in various fields of study. There is an opportunity to earn credits towards the minor through a study abroad experience in Africa (Contact coordinator for details). There is also an Independent Study option under the AFAM 795 course, which allows students to work closely with a faculty member on a research project and/or internship relevant to any aspect of Africana & African American Studies (Contact coordinator for details). Students must earn a C- or better in each course, and maintain a 2.0 grade-point average in courses taken for the minor. Electives may include special topics courses, as approved by the minor coordinator, a senior seminar, internship, or study abroad credits.

Students interested in minoring in Africana and African American studies should contact the minor coordinator, Cait Vaughan, 322 Huddleston Hall, (603) 862-2179, e-mail [cait.vaughan@unh.edu](mailto:cait.vaughan@unh.edu).

**Introductory Courses (one of the following)**

ANTH 500D, Peoples and Cultures of Sub-Saharan Africa  
 ENGL 517/AMST 502, Introduction to African American Literature and Culture  
 ENGL 609, Ethnicity in America: The African American Experience in the 20th Century  
 INCO 450, Introduction to Race, Culture, and Power  
 HIST 505 or 506, African American History  
 HIST 531, Introduction to Latin America & the Caribbean  
 HIST 587/588, History of Africa  
 HIST 444D, Slavery and Society in Pre-Colonial Africa

**Elective Courses**

Electives are approved for the minor and announced each semester in the [Time and Room Schedule](#) and on the Africana and African American studies Web site, [www.unh.edu/afamstudies](http://www.unh.edu/afamstudies). Courses that are partly devoted to the concerns of Africana and African American studies may count for the minor, if the instructor will allow the students to focus a significant amount of coursework on this field of study. Approval by both the minor coordinator and the course instructor is required for such courses.

**Pre-approved Electives**

ANTH 500B, Peoples and Cultures of South America  
 ANTH 500D, Peoples and Cultures of Sub-Saharan Africa  
 ANTH 627, Urbanization in Africa  
 ANTH 686, Gender, Sexuality, and HIV/AIDS in Sub-Saharan Africa

ANTH 760, Race in Global Perspectives  
ARTS 671, Egypt and Nubia: Art, Architecture, and Rediscovery  
CMN 632, Communication Theory  
EDUC 797/ANTH 790, Seminar: Teaching Race  
ENGL 581/581H, Introduction to Post-Colonial Literature in English  
ENGL 609, Ethnicity in America: The African American Experience in the 20th Century  
ENGL 681, Introduction to African Literatures in English  
FREN 526, Introduction to Francophone Cultures  
FREN 676, Topics in Francophone Cultures  
FS 757/851, Race, Class, Gender, and Families  
HIST 444D, Slavery and Society in Pre-Colonial Africa  
HIST 497, The Civil Rights Movement  
HIST 531, Introduction to Latin America and the Caribbean  
HIST 587/588, History of Africa  
HIST 589, Islam in Africa  
HIST 600.02, Race, Gender, Science and African-American Experience  
HIST 611, History of the Civil War Era  
HIST 625, Southern History and Literature Since the Civil War  
HIST 684, History of Southern Africa Since 1652  
HIST 688, African Religions  
HUMA 609, Ethnicity in America: The Black Experience in the 20th Century  
MUSI 460, Jazz Band  
PHIL 540, Philosophy of Race and Racism  
POLT 519, Civil Rights and Liberties  
PSYC 791A02, Psychology of Race  
SOC 530/530W, Race and Ethnic Relations  
SOC 745, Race, Ethnicity, and Inequality  
WS 401.06, Intro to Women's Studies  
WS 595, Black Women in America

**American Studies Minor ▼**

<http://www.unh.edu/amstudies>

American Studies is the interdisciplinary study of United States culture in all its varied aspects. Students learn to connect history, art, politics, religion, popular culture, literature, and other features of American life and to examine both the differences and the similarities among, for example, different racial and ethnic groups, historical periods, and media. Students may wish to focus their coursework in the minor around a coherent topic, either chronologically or

thematically. Examples include but are not limited to: a specific historical period (for example, the twentieth century); race, ethnicity, gender, or class in America; popular culture; the arts; Native American studies; regional studies; urban, rural, and natural environments; American institutions (education, sports, religion, etc.).

The American Studies minor consists of five courses. Students must take AMST 501 (Introduction to American Studies) as early in their careers as possible. In addition, students must take at least one course concentrating on issues of race, gender, or ethnicity in America. No more than three courses of the five may be at the 400/500-level (departmental prerequisites may be waived for American studies students at the discretion of the instructor). Ordinarily, not more than two electives may be taken from the same academic department. A relevant internship may be substituted for one of the electives. Students should consult with the minor coordinator before registration. Students must earn a C- or better in each course and maintain a 2.0 grade-point average in courses taken for the minor.

Students interested in completing an American Studies minor should contact the minor coordinator, Cait Vaughan, The Center for the Humanities, 322 Huddleston Hall, (603) 862-2179, e-mail [cait.vaughan@unh.edu](mailto:cait.vaughan@unh.edu).

#### **Courses**

AMST 444B, New Orleans: Place, Meaning & Context

AMST 444E, Fly Fishing & the American Experience

AMST 501, Introduction to American Studies

AMST 502, Introduction to African American Literature and Culture\*

AMST 503, Introduction to Native American Studies\*

AMST 604, Landscape and American Culture

AMST 605, Film in American Culture

AMST 607, Religion in American Life and Thought

AMST 608, Women Artists and Writers, 1850-Present\*

AMST 609, The African American Experience in the Twentieth Century\*

AMST 610, New England Culture

AMST 611, Indigenous New England\*

AMST 612, Periods in American Culture

AMST 613, Regions in American Culture

AMST 614, Native American Studies Topics\*

AMST 615, Asian American Studies Topics\*

AMST 695/6, Special Topics in American Studies

AMST 697/8, Seminar in American Studies

AMST 795, Independent Study

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\*These courses concentrate on issues of race, gender, or ethnicity in America.

### Elective Courses

Electives are approved for the minor and announced each semester in the [Time and Room Schedule](#) and on the [American studies website](#).

### Asian Studies Minor ▼

<http://www.unh.edu/asian-studies>

To appreciate the Asian peoples—their languages, their history, their society, their political/economic systems—and the Asian experiences in the United States, the Asian studies minor is designed to be broadly inclusive. Students are required to choose five courses from a variety of Asian courses offered at UNH, no more than three of which can be from one individual discipline. Students are strongly encouraged to enroll in Asian languages classes at UNH as well as explore Asian courses at other U.S. and Asian institutions. For further information, please contact Lawrence C. Reardon, coordinator, Department of Political Science, 241A Horton Social Science Center, (603) 862-1858; e-mail [chris.reardon@unh.edu](mailto:chris.reardon@unh.edu).

ANTH 500E, People and Cultures of South Asia

ARTS 697, Arts of the Far East

CHIN 400, Conversational Chinese

CHIN 401/2, Elementary Chinese

CHIN 425, Introduction to Chinese Culture and Civilization

CHIN 503/4, Intermediate Chinese

CHIN 631/2, Third Year Chinese

CHIN 795/96, Independent Study in Chinese

CLAS 413/4, Elementary Sanskrit

ENGL 581, Introduction to Postcolonial Literatures in English

ENGL 616C, Asian Americans in Film/Asian American Film

ENGL 750, Special Topics in Literature: Asian American Literature

ENGL 777, Post Colonial Novel

GEOG 541, Geography of Japan

HIST 425, Chinese Civilization

HIST 579, History of China in Modern Times

HIST 580, History of Japan in Modern Times

HIST 681, Modern China Topics

HIST 701, China's Revolutionary Century  
JPN 401/2, Elementary Japanese\*  
JPN 425, Introduction to Japanese Culture and Civilization  
JPN 503/4, Intermediate Japanese\*  
JPN 631/2, Advanced Japanese  
JPN 795/6, Independent Study in Japanese  
PHIL 520, Introduction to Eastern Philosophy  
POLT 545, People and Politics in Asia  
POLT 546, Wealth and Politics in Asia  
POLT 556, Politics in China  
POLT 566, Foreign Policies in Asia and the Pacific  
POLT 569, Chinese Foreign Policy  
POLT 797, Seminar in Chinese Politics

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\*Japanese taught at UNH. Other Asian languages studied elsewhere may be substituted by approval.

### **Cinema Studies Minor ▼**

<http://www.unh.edu/cinema-studies/minor.htm>

The minor in cinema studies offers a variety of opportunities to study a predominant contemporary form of narrative, aesthetic, and social discourse: the moving photographic image. Film is the primary medium of study for the minor, but the cinematic practices of video and television also may be included as potential areas of interest. Courses consist of interdisciplinary approaches to the analysis of cinema, covering works from the silent period to the present, from the U.S. and other nations, and from “mainstream” and “alternative” groups. Students learn the art, geography, history, technology, economics, and theory of cinema, while also learning the language for analyzing its forms and practices. The minor allows for organized and meaningful study of the moving photographic image, from a wide range of scholarly interests and approaches that complement the increasingly significant place of cinema in many major disciplines and other programs. Students in this program become keenly aware of themselves as members of a culture of the moving photographic image.

Cinema studies students are required to take five courses. Students must earn at least a C- in each course and maintain a 2.0 grade-point average in courses taken for the minor. “Double counting” of minor course credits with major course credits will be left to the discretion of existing major departments, with the exception that no more than eight credits, if approved, will “double count.” Courses in cinema studies should be taken in the following sequence: first, one

introductory course, ENGL 533, or CMN 550, followed by one history or theory of film course, LLC 540 or ENGL 618, followed by at least two of the more advanced and/or focused courses, and one of the elective courses.

Interested students should contact the cinema minor coordinator, Matt Konzett, Department of English, [matt.konzett@unh.edu](mailto:matt.konzett@unh.edu), (603) 862-0261.

**Introductory Course (one required)**

ENGL 533, Introduction to Film Studies

CMN 550, Cinema and Society

**History and Theory of Film (one required)**

LLC 540, History of Film

ENGL 618, Film Theory

**Advanced and/or Focused Courses (two required)**

CMN 650, Critical Perspectives on Film

ENGL 616 A, Studies in Film: Genre

ENGL 616 B, Studies in Film: Authorship

ENGL 616 C, Studies in Film: Culture and Ideology

ENGL 616 D, Studies in Film: Narrative and Style

ENGL 733, Special Studies in Film

GERM 523, Women and German Film

GERM 524, Special Topics in German Film

ITAL 525, Italian Cinema

LLC 440, Cultural Approaches to Film and Fascism

RUSS 426, Film and Communism

SOC 670, Sociology and Nonfiction Film

**Elective Courses (one required)**

Electives are drawn from an approved list of courses for the minor, which is compiled and announced every semester. Students also may choose from the advanced and/or focused courses. Elective courses have a significant cinema studies component and may have another disciplinary focus as well. Contributing departments and/or programs include: American studies, anthropology, arts, communication, English, French, geography, German, history, humanities, Italian, music, philosophy, political science, psychology, Russian, sociology, Spanish, theatre and dance, and women's studies. Students should check with the cinema minor coordinator each semester for approval of the elective.

## European Cultural Studies Major and Minor ▼

<http://www.unh.edu/ecs/>

To learn about the European cultural studies major, see the [European cultural studies program](#).

European cultural studies (ECS) is an interdisciplinary minor (interdisciplinary major also available) in which students study the field of cultural analysis through an individually designed focus on a European topic. The ECS major and minor are driven in part by the belief that language is an integral part of culture and not merely a tool for the study of its literature. By the same token, the study of European history, philosophy, politics, and so forth can only be enriched by the addition of critical perspectives developed in language and literature study.

The minor in ECS consists of 20 credits: ECS 500, 504 level in a European language, two foundation courses (see below), and one elective.

### Foundation Courses

The foundation requirement is designed to give students an introduction to European languages; European social and political institutions; and the European arts and humanities. Each student must take two such courses (8 credits).

#### 1. Languages

504 or equivalent (intermediate level) in a European language, or an approved alternative

#### 2. Arts / Humanities or Social Sciences (one course from the following):

ARTS 580 or 581, Survey of Art History

ENGL 651 or 652, Comparative Literatures when inclusive of European literatures

HUMA 501, 502, 503 (when focused on European topics)

MUSI 402, Survey of Music History

ECON 630, Comparative Study of Economic Systems

HIST 435 or 436, Western Civilization

HIST 565, Women in European History

HIST 650, European Socialism

HIST 656, 20th Century Europe

POLT 550, Major Foreign Governments

POLT 552, Contemporary European Politics

For more information on the ECS minor, contact Carmen Rasilla, Department of Languages,



Literatures, and Cultures, Murkland G10D, (603) 862-3126, [crasilla@cisunix.unh.edu](mailto:crasilla@cisunix.unh.edu).

### History and Philosophy of Science Minor ▼

<http://www.unh.edu/colaminors/hps>

What is science? When people ponder this question, they often are led to seek answers outside the sciences themselves. This interdisciplinary minor helps students address historical and philosophical questions about science. The history of science asks, How did we come to hold the beliefs we do about the natural world? How were the great scientists of the past led to the discoveries for which they are remembered? Why did people in the past have very different ideas on issues like the motions of the heavens or the nature of the human body? It is a puzzling reality of world history that the human understanding of nature, society, and the mind has varied greatly with place and time. This intriguing variety also raises philosophical questions: What separates science from pseudoscience or religion? How can we decide whether scientific knowledge will have good or bad consequences for humanity? Can science ever reach the ultimate truth about the universe?

The minor in history and philosophy of science offers courses in such diverse departments as economics, history, mathematics, philosophy, and psychology. It presupposes no specialized scientific background and may be combined with any undergraduate major. Five 4-credit courses are required for the minor, with no more than three from any single department.

Students interested in taking the minor should contact the coordinator, Jan Golinski, Department of History, Horton Social Science Center; e-mail [jan.golinski@unh.edu](mailto:jan.golinski@unh.edu).

ECON 615, History of Economic Thought

ECON 698, Topics in Economics\*

ECON 798, Economic Problems\*

HIST 521, The Origins of Modern Science

HIST 522, Science in the Modern World

HIST 621, 622, History of American Thought

HIST 651, 652, European Intellectual History

HIST 654, Topics in History of Science

HUMA 651, Humanities and Science

MATH 419, Evolution of Mathematics

PHIL 424, Science, Technology, and Society

PHIL 435, Human Nature and Evolution

PHIL 447, Computer Power and Human Reason

PHIL 630, Philosophy of the Natural Sciences

PHIL 683, Technology: Philosophical and Ethical Issues  
PHIL 725, Philosophy of the Social Sciences  
PHIL 780, Special Topics in Philosophy\*  
PSYC 571, Pioneers of Psychology  
PSYC 591, Special Topics in Psychology\*  
PSYC 770, History of Psychology  
PSYC 771, Psychology in 20th-Century Thought and Society

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\*with approval

### **Humanities Major and Minor ▼**

<http://www.unh.edu/humanities-program>

To learn about the humanities major, see the [humanities program](#).

The humanities minor studies the fundamental questions and issues of human civilization. The minor consists of a minimum of 20 credits of academic work (five courses), with a minimum grade of C from the following courses:

**Two courses from the 510/511/512/513/514/515 sequence:**

HUMA 510, The Ancient World: An Interdisciplinary Introduction  
HUMA 511, The Medieval World: An Interdisciplinary Introduction  
HUMA 512, Renaissance and Early Modern: An Interdisciplinary Introduction  
HUMA 513, The Modern World: An Interdisciplinary Introduction  
HUMA 514, The Twentieth Century, Part I: 1900-1945  
HUMA 515, The Twentieth Century, Part II: 1945-1999

**Two other Humanities Program courses, one of which should be at the 600-level:**

HUMA 401, Introduction to the Humanities (theme varies)  
HUMA 444, Idea of University  
HUMA 500, Critical Methods in the Humanities  
HUMA 592, Special Topics (theme varies)  
HUMA 607, The American Character: Religion in American Life and Thought  
HUMA 608, Arts and American Society: Women Writers and Artists, 1850-Present  
HUMA 609, Ethnicity in America: The Black Experience in the Twentieth Century  
HUMA 610, Regional Studies in America: New England Culture in Changing Times  
HUMA 650, Humanities and the Law  
HUMA 651, Humanities and Science  
HUMA 730, Special Studies in the Humanities

HUMA 700, Seminar in the Humanities

**Justice Studies Dual Major and Minor ▼**

<http://www.unh.edu/justice-studies>

To learn about the justice studies dual major, see the [justice studies program](#).

Justice studies is an interdisciplinary area that blends topics from humanities departments (e.g., philosophy), social science departments (e.g., psychology, sociology, women's studies), departments that include both humanities and social science faculty (e.g., history, political science), and professionally oriented departments (education, family studies, social work). Some of the topics studied include courts, family violence, rights, substance abuse, juvenile justice, school law, children as witnesses, hate crimes, and community policing. The goal is to produce graduates who have a higher level of knowledge about law and justice in American society and in the world so that they will mature into more knowledgeable and effective citizens. The justice studies minor is intended for students who are looking for careers in the justice system but do not have the time in their academic schedule to complete the dual major program.

The minor in justice studies requires students to take a total of five courses (20 credits) each with a grade of C- or better in order to complete the program. Students are allowed to "double count" no more than two courses toward their major and minor, and are not allowed to take more than two courses from any one department (except for justice studies).

**Required Courses**

JUST 401, Introduction to Justice Studies

And one of the following three courses

POLT 407, Law & Society

POLT 507, Politics of Crime and Justice

SOC 515, Introductory Criminology

**Elective Courses**

Students are required to select three elective courses from the Justice Studies approved course list. This list is approved and published yearly by the Justice Studies Executive Committee. Departmental offerings that are currently accepted for the minor include:

BIOL 420, Intro to Forensic Science

CD 717, Law of Community Planning (offered every other year)

CMN 765, Police Talk

EDUC 767, Students, Teachers and the Law  
FS 772, International Approaches to Child Advocacy  
FS 794, Families and the Law  
FS 776, Children, Adolescents and the Law  
HMP 734, Health Law  
HIST 509, Law in American Life  
HIST 600, Crime and Punishment in Modern History  
HIST 609, Special Topics: American Legal History  
HIST 645, 19thC European Great Powers - Diplomacy and International Law  
HMGT 625, Hospitality Law (only HMGT majors allowed)  
HMGT 627, Employment Law  
HUMA 650, Humanities and the Law: The Problem of Justice in Western Civilization  
INCO 404F, Medicine and Law in the United States  
JUST 401, Introduction to Justice Studies  
JUST 405, Technology, Crime & Society  
JUST 501, Justice Studies Research Methods  
JUST 550/551, Mock Trial (must take year-long course)  
JUST 601/602, Internship/Research Internship  
JUST 650/651, Budapest Study Abroad  
JUST 695, Special Topics in Justice Studies (no more than two courses)  
JUST 701, Senior Seminar (writing intensive course)  
JUST 767, Students, Teachers, and the Law  
JUST 795, Reading and Research (variable credit)  
KIN 798, Sports Law  
MGT 647, Business Law (only Business Administration, Accounting and Business Administration, and Management allowed)  
MGT 648, Business Law II  
NR 566, Wildlife Enforcement I  
NR 718, Law of Natural Resources and Environment  
PHIL 436, Social and Political Philosophy  
PHIL 635, Philosophy of Law  
PHIL 660, Law, Medicine and Morals  
PHIL 701, Value Theory  
PHIL 730, Theories of Justice  
PHIL 740, Advanced Topics in Philosophy of Law  
POLT 407, Law and Society  
POLT 507, Politics of Crime and Justice  
POLT 508, Supreme Courts and the Constitution  
POLT 513, Civil Rights and Liberties

POLT 520, Justice and the Political Community  
POLT 568, Intro to Intelligence (only when taught by Professor MacPherson)  
POLT 660, Terrorism and Political Violence  
POLT 701, The Courts and Public Policy  
POLT 707, Criminal Justice Administration  
POLT 708, Administrative Law  
PSYC 591, Forensic Psychology  
PSYC 755, Psychology and Law (Research Methods Prerequisite)  
PSYC 756, Psychology of Crime and Justice (Research Methods Prerequisite)  
PSYC 791, Advanced Topics: Psychology of Hate  
RMP 772, Law and Public Policy in Leisure Services (must have junior/senior status)  
SOC 515, Introductory Criminology (or POLT 507)  
SOC 525, Juvenile Crime and Delinquency  
SOC 535, Homicide  
SOC 620, Drugs and Society  
SOC 650, Family Violence (must have junior/senior status)  
SOC 655, Sociology of Law and Justice  
SOC 697, Spc. Top. Perspectives on Terrorism  
SOC 715, Criminological Theory  
SOC 720, Sociology of Drug Use  
SOC 780, Social Conflict  
SOC 797, Special Topics: Research in Crime and Justice  
SW 525, Introduction to Social Welfare Policy  
WS 595, Special Topics: Violence Against Women

Students who are interested in minoring in the justice studies program will need to file an intent to minor form. This form is available in the justice studies office or can be downloaded from the Web site at [www.unh.edu/justice-studies](http://www.unh.edu/justice-studies). Offices are located in Room 202, Huddleston Hall, and are open Monday through Friday 8:00 a.m. to 12 p.m. and 1 p.m. to 4:30 p.m. For more information contact Ellen Cohn at (603) 862-3197, e-mail [ellen.cohn@unh.edu](mailto:ellen.cohn@unh.edu); or Debbie Briand at (603) 862-1716, e-mail [justice.studies@unh.edu](mailto:justice.studies@unh.edu).

### **Latin American Studies Minor ▼**

<http://www.unh.edu/colaminors/latin-american-studies>

The Latin American studies minor provides an interdisciplinary approach to the study of Latin America. People of Latin American or Latino heritage comprise the largest minority group in the U.S. Knowledge of Latin America is especially valuable for students who plan to work in

education, international organizations, government, social services, and business, as well as for those who plan to undertake graduate study in Latin America. The minor requires five courses representing three disciplines. Latin American history (HIST 531 or 532) is required. A minimum of high-intermediate level proficiency in Spanish or Portuguese must be reached through coursework or other means. Academic study in Latin America is strongly recommended. Elective courses must be approved by the Latin American Studies minor coordinator or committee and at least 50 percent of any selected course must focus on Latin America. At least three courses must be taken in residence. All coursework required for the Latin American minor must be completed with a grade of C or better. Courses for the minor may not be taken pass/fail.

ANTH 500B, Peoples and Cultures of the World: South America

ANTH 501, World Prehistory: Meso America

ANTH 697, Mayan Culture

CMN 515, Analysis of the News\*\*

EC 535, Environmental Conservation\*

HIST 425, Foreign Cultures\*\*

HIST 531, 532, Modern Latin America

HIST 632, Latin American History

POLT 554, Politics of Central America, Mexico, and the Caribbean

POLT 559, Politics of South America

POLT 565, United States- Latin American Relations

POLT 651, Selected Topics in Comparative Politics\*\*

SPAN 526, Latin American Culture and Civilization

SPAN 641, Phonetics

SPAN 647, Hispanic Cultural Studies\*\*

SPAN 648, Current Periodicals

SPAN 653, 654, Introduction to Latin American Literature and Thought

SPAN 771, Latin American Drama

SPAN 772, Latin American Novel

SPAN 774, Major Latin American Authors

SPAN 797, Latin American Literature

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\*Since less than 50 percent of this course deals with Latin America, students must talk to the professor at the beginning of the semester and declare their intention to apply it to the Latin American studies minor. All research paper/projects must focus on a Latin American topic.

\*\*When course content is relevant.

For more information on the Latin American studies minor, contact Lori Hopkins, Latin

American studies minor coordinator, Murkland G10C, (603) 862-3122, e-mail:

[lhopkins@cisunix.unh.edu](mailto:lhopkins@cisunix.unh.edu).

### **Linguistics Major and Minor/TESOL Minor ▼**

<http://www.unh.edu/linguistics>

To learn about the linguistics major, see the [linguistics program](#).

Linguistics is the study of one of the most important characteristics of human beings— language. It cuts across the boundaries between the sciences and the humanities. This interdisciplinary minor consists of any five linguistics courses approved by the coordinator of the linguistics program. It is highly recommended that English 405 or Linguistics 405 (or 505), Introduction to Linguistics, be one of the five.

For more information about the linguistics minor, please contact Rochelle Lieber, [rochelle.lieber@unh.edu](mailto:rochelle.lieber@unh.edu), 862-3964.

A minor in TESOL also is available. The TESOL minor is a set of courses that are related to teaching English to speakers of other languages. This minor primarily is for students who are interested in teaching English to speakers of other languages, but it is also appropriate for students who are going into social work or other professions that require regular interaction with nonnative English speakers.

The TESOL minor will not certify students to teach in New Hampshire public schools (K-12). For that purpose, students must complete the ESL certification program that is offered at the graduate level by the Education and English departments. However, the coursework in this minor will provide a very good start for students who want to later pursue ESL certification or an M.A. in TESOL at UNH or another institution.

The TESOL minor requires the following five courses (See course descriptions at [www.unh.edu/linguistics](http://www.unh.edu/linguistics)):

ENGL 715, TESL Theory and Methods

ENGL 716, Curriculum, Materials, and Assessment in ESL

One course on the structure of English:

ENGL 791, English Grammar; or

ENGL/LING 405, Introduction to Linguistics

Two electives from the list of approved TESOL electives:

COMM 522 Acquisition of Language

ENGL 791 or ENG/LING 405, whichever was not taken before

ENGL/LING 719, Sociolinguistics Survey

ENGL 727, Issues in Second Language Writing (WI)

ENGL 752, History of the English Language (WI)

ENGL/LING 790, Special Topics in Linguistics (when offered on a TESOL-related topic) (WI)

LLC 791, Methods of Foreign Language Teaching

Special topics courses that are related to TESOL

(The TESOL coordinator can provide you with a list of available courses for a particular semester.)

Students must receive a C- or better in each course and achieve a 2.0 GPA in the five courses.

No more than 8 transfer credits will be accepted.

For more information about the TESOL minor, please contact Mary Clark,

[mmc@cisunix.unh.edu](mailto:mmc@cisunix.unh.edu), 862-3714.

### **Middle Eastern Studies Minor ▼**

<http://www.unh.edu/colaminors/middle-east>

The minor in Middle Eastern studies will acquaint students with the many facets of Middle Eastern civilizations through the interdisciplinary study of languages, history, politics, geography, and anthropology. Minor coursework will enable students to understand the Middle East as a dynamic region in a global and comparative context. Middle Eastern studies thus encompasses not only the study of the region itself, but also the flows of migration, diasporas, refugees, ideas, literatures, social movements, war, and natural resources that make the region pivotal to world history and the global economy. In addition, participation in the minor will prepare students for study abroad experiences, help students acquire skills and qualifications for graduate study, and enhance employment opportunities.

### **Minor Requirements**

The Middle Eastern studies minor requires five courses (20 credits) drawn from the list of **approved courses** or from exceptional courses and opportunities approved by the affiliate faculty in respective disciplines. The five-course requirement will include **one** general introductory course chosen from the following:

HIST 425: Islamic Cultures and Civilizations

ANTH 550C: Peoples and Cultures of the Middle East

GEOG 540: Geography of the Middle East



### POLT 559: Comparative Politics of the Middle East

Students must receive a grade of C- or better for a course to count toward the minor. Courses for the minor may not be taken on a pass/fail basis.

**Foreign Language Study:** The study of a Middle Eastern or language relevant to Middle Eastern studies is strongly encouraged but not required. Students are encouraged and permitted to count Arabic towards the five-course requirement. Students who have studied Hebrew, Turkish, Farsi, or other Middle Eastern languages at other institutions may apply for transfer credit towards the minor. Through petition to the minor coordinator and with support of affiliate faculty in the respective discipline, students may apply for European languages, such as French and Italian, to count towards minor requirements, provided these are relevant to their research and study interests in the region.

**Transfer or Articulation Agreements with other Institutions:** Transfer credits may be approved by the coordinator to count towards the minor if the transfer credit is accepted by the University and fits within the scope of the minor.

Students interested in the minor should contact the coordinator and/or affiliated faculty to discuss their program of study. The coordinator, Jeannie Sowers, may be reached at [jeannie.sowers@unh.edu](mailto:jeannie.sowers@unh.edu), (603) 862-1752.

### **Neuroscience and Behavior Major** ▼

<http://www.unh.edu/psychology/neuroscience-behavior>

This interdisciplinary major is jointly housed in the College of Liberal Arts and the College of Life Sciences and Agriculture.

See description under **College of Life Sciences and Agriculture** for full program information.

### **Queer Studies Minor** ▼

<http://www.unh.edu/queerstudies>

The queer studies minor provides students with opportunities to research and understand a rapidly growing field whose focus is study of lesbian, gay, bisexual, trans and allied peoples, their histories and cultures. Queer studies is a method of inquiry that explores the role of same-sex desire and constructions of gender across and among cultures and histories. In these classes, students will consider sexualities and genders as identities and social statuses, as categories of knowledge, and as lenses that help to frame how we understand our world. The minor consists of interdisciplinary coursework in queer studies and is open to all students. Students who wish to pursue the queer studies minor should consult with the queer studies

coordinator at [queer.studies@unh.edu](mailto:queer.studies@unh.edu) or contact the program through the women's studies office, (603) 862-2194.

**Queer Studies Course Offerings (may vary by instructor)**

ANTH 625, Female, Male, and Society

ANTH 685, Gender, Sex, & HIV in Sub-Saharan Africa

CMN 583, Gender and Expression

CMN 697, Gender and Sexuality in US Public Culture

ENG 586, Women Writers of the 19<sup>th</sup> & 20<sup>th</sup> Century

ENG 693/798Q, LGBT Writing, Queer Reading

ENGL 746, No More Drama: Studies in American Drama

ENGL 785, Virginia Woolf: Public Intellectual, Cultural Icon

FS 746, Human Sexuality

FS 757/857, Race, Class, Gender, and Families

HIST 497, Gender and Sexuality in African History

HIST 595, Colloquium: Gender and Sexuality in Pre-Modern Europe

HIST 595, Colloquium: Sex and Sexuality in Islamic History

HIST 596, Introduction to Gay and Lesbian History

HIST 665, Sex in the City

HUM 401, Sex and Love in Literature and Philosophy

INCO 404, Honors Seminar: History of Body and Sexuality

JUST 695, Topics in Race, Gender

POLT 525, Multicultural Theory

PSYC 595, Applied Psychology (Research, Field, or Academic Experience)

SOC 520, Sociology of the Family

SOC 570, Sexual Behavior

SOC 630, Sociology of Gender

SOC 675, Sociology of AIDS

SW 715/815, Social Work Practice with GLBT People

WS 405, Gender, Power, & Privilege

WS 444, Trans/Forming Gender

WS 444B, Gender and Diversity in Sports

WS 505, Survey: Violence Against Women

WS 505, Survey: Gender, Race & Sexuality in Visual Culture

WS 632, Feminist Thought (depending on instructor)

WS 632, Honors Thesis (or other departmental designation)

WS 795, Independent Study (or other departmental designation)

WS 798, Colloquium: Race, Gender & Representation

WS 798, Colloquium: Gay Marriage and Kinship

WS 798, Colloquium: Women in Prison

**Electives (require program approval and may vary by instructor)**

ARTS 690, Women Artists of the 19th & 20th Century

CMN 567, Gender, Race, and Class in the Media

CMN 697, Seminar: Contemporary Feminist Rhetoric

EDUC 507, Mentoring Adolescents

EDUC 705/805, Contemporary Educational Perspectives

ENGL 786, 20<sup>th</sup> Century British Fiction

ENGL 618, Film Theory

ENGL 685, Women's Literary Traditions: Dreamgirls: Black Music, Black Beauty, and Diva  
Autobiography

FS 545, Family Relations

HUMA 401, Introduction to Humanities: Marriage

INCO 450, Introduction to Race, Culture, & Power

LLC 440, Cultural Approaches to Film and Fascism

POLT 522, Dissent & Political Community

POLT 721/821, Feminist Political Theory

PSYCH 763, Community Psychology

SOC 630, Sociology of Gender

SOC 570, Human Sexual Behavior

SOC 697, Women, Health, and Illness

SW 840, Implications of Race, Culture, and Oppression for Social Work Practice

THDA 762, Women in 20<sup>th</sup> & 21<sup>st</sup> Century Theatre

WS 401, Introduction to Women's Studies

WS 444A, Race Matters

WS 595, Topics: Feminisms & Global Perspectives

WS 595, Topics: Activism: VAW, Poverty, Repro Rights

WS 632, Feminist Thought

WS 796, Capstone Experiences

WS 797, Internship (or other departmental designation)

WS 798, Colloquium: Violence Against Women/Activism

**Religious Studies Minor ▼**

<http://www.unh.edu/colaminors/religious-studies>

The religious studies program at the University of New Hampshire currently offers an interdisciplinary minor, bringing together courses in several fields that address religion as a

cultural, logical, or expressive phenomenon in human history. A religious studies major is available through the self-designed major program. Religious studies courses at UNH avoid theological or confessional biases and emphasize multicultural tolerance and diversity.

Requirements of the religious studies minor include the basic two-semester sequence, History of World Religions (RS/HIST 483) and Patterns in World Religions (RS/HIST 484); the advanced Minors' Seminar in Religious Studies to be taken students' senior year (RS 699); and at least two other courses either cross-listed in religious studies, announced in the *Religious Studies Bulletin*, or otherwise relevant to the study of religion (by student's petition to the program director). Students especially interested in religious studies are encouraged to combine the minor with further pertinent coursework in one of the established departments contributing to the program: history, philosophy, anthropology, and English. The religious studies self-designed major involves seven courses beyond the minor requirements, at least five of which are 600 level or higher. The program director can aid in advising such a major program.

Courses included in the biannual *Religious Studies Bulletin* ordinarily have some degree of focus on issues related to the academic study of religion, conceptualizing religion or religious influences as a principal problem, asking comparative questions, and/or developing models of cross-cultural usefulness. Courses listed here generally are offered at least once every two years:

#### **Historical-Cultural**

RS/HIST 483, History of World Religions

HIST 585, Middle East History to the Medieval Islamic Era

HIST 587, Africa South of the Sahara

HIST 589, Islam in Africa

RS/ENGL/AMSTUD 607, Religion in American Life and Thought

RS/ANTH 617, Religion and Conflict in South Asia

HIST 642, Religious Conflict in Early Modern Europe

HIST 688, African Religions

#### **Theoretical**

PHIL 417, Philosophical Reflections on Religion

RS/HIST 484, Patterns in World Religions

ANTH 616, Religion, Culture, and Society

RS/HIST 682, Cults and Charisma

RS 699, Senior Seminar in Religious Studies

RS/ANTH 770, Anthropology of the Sinister

### Textual

ENGL 518, The Bible as Literature

HIST/RS 576, The Hebrew Bible in Historical Context

HIST/RS 601, Seminar in Religious Texts

HIST/RS 689, The New Testament in Historical Context

Interested students also should be alert for special topics courses in history (HIST 600), English (ENGL 697/698), anthropology (ANTH 500), religious studies (RS 600), and other disciplines that might be relevant to the study of religion. Copies of the *Religious Studies Bulletin*, which includes all such courses each semester, can be picked up outside the director's office.

Students interested in the religious studies minor should see the director to fill out an intent-to-minor form by the beginning of their junior year. For more information, consult the director, Funso Afolayan, Department of History, 415 Horton Social Science Center, (603) 862-3026; e-mail [fsa@cisunix.unh.edu](mailto:fsa@cisunix.unh.edu).

### Women's Studies Major and Minor ▼

<http://www.unh.edu/womens-studies>

To learn about the women's studies major, see the [women's studies program](#).

The women's studies minor offers students an interdisciplinary introduction to the status and contributions of women in various cultures and historical eras.

For the women's studies minor, students must complete 20 credits of women's studies courses with a grade of C or better. Courses taken pass/fail may not be used toward the minor. No more than eight credits used to satisfy the requirements for the major may be used for a minor. Students electing the Women's Studies minor must complete WS 401, Introduction to Women's Studies, or WS 405, Gender, Power, and Privilege, and WS 798, Colloquium in Women's Studies, normally taken at the beginning and end of the course sequence, respectively. It may be possible to substitute WS 797, Internships, or WS 796, Capstone Experiences, for WS 798, Colloquium, with permission from a Women's Studies adviser. Additionally, students must complete three other women's studies courses, either program courses or those that are cross-listed with other departments.

Other Women's Studies courses are WS 505, Survey in Women's Studies; WS 632, Feminist

Thought; and WS 795, Independent Study.

*Departmental offerings include the following courses offered by other UNH departments:*

ARTS 690, Women Artists of the Nineteenth and Twentieth Centuries

CMN 567, Gender, Race, and Class in the Media

CMN 583, Gender and Expression

ECON 698, Topics: Women in Economic Development

ECON 698, Topics: Consumption

EDUC 507, Mentoring Adolescents

ENGL 585, Introduction to Women in Literature

ENGL 685, Women's Literary Traditions

ENGL 785, Major Women Writers

ENGL 798, Special Studies: LGBT Writing, Queer Reading

FS 545, Family Relations

FS 757, Race, Class, Gender, and Families

GERM 520, Women in German Literature and Society

GERM 524, Topics in German Film

HIST 565, Women in Modern Europe

HIST 566, Women in American History

HIST 600, Advanced Explorations: The History of Childhood

HIST 665, Themes in Women's History

HUMA 401, Intro: Sex and Love in Literature and Philosophy

NURS 595, Women's Health

POLT 525, Multicultural Theory

POLT 721, Feminist Political Philosophy

PHIL 510, Philosophy and Women

PSYC 571, Pioneers of Psychology

PSYC 711, Psychology in 20th Century Thought and Society

PSYC 763, Community Psychology

SOC 630, Sociology of Gender

SW 697, Special Topics: Practice with GLBT People

Students who wish to minor in women's studies should consult with the coordinator or assistant coordinator, 203 Huddleston Hall, (603) 862-2194.

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## Undergraduate Course Catalog 2011-2012

### College of Liberal Arts ▼

» <http://www.unh.edu/liberal-arts/>

### Anthropology (ANTH) ▼

» <http://www.unh.edu/anthropology/>

» [Click to view course offerings](#)

*Chairperson:* Joe L.P. Lugalla

*Professor:* Joe L.P. Lugalla

*Associate Professor:* Justus M. Ogembo, Robin E. Sheriff

*Research Associate Professor:* Curt D. Grimm

*Assistant Professor:* Eleanor Harrison-Buck, Meghan C.L. Howey, Svetlana Peshkova

*Lecturer:* Edgar Martin del Campo, Sara Withers

Anthropology asks the question: What does it mean to be human? We answer this fundamental query with a global perspective on the human condition as students explore both the similarity and diversity of human experience. Through courses that cover a wide range of societies throughout the world, we investigate the human condition, past and present. Introductory courses provide an overview of the fields of anthropology: social and cultural anthropology, archeology, physical anthropology, and linguistics. More advanced courses provide the opportunity for students to pursue intensive study of particular topics in cross-cultural perspective. The department emphasizes critical thinking and writing skills and encourages close faculty/student contact in seminar courses and at the upper level. Students, in consultation with their academic adviser, have the opportunity to take courses in other departments that complement specific foci in anthropology.

At this time of increasing globalization, anthropology provides students with a broad overview of diverse peoples and cultures. Majors are therefore well prepared to live in a rapidly changing world. The major both prepares students for graduate-level studies and serves as a foundation for a wide range of careers. With backgrounds in anthropology, our students become teachers, social workers, public policy experts, forensic investigators, health practitioners, primatologists, international business executives, and community and economic development specialists, as



well as pursuing various other careers.

To declare a major in anthropology, students must have completed at least one introductory level anthropology course at the 400- or 500-level with a grade of C or better.

Majors must complete a minimum of 40 credits in anthropology with grades of C or better and in accordance with the following requirements:

**Required**

ANTH 411, 412, or 415

ANTH 500 or 501

ANTH 511

ANTH 513 or 514

ANTH 611

Four additional courses numbered 600 or above.

The Discovery Program capstone requirement may be fulfilled by completing one 700-level course (seminar format). Seminar courses include ANTH 705, 720, 770, 785, and 797. Other courses, internships, or experiences may be substituted with the permission of the student's adviser and department chair.

Anthropology majors may use one major course to satisfy both a major requirement and a Discovery category requirement.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

American Sign Language may not be applied toward the foreign language requirement.

Honors-in-major and senior thesis options are available.

Students who declare a major in anthropology are expected to make steady progress toward fulfillment of major requirements. Normally, this means taking at least one anthropology course per semester until all of the requirements have been met. A student who has fulfilled most of the major requirements may request an exception to this policy from his or her adviser.

Students wishing to major in anthropology should consult with the anthropology chairperson.

The anthropology minor consists of 20 credits in anthropology courses with a C or better at

least one of which must be numbered above 600.

» [Click to view course offerings](#)

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## **Art and Art History (ARTS) ▼**

» <http://www.arts.unh.edu/>

» [Click to view course offerings](#)

*Chairperson:* Jennifer K. Moses

*Professor:* Grant Drumheller, Patricia A. Emison, Eleanor M. Hight, Craig A. Hood, Scott Schnepf, David R. Smith

*Associate Professor:* Benjamin S. Cariens, Brian W.K. Chu, Michael McConnell, Maryse Searls McConnell, Jennifer K. Moses

*Assistant Professor:* Julee Holcombe, Leah Woods

*Lecturer:* Richard Fox, Rebecca Karo, Suzanne Schireson, Henrietta Startup, Don Williams

The courses offered by the Department of Art and Art History provide an opportunity, within the liberal arts framework, for students to acquire a thorough knowledge of the basic means of visual expression, to study intensively the history of art, or to prepare themselves for a career in art teaching. In addition, these courses offer foundation experience for students who are interested in art but are majoring in other departments in the University. The Department of Art and Art History offers programs leading to a bachelor of arts degree in either studio art or art history and a bachelor of fine arts degree in studio art. Certification for art teaching in the public schools is also offered in cooperation with the Department of Education (see [Education](#), under Programs of Study).

The University reserves the right to retain selections from a student's work for a period of not more than two years.

### ***Bachelor of Arts Curriculum (Studio)***

Students selecting to work toward a bachelor of arts degree in studio art must complete a minimum of thirteen courses (52 credits), with a minimum grade of C- in each course.

#### **The following courses are required**

ARTS 480, Introduction to Art History

ARTS 532, Introductory Drawing

ARTS 546, Introductory Painting

ARTS 567, Introductory Sculpture

## ARTS 632, Intermediate Drawing

### One of the following

ARTS 536, Introductory Printmaking: Intaglio

ARTS 537, Introductory Printmaking: Lithography

ARTS 551, Photography

### One of the following

ARTS 501, Ceramics

ARTS 525, Woodworking

ARTS 667, Sculpture Workshop

Three additional courses in a studio concentration at 600 level or above

One additional studio elective

Two additional art history courses, at least one of which must be at the 600 level or above

While these courses represent the minimum departmental requirements for the studio art major, students may wish to plan a program involving greater depth in one or several of the studio areas.

The Discovery Program capstone requirement may be fulfilled by completing a 600 level or above course in the studio concentration. The student will work with the course's instructor to complete a mutually agreed upon capstone project associated with the course's medium.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***Art History Major***

The art history major provides a comprehensive, in-depth study of Western art from the ancient world to the present as well as some exposure to non-Western cultures and artistic traditions. All courses in the program teach basic skills of interpretation and critical analysis within the framework of broad cultural perspectives that connect the visual arts to larger historical developments. They also teach good writing and research skills. In addition, art history majors typically branch out into other fields, such as history, literature, and foreign languages. By the time they graduate, most majors are well equipped to pursue such traditional careers in the field as museum and gallery work, teaching, publishing, or librarianship. But because art

historical education is so broad, it also prepares students for a variety of other, more flexible options, such as law, business, or architecture.

Students must complete a minimum of 10 courses (40 credits). The following courses are required:

ARTS 480, Introduction to Art History

ARTS 532, Introductory Drawing

ARTS 795, Methods of Art History

ARTS 799, Seminar in Art History

Also required are six 600- or 700-level art history courses: one each from the Pre-Renaissance, Renaissance/Baroque, and Modern areas, and three in any area. These courses must be completed with a minimum grade of C-. Art history majors receive preferential placement in ARTS 532. Students contemplating graduate school should learn German, and, if possible, either French, Italian, or another language relevant to their areas of interest.

The Discovery Program capstone requirement may be fulfilled by completing ARTS 795, Methods of Art History.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***Bachelor of Fine Arts Major***

Incoming first-year applicants wishing to enter the bachelor of fine arts (B.F.A.) degree program must first apply for, and be admitted to, the bachelor of arts (B.A.) studio arts major. After taking the introductory studio art courses at UNH, interested students can then seek out two faculty members to sponsor their application for the B.F.A. program. Studio majors generally wait until they are well into the intermediate-level courses before submitting a portfolio for the B.F.A. review, which is held before a full faculty committee twice a year.

The B.F.A. curriculum provides training for students who plan to enter professional graduate school or pursue careers as professional artists. Students selecting to work toward a B.F.A. degree must complete a minimum of 19 courses and 80 credits, with a minimum grade of C- in each course.

**The following courses are required**

ARTS 480, Introduction to Art History  
ARTS 532, Introductory Drawing  
ARTS 546, Introductory Painting  
ARTS 551, Photography  
ARTS 567, Introductory Sculpture  
ARTS 598, Sophomore Seminar  
ARTS 632, Intermediate Drawing  
ARTS 798, Seminar/Senior Thesis (8 credits)

Six courses in a studio concentration

Three additional art electives

Two art history courses, at least one of which must be at the 600 level or above

The possible areas of concentration within the department are painting, sculpture, and individualized programs. Individualized programs may be designed in ceramics, drawing, printmaking, photography, and furniture design. Proposals for individualized programs are accepted only by permission of the departmental chairperson, the major adviser, and the departmental bachelor of fine arts committee. Candidates applying for the bachelor of fine arts program are required to submit a portfolio to the B.F.A. committee, which meets each semester one week before preregistration.

The Discovery Program capstone requirement may be fulfilled by completing ARTS 798, Senior Seminar.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***Art Education Curriculum***

The program in art education is organized into a five-year, teacher-education sequence.

This curriculum is designed to prepare teachers of art in the public schools. The satisfactory completion of the B.A. studio art curriculum for art education students and required education courses, in conjunction with the fifth-year internship, will satisfy the initial certification requirements for teachers of art in the public schools of New Hampshire and in most other states. These requirements may change by the time students apply for certification and the students are required to fulfill the then-current requirements.

Art education students may take accredited crafts courses at other institutions as art electives.

### ***Minors in the Department of Art and Art History***

All minors require five courses (20 credits). Students must receive a minimum grade of C- in all required courses. Only two courses from the art and art history major requirements can be applied toward the minor.

A maximum of two courses (8 credits) may be transferred from another accredited institution, provided UNH has accepted them as transfer credits. Transfer courses must be a minimum of three credits. Students with transfer courses that are accepted with less than four semester credits must still meet the 20 credit requirement for completion of the minor.

### ***Minor in Architectural Studies***

The minor in architectural studies provides students with an interdisciplinary introduction to the history, theory, and methods of architecture and its symbolism. The program allows students who are interested in this field to receive programmatic recognition of their work. It is designed to assist those who are contemplating enrollment at a school of architecture; are particularly interested in architectural history; want to supplement their technical majors (e.g., civil engineering) with strong academic minors; or plan to pursue careers in preservation, education, community service, and public relations.

The minor in architectural studies consists of five courses (20 credits) distributed in the following way:

ARTS 455, Introduction to Architecture

ARTS 532, Introductory Drawing

Three courses in architectural art history - one of which is ARTS 574, Architectural History

### ***Minor in Art***

The minor in art consists of five courses (20 credits) chosen from the offerings of the department, two of which must be at the 500 level or above.

### ***Minor in Art History***

The art history minor offers those majoring in other fields (including studio art) the chance to gain a serious knowledge of aspects of the history and meanings of Western art from antiquity to the modern world. Particularly for those working in history and the humanities, a minor in art history will provide new interdisciplinary perspectives on their major fields. The minor consists of five courses (20 credits) with a distribution that includes ARTS 480, Introduction to Art History, and four additional art history courses at the 600 level or above.

### ***Minor in Studio Arts***

The minor in studio arts consists of five courses (20 credits) with a distribution that includes ARTS 532, Introductory Drawing; two studio courses from the 600- level or above; and two additional studio courses chosen from the offerings of the department.

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### **Chinese (CHIN) ▼**

» <http://www.unh.edu/asian>

» [Click to view course offerings](#)

*Lecturer:* Ruirui Zhang, Yiqiao Zhou

For program description, see [Languages, Literatures, and Cultures](#).

» [Click to view course offerings](#)

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### **Classics (CLAS) ▼**

» <http://www.unh.edu/classics>

» [Click to view course offerings](#)

*Professor:* Stephen M. Trzaskoma

*Associate Professor:* Stephen Andrew Brunet, Robert Scott Smith

*Senior Lecturer:* Richard E. Clairmont

*Lecturer:* Susan Curry, Anna Newman, Jeannie Nguyen

Classics encompasses the interdisciplinary study of the ancient Greeks and Romans, as well as the ways in which the ancient world's influence extends to the Medieval Period, the Renaissance, and contemporary societies. To study the classics, therefore, means to approach a wide range of material from several thousand years through the study of languages, literature, history, politics, law, archaeology, art, mythology and folklore, gender and sexuality, religious studies, philosophy, and more--all with methods derived from a variety of humanistic and social science perspectives. This breadth provides an excellent Liberal Arts education that prepares students for a variety of careers, as well as for further study. Classics majors from UNH have gone on to law school, medical school, and graduate school in classics and many

related disciplines.

The classics major is offered by the classics program of the Department of Languages, Literatures, and Cultures. The minimum requirements for a major in classics are 40 credits offered by the classics program, at least 3 of which must be taken at the Durham campus. The core of the major is the study of Greek or Latin and at least 24 of these 40 credits must be in Greek (GREK) and/or Latin (LATN) language courses. At least one of these courses must be a 700-level course in Greek or Latin. Students should be sure, however, to pursue the study of areas of interest through courses in translation offered under the CLAS rubric. Opportunities also exist to study Hittite and Sanskrit to satisfy major requirements. Students are highly encouraged to take courses in related fields such as ancient history, archaeology, ancient philosophy, classical art, modern languages, and English, and to take part in overseas study programs in Greece and Italy such as the Intercollegiate Center for Classical Studies in Rome (UNH is a member of the consortium of this program). Up to two outside courses may be used toward major requirements if they are tightly focused on the ancient world and the student obtains the permission of his or her classics major adviser. The Discovery Program capstone requirement may be fulfilled by completing any classics, Latin, or Greek course at the 700 level or through another option (Honors thesis, etc) approved by the advisor.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Classics majors may satisfy Discovery Category requirements with CLAS, GREK, and LATN courses, but they may only count the credits from a maximum of two such courses for both major requirements and Discovery.

A minor in classics consists of five courses (20 credits) in classics, [Greek](#), and/or [Latin](#).

The coordinator is R. Scott Smith, Murkland Hall; Department of Languages, Literatures, and Cultures, (603) 862-2388; email [rss3@cisunix.unh.edu](mailto:rss3@cisunix.unh.edu).

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## College of Liberal Arts (COLA) ▼

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## Communication (CMN) ▼



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*Chairperson:* Joshua Meyrowitz

*Professor:* James M. Farrell, Sheila McNamee, Joshua Meyrowitz, Lawrence J. Prelli

*Associate Professor:* Jennifer L. Borda, Melissa D. Deem, Mardi J. Kidwell, John Lannamann

*Assistant Professor:* Josh Lauer, Danielle Pillet-Shore

*Senior Lecturer:* R. Michael Jackson

*Lecturer:* Michael Albrecht, Per E. Fjelstad, Mark Hungerford, Michelle Michaud, Jessica Robles

The purpose of the communication major is to prepare students to engage more knowingly with the communicative patterns, problems, and practices that they will encounter in their personal, professional, and civic lives. This purpose requires that students learn to move beyond commonplace and conventional understandings of “communication” and acquire sophisticated perspectives—workable orientations—for describing, analyzing, reflecting upon, and engaging with those patterns, problems, and practices. Accordingly, the major not only acquaints students with a variety of empirical, critical, historical, theoretical, and pragmatic perspectives on communication phenomena, but encourages them to formulate workable orientations of their own for engaging with communication issues and questions. Students who graduate with a communication major are prepared to become thoughtful and proficient “communication decision-makers” during their postgraduate lives.

Students wishing to declare communication as a major should contact the department's academic adviser, Mr. Andrew Sharp, for application information and requirements.

### ***Communication Major***

Majors must complete ten courses (40 credits) with a 2.0 overall average in the major. The distribution of required courses for the major is as follows:

#### **Three introductory courses (12 credits)**

CMN 455, 456, and 457 (12 credits). Majors must earn a grade of C or better in each introductory course.

#### **Two 500-level communication analysis courses (eight credits)**

The two 500-level courses must have different 400-level prerequisites. Majors must earn a grade of C- or better in both analysis courses before taking 600-level courses. CMN 599 (Internship) cannot be used to fulfill an analysis course requirement.

#### **Five upper-division courses (20 credits)**

Students must choose to focus at least three of their upper-division courses on one of six thematic concentrations: Histories and Traditions in Communication; Political Communication and Public Space; Communication, Community, and Everyday Life; Culture and Identities; Citizenship and Advocacy; and Visual Communication. At least two of the student's five upper-division courses must be at the 700-level. Majors must earn a grade of C- or better in all upper-division courses.

A maximum of 4 credits of independent study (CMN 795) may be counted toward the major. CMN 799 (Honors Thesis) and CMN 796 (Commentary) cannot be used to fulfill an advanced course requirement. The Discovery Program Capstone requirement may be fulfilled by completing any 700-level communication course except CMN 795 and CMN 796.

Transfer students must complete 20 credits of their communication coursework at UNH to complete the major satisfactorily. Exchange students may transfer no more than 10 approved credits from another institution to be applied toward completion of the communication major at UNH.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***Communication Minor***

The communication minor consists of five courses (20 credits). Students must complete a minimum of two 400-level introductory courses (CMN 455, CMN 456, or CMN 457), a minimum of two 500-level analysis courses, and a minimum of one advanced 600-level or 700-level course.

Students who pursue a communication minor must complete five courses within the minor with a C or better at the 400-level and with a C- or better at the 500-, 600-, and 700-levels, and maintain a minimum grade-point average of 2.0. No more than two transfer courses from other institutions can be applied to the minor and all transfers are contingent upon departmental approval. No more than 4 credits of independent study can count toward the minor. No pass/fail or credit/fail courses can count toward the minor.

### ***Media Practices Option***

This option is designed for qualified students who want to augment their communication major at Durham with training in media production and applied media communication through courses in the communication arts department at the Manchester campus. Qualified students who meet

all requirements will graduate with a B.A. degree in communication: media practices option. In addition to communication major requirements, students are required to take two designated media practices courses at the Manchester campus and complete a four credit media practices internship (CMN 599). Students must maintain both an in-major and cumulative grade-point average of at least 2.5 to satisfactorily complete the media practices option.

### ***Business Applications Option***

This option is designed for qualified students who want to augment their communication major with professional training in such areas as marketing, advertising, and organizational behavior through courses at the Whittemore School of Business and Economics. Qualified students who meet all requirements will graduate with a B.A. degree in communication: business applications option. In addition to communication major requirements, students are required to take three business applications option courses designated at WSBE and complete a 4- credit business applications internship (CMN 599). Students must maintain both an in-major and cumulative grade-point average of at least 2.5 to satisfactorily complete the business applications option.

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## **Education (EDUC) ▾**

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*Associate Chairperson:* Leslie J. Couse

*Professor:* Eleanor D. Abrams, Todd A. DeMitchell, Ann L. Diller, Janet Elizabeth Falvey, David J. Hebert, Barbara E. Houston, Bruce L. Mallory, Jane A. Nisbet, Sharon N. Oja, Paula M. Salvio

*Affiliate Professor:* Tom Franke, David C. Hagner, Sarah Redfield

*Associate Professor:* Vincent J. Connelly, Leslie J. Couse, Virginia E. Garland, Suzanne E. Graham, Georgia M. Kerns, Michael J. Middleton, Justus M. Ogembo, Joseph J. Onosko, Loan T. Phan, Harry J. Richards, Judith A. Robb, Thomas H. Schram, Judy Sharkey, William L. Wansart, Ruth M. Wharton-McDonald

*Affiliate Associate Professor:* Wanda S. Mitchell

*Assistant Professor:* Eun Kyeong Cho, Sarah M. Stitzlein

*Research Assistant Professor:* Mary C. Schuh

*Affiliate Assistant Professor:* John F. Hornstein, Cheryl M. Jorgensen, Cari A. Moorhead

*Clinical Assistant Professor:* Janet L. Thompson

*Affiliate Faculty:* Mark Wiley

*Senior Lecturer:* Timothy J. Churchard

*Lecturer:* Lara Gengarelly, Stephanie McSherry, Cynthia Merrill, Alison Rheingold, Bruce Turnquist

***Basic Programs***

At the undergraduate level, students have the opportunity to begin taking courses in teacher preparation programs, which will lead at the graduate level to teacher licensing in elementary and secondary education. They also may wait to prepare to teach solely at the graduate level.

Students majoring in music, mathematics, Pre-K-3rd grade, and physical education have the option of participating in a five-year program leading to licensure and a graduate degree. Or they may choose the four-year option in those majors, which leads to licensure at the undergraduate level. Students interested in the four-year option in these areas should contact the departments for information. Students interested in agriculture and occupational education should contact Michael Andrew in the Department of Education.

Elementary teaching and most secondary areas require completion of a minimum of one-year graduate program, which leads to a master's degree and teacher licensure. Most students who plan to teach in elementary and secondary schools apply to the graduate school to complete a five-year program. In the five-year program, students begin preparation for teaching at the undergraduate level with a semester of field experience (EDUC 500, Exploring Teaching) and professional course work in education. Students complete a baccalaureate degree outside of education and move into a fifth year of study and a full-year internship leading to the M.Ed. or M.A.T. degree and licensure in teaching.\*

There also are opportunities for study or certification at the graduate level in administration, counseling, elementary and secondary teaching, early childhood, reading, special education, and adult and occupational education. The department encourages students interested in graduate study or in relevant undergraduate courses to meet with these graduate program coordinators in the Department of Education.

Students at the undergraduate level who are interested in special education or early childhood education can begin to complete prerequisite coursework for the graduate program leading to certification in special education (K-12) or early childhood education. For students seeking the M.Ed. in special education or early childhood education without certification in general education, it is not necessary to complete Education 500. For coursework that can be taken at the undergraduate level, students should see program advisers in the Department of Education.

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\*Students in the five-year program may combine their program for teacher licensure with a master's program in their major field department.

### ***Program Philosophy and Mission***

*Unit Mission Statement* The following conceptual framework guides all of the programs that prepare professionals in education at the University of New Hampshire:

The professional education unit at the University of New Hampshire seeks to prepare practitioners who will become leaders in their own practice settings and within their profession, applying knowledge to improve education for all students and enrich the lives of clients. Immersion in subject matter, research, theory, and field-based experience provides a base for our graduates to make well-reasoned judgments in complex situations, render informed decisions, model exemplary practice, and take initiative for planned change.

Students learn to establish caring environments that celebrate individual differences and backgrounds while fostering cooperation and educational improvement. We stress reflective critical inquiry as a mode of study, and community-building as a means for promoting change. We value and support both our students' local practice and their broader leadership within the profession.

### ***Mission of Programs in Teacher Education***

The following mission statement gives direction to the basic and advanced programs in teacher education:

We seek to prepare beginning teachers who demonstrate excellence in classroom practice and who will become educational leaders. Our graduates will possess the knowledge, skills, and dispositions required for outstanding classroom practice and eventual leadership within the local school community and the larger education community.

### ***Undergraduate Work toward Teacher Certification in Elementary and Secondary Education***

#### ***Phase I. Enroll in Exploring Teaching: Education 500***

Students are encouraged to take EDUC 500, Exploring Teaching, as a sophomore, but completion during junior or senior year also can leave enough time for other education course requirements.

Exploring Teaching is also available through the Live, Learn, and Teach summer program, which is open to juniors and seniors. For information, contact the Department of Education, 203

Morrill Hall. A positive recommendation from the Exploring Teaching instructor is required before further coursework is taken in the teacher education program.

***Phase II. Professional Coursework in Education at the Undergraduate Level***

Education 500 is a prerequisite to further work in the teacher education program. An undergraduate receives a co-adviser in the Department of Education (usually the Exploring Teaching instructor). Along with the major adviser, this co-adviser works with the students to plan the undergraduate portion of the five-year teacher education program.

Every student must take four credits in each of five areas, as follows: EDUC 700, Educational Structure and Change; EDUC 701, Human Development and Learning: Educational Psychology; EDUC 703, Alternative Teaching Models (or other required methods course(s)); EDUC 705, Alternative Perspectives on the Nature of Education; EDUC 751, Educating Exceptional Learners. EDUC 707, Teaching Reading through the Content Areas, is required for some secondary subject licensure areas. Elementary education students are required to have four methods courses: one each in the teaching of reading, mathematics, science, and social studies. Those who do not intend to use this coursework for initial licensing may enroll with instructor permission. All 700-level education courses at UNH are restricted to students with junior or senior standing. These courses may also be taken at the graduate 800-level.

Any course taken in the Department of Education that will be used to fulfill a teacher licensure requirement must be completed with a grade of B- or above.

***Phase III. Internship and Graduate Phase of the Teacher Education Program***

Undergraduates should apply to the Graduate School by November 1 in the first semester of the senior year for the final phase of the teacher education program.

The final phase of the program includes a full-year internship, electives, and a program portfolio and colloquium. This phase normally takes an academic year plus a summer to complete.

Students with an undergraduate grade-point average of 3.2 or better may be allowed to begin the program in the second semester of the senior year, earning a maximum of twelve graduate credits.

The yearlong internship (EDUC 900/901) is part of the final stage of the five-year program. It meets the goals of increased clinical experience and better integration of theory and practice.

The internship is a teaching and learning experience in which the intern is involved in an elementary or secondary school over the course of an entire school year. Interns become a

part of the school staff, sharing appropriate instructional tasks, and often carrying the full instructional duties in one or more classes.

Interns are mentored and supervised by a school staff member who is designated as a “cooperating teacher.” A UNH faculty member collaborates in intern supervision and conducts a weekly seminar for all interns with whom he/she is working.

The internship is a full-time experience for 6 graduate credits each semester. It typically begins in September and runs through May or June. Due to the intensive time commitment, it is recommended that, at most, only one course be taken in addition to the internship each semester.

Before the internship, all students will have completed a bachelor’s degree with a major outside of education. Because of this, they will possess a depth of knowledge in a subject area and a broad general education, in addition to substantive preparation for teaching. Secondary education candidates must have completed an approved major, or its equivalent, in the subject that they intend to teach. Elementary education candidates may pursue an undergraduate major in any area; however, majors in the core disciplines taught in elementary schools are desirable.

Undergraduates should apply for internship in September/October of their senior year. At the same time, it is advisable to begin the application process for graduate school. Arranging an appropriate placement is a time-consuming process. Starting early will facilitate finding the best setting for students’ needs and goals. The director of field experiences in Durham and the associate director of teacher education in Manchester play a major role in identifying internship sites and should be consulted regarding the placement process. Internship applications are available at the Department of Education, Durham, and the Office of Teacher Education, Manchester. Admission to the internship requires a completed application to the internship, admission to the graduate school, and a consultation with the director of field experiences. Please note: Undergraduates interested in the master’s degree in early childhood education, the early childhood special education option, and special education do not apply for internships in their senior year. Internships for this program are arranged with program faculty once core graduate requirements are met.

### ***Admission to the Program***

***Phase I*** - Exploring Teaching is open to all students, subject to available space. Approximately 150 students are accepted each semester.

***Phase II*** - Continuation in Professional Coursework is dependent upon positive

recommendations from Education 500, Exploring Teaching.

**Phase III** - Admission to the Internship and the Graduate Program requires acceptance to the Graduate School. The process is competitive because of high admissions standards and limited space in the program. Approximately 80 percent of applicants for Phase III are accepted.

In determining admission of students to teacher education graduate programs, several criteria are used:

*1. Undergraduate Grade-Point Average*

The undergraduate grade-point average of the middle 50 percent of students admitted to the graduate programs in teacher education falls in the range of 3.15-3.53.

*2. The Graduate Record Examination Scores*

The Graduate Record Examination (GRE) scores of the middle 50 percent of students admitted to the graduate programs in teacher education fall in the following range: Verbal, 440-560; Quantitative, 460-620; Writing, 4.0-5.0.

*3. Recommendations*

Positive recommendations from EDUC 500, Exploring Teaching, or the equivalent and from those able to relay information about a candidate's performance in teaching situations or related areas are important. Recommendations from undergraduate subject major professors also are important.

In the admission process, the program seeks evidence that candidates have the following knowledge, abilities, and dispositions: (1) motives to teach that include a strong social commitment to contribute to society through education; (2) a disposition to care for students—each and every one; (3) the ability to interact positively with children and adults; (4) the capacity to win the respect of their peers and be effective in group interaction, showing openness to the needs and views of others; (5) well-developed communication skills, including speaking, writing, and listening skills as well as an ability to engage others in both the giving and receiving of information and feelings; (6) perceptiveness: the ability to identify and process the relevant details in a given environment, especially in the context of a classroom; (7) the ability to make reasonable judgments in the context of complex situations that change from moment to moment; (8) the capacity for clear thinking and an ability to translate complex thoughts into simple and clear explanations; (9) superior academic skills: extensive knowledge of at least one major discipline, intellectual curiosity, and the ability to be open to the unknown;



(10) a disposition to take charge of one's own learning, which includes the active pursuit of feedback and the willingness to take thoughtful risks.

### ***Early Admission***

UNH undergraduate seniors with a minimum of a 3.2 cumulative grade point average at the end of the first semester of their senior year and undergraduate juniors with a minimum of a 3.2 cumulative grade point average at the end of the second semester of their junior year can apply for "early admission" to the Graduate School (November 1st deadline for seniors, February 1st deadline for juniors). Such candidates may register for a maximum of 12 credits of dual credit coursework (undergraduate/graduate level course work, e.g., 700/800) prior to completing their bachelor's degree. A student must be admitted to the Graduate School before the start of the semester in which the course(s) will be taken in order to receive graduate credit. Once accepted a student must maintain the minimum 3.2 cumulative grade point average until their undergraduate degree is awarded. A student would apply for early admission on the regular graduate school application available at [www.gradschool.unh.edu](http://www.gradschool.unh.edu) .

### ***Four-Year, Undergraduate Option***

A bachelor's degree including a one-semester student-teaching requirement allows students to be recommended for licensure in certain specialized areas. Those areas are: mathematics, music, PreK-3rd grade, and physical education.

These program options include a major appropriate for the licensure being sought, in addition to the following core professional courses or their equivalent: EDUC 500, Exploring Teaching; EDUC 700, Educational Structure and Change; EDUC 701, Human Development and Learning: Educational Psychology; EDUC 703, Alternative Teaching Models; EDUC 705, Alternative Perspectives on the Nature of Education; EDUC 751, Educating the Exceptional Learner; and EDUC 694, Supervised Student Teaching.

For admission to supervised student teaching, a minimum 3.0 grade point average in the major and a minimum 2.8 cumulative grade-point average at the time of application to the student - teaching are required. Students in music, mathematics and physical education need to apply by March 1st of the junior year and October 15th of the senior year for spring semester to the Department of Education for student-teaching. An unofficial transcript and a current résumé must accompany your application. Return applications to the Department of Education Office, 203 Morrill Hall.

Students also may become licensed for kindergarten through grade three (early childhood licensure) by completing the master's degree program in early childhood education.

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## English (ENGL) ▼

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Newkirk, David Rivard, Rachel Trubowitz, David H. Watters, Janet Aikins Yount

*Associate Professor:* Brigitte Gabcke Bailey, Robin Hackett, Susan M. Hertz, Delia C. Konzett, Martin McKinsey, Lisa C. Miller, Sean D. Moore, Petar Ramadanovic, Siobhan Senier, Sarah Way Sherman, Sandhya Shetty

*Affiliate Associate Professor:* Georgeann Murphy

*Assistant Professor:* Cristy Beemer, Dennis Britton, Tom Haines, Courtney Marshall, Christina Ortmeier-Hooper, Thomas Payne, Cord Whitaker, Reginald A. Wilburn, Ann J. Williams

*Senior Lecturer:* Pamela Barksdale, Shelley Girdner, Dawn Haines, Clark Knowles, Janet Schofield

*Lecturer:* Maya Ravindranath Abtahian, Molly Campbell, Nathaniel Freedman, Stephanie Harzewski, David Howland, Krista L. Jackman, Matthias Konzett, Rachel Lachance, Robin Lent, Andrew Marsters, Christine O'Keefe, Laura J. Qualliotine, James Rioux, Elissa Scogland, Nancy Sell, Oksana Semenova, Laura A. Smith, Charli Valdez, Leah D. Williams, Carol A. Zickell, Jay Zysk

The English department offers four majors: English, English Literature, English Teaching, and English/Journalism. A fifth undergraduate program is the interdepartmental Linguistics major.

Through these diverse but interrelated programs of study, the English department pursues a three-pronged mission in undergraduate instruction. We seek first to train students in the professional study of literature in the English language. In conjunction with this broad, multifaceted aim, we strive to educate students about the history and nature of English language in its spoken and written forms. As a third and equally important part of our mission, we teach students to write clearly, persuasively, and elegantly. In all five of its undergraduate majors, the English department provides students with the kinds of critical thinking, research, and writing skills that will serve them well in their personal and professional lives.

### ***The English Major***

The dual objectives of the general English major are to provide all students with a common core of literary experience and to offer the opportunity to shape a course of study suited to their personal interests. Flexible requirements place a responsibility on each student to devise a program that has an intelligent rationale. For example, students with a special interest in writing are free to take the minimum number of literature courses (five) and complete their major by taking offerings in fiction, creative nonfiction, and poetry writing. All the undergraduate courses offered by the department are open to English majors so that students may sample a range of courses in literature, linguistics, creative or nonfiction writing, and English teaching, according to particular interests that change and grow.

By its very nature, the English major is broad, open, and liberal. It enables students to sample a variety of courses in order to understand the operation of language from many perspectives.

For the English major, students must complete a minimum of 40 credits of major coursework with a grade of C- or better, with the exception of ENGL 419, which must be completed with a grade of C or better. Students must complete ENGL 419, two 500-level courses (or one 500-level course and ENGL/LING 405), six courses numbered 600 and above, and one additional 500-, 600-, or 700-level English course of their choosing. In selecting these courses, students must be sure to meet the following distribution requirements:

1. Two courses in literature written before 1800: either two advanced courses (numbered 600 or above), or one advanced course and ENGL 512 or ENGL 513.
2. Two courses in literature written since 1800: either two advanced courses, or one advanced course and one course from the following list: ENGL 514, 515, or 516.
3. One course that addresses race, the construction of race, and racial theories. Students may choose from: ENGL 517, 540, 609, 690, 738, 739, 740, 693R, 797R. Other courses may count, when relevant and with prior written approval of the adviser.

The Discovery Program capstone for English majors is one of the following: the English Major Seminar (ENGL 787), a 700-level class taken for capstone credit, one additional 700-level class, or a writing portfolio. (See the English Department website for specific descriptions of these requirements.)

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Majors may count one major course from the Humanities Discovery category for both a major requirement and a Discovery requirement.

Students interested in majoring in English should consult Carla Cannizzaro, coordinator of the Department of English, 113 Hamilton Smith Hall, (603) 862-1313.

### ***The English Literature Major***

The English literature major has been developed for those students looking for a more focused study of literature, especially those who plan to go on to graduate school in English or other fields in the humanities. Its requirements have been designed to engage students in a sustained study of literature that explores the formal, historical, cultural, and theoretical dimensions of written texts.

These requirements are designed to strengthen students' knowledge of literary history and cultural contexts, forms of literary expression, and the interpretive questions that shape critical inquiry. Students in this program will develop a deep understanding and appreciation of literatures in English, including both British and American literatures, as well as literary traditions organized around other principles, such as postcolonial or African-American. The English literature major also encourages students to develop a higher proficiency in critical writing, in formulating and addressing complex problems, and in synthesizing research.

For the English literature major, students must complete a minimum of 40 credits of major coursework with a grade of C- or better, with the exception of ENGL 419, which must be completed with a grade of C or better. Additional requirements include two 500-level courses, one of which must be a survey course; ENGL 619; and ENGL 787. A minimum of six courses must be completed at the 600 level or higher. In selecting courses, students must be sure to meet the following distribution requirements (please note that, in many cases, a single course may satisfy a requirement in two or more categories):

1. Two courses in literature written prior to 1800: either two advanced courses (600 level and above) or one advanced course and ENGL 512 or ENGL 513.
2. Two courses in literature written since 1800: either two advanced courses or one advanced course and one of the following: ENGL 514, 515, or 516.
3. One American literature course at the 600/700 level.
4. One British literature course at the 600/700 level.
5. Two courses that investigate and question representations of identity (ENGL 517, 540, 555, 581, 585, 586, 681, 685, 690, 738, 739, 740, 775, or 777); genre, including film, with the exception of ENGL 533 (616, 618, 630, 631, 632, or 777); and/or theoretical positions (ENGL 713, 714). Other courses may count, when relevant and with prior written approval of the

adviser.

6. One course that addresses race, the construction of race, and racial theories. Students may choose from ENGL 517, 540, 609, 690, 738, 739, 740, 693R, 797R. Other courses may count, when relevant and with prior written approval of the adviser.

The Discovery Program capstone for English Literature majors is the English Major Seminar, ENGL 787.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Majors may count one major course from the Humanities Discovery category for both a major requirement and a Discovery requirement.

Students interested in majoring in English Literature should consult Carla Cannizzaro, coordinator of the Department of English, 113 Hamilton Smith Hall, (603) 862-1313, or the director of the English Literature program.

### ***The English Teaching Major***

The English teaching major is designed for students wishing to teach English in middle or high schools (grades 5-12). Students receive a B.A. in English Teaching upon completion of their undergraduate studies. Completion of the undergraduate major does not in itself, however, meet state certification requirements to teach, and students must apply for admission to (and complete) graduate study, including course work and a year-long internship leading to certification, within the Department of Education. (Students usually apply for the Master's program in their senior year; please see the Department of Education for details on the M.A.T. and M.Ed. programs.) Much of the work for a master's degree may be completed during this fifth year, but some students will need additional time spent in summer courses or additional semesters. Most students, however, will earn certification at the end of the fifth year and receive the graduate degree. The New Hampshire teaching certificate is recognized by many but not all states.

The goal of the English teaching major is to prepare students as informed, thoughtful, and skilled English teachers who will become educational leaders in their schools and, more broadly, in the profession itself. To that end, the department seeks to make its preservice teachers thoroughly familiar with the knowledge base available in the Departments of English and Education. From their courses within the English department, students learn what the study of English entails, from literature to linguistics, and how areas of knowledge and the abilities to read, write, and discuss can best be taught to students in grades 5-12. Preservice teachers also acquire knowledge of certain content areas, such as American and British

literature and English grammar. From their courses within the education department, students learn about human development and learning, the history and structure of schools, and different philosophical perspectives on public education. Finally, through the yearlong teaching internship, students apply their knowledge from both sources to actual practice. This requirement reflects a core belief that the opportunity to combine theory and practice is essential in preparing effective beginning teachers.

Completion of the undergraduate teaching major does not in itself meet state certification requirements. Students should enroll in the undergraduate major and:

1. Pass the following English courses with an average of 2.5 or better: ENGL 419, 514, 516, 657, 725 & 726 or 710 & 792; 718 or 791, two additional literature courses numbered 600 or above, one course that addresses race, the construction of race, and racial theories from a department-approved list (other courses may count, when relevant and with prior written approval of the student's advisor), and any English department course in writing, linguistics, critical theory, film, or literature (except 401, 403, and 444). ENGL 513 may be substituted for one of the two required literature courses numbered 600 or above.
2. Apply for the fifth-year teaching internship and Master's degree program by fall or spring of their senior year (usually September 30 for the internship and November 1 or February 1 for the Master's program).
3. Complete a writing portfolio.

The Discovery Program capstone for English Teaching majors is the Writing Portfolio.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Majors may count one major course from the Humanities Discovery category for both a major requirement and a Discovery requirement.

Students interested in majoring in English teaching should consult Carla Cannizzaro, coordinator of the Department of English, 113 Hamilton Smith Hall, (603) 862-1313, or the director of the English Teaching program.

### ***The English/Journalism Major***

The English/Journalism major combines the study of literature with the study of nonfiction writing and professional training for students considering media writing or editing careers. As the industry has changed with the advent of the Internet, so have the courses. In addition to learning the basic skills required to write for publication, which include interviewing, reporting,

fact gathering, and writing in both news and feature styles, students are also taught to produce stories for multiple platforms, such as producing online podcasts and vodcasts. Students develop skills that will help launch successful careers in journalism but also in a wide variety of other vocations. Learning to think and communicate clearly are talents desired by most employers.

English/Journalism majors must complete ENGL 419 with a grade of C or better and the literature requirements of the standard English major. These requirements include:

1. Two courses in literature written prior to 1800: either two advanced courses (600 level and above) or one advanced course and ENGL 512 or ENGL 513.
2. Two courses in literature written since 1800: either two advanced courses or one advanced course and one of the following: ENGL 514, 515, or 516.
3. One course that addresses race, the construction of race, and racial theories. Students may choose from: ENGL 517, 540, 609, 690, 738, 739, 740, 693R, 797R. Other courses may count, when relevant and with prior written approval of the adviser.

In addition to the five required literature courses, English/Journalism majors must take ENGL 501, Introduction to Creative Nonfiction, and earn a B or better to enroll in the first journalism course, ENGL 621, Newswriting. Students must also earn a B or better in Newswriting to continue on to the advanced journalism courses. Additional journalism course requirements include ENGL 622 and any two of the following courses: ENGL 623, 711, 721, 722, 723, 703, 704, 708. Students are also encouraged to write and edit for student publications such as *The New Hampshire* and *Main Street*. Beyond these requirements, English/Journalism majors work at one media internship, preferably full-time, for a semester (ENGL 720). A faculty member supervises the internships, which are central to the English/Journalism major, requiring students to use their new skills in a professional environment.

Because media outlets are expecting even entry-level staff to have an area of expertise, English/Journalism majors must take a three-course concentration in another field, such as sociology, German, environmental science, criminal justice, or other English disciplines (e.g. African American Studies).

The Discovery Program capstone for English/Journalism majors is the Journalism Internship, ENGL 720.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Majors may count one major course from the Humanities Discovery category for both a major requirement and a Discovery requirement.

Students interested in the English/Journalism major should see Carla Cannizzaro, coordinator of the Department of English, 113 Hamilton Smith Hall, (603) 862-1313, or the director of the English/Journalism program.

### ***Writing Programs***

The Department of English offers courses for students interested in becoming writers. Up to four consecutive creative writing workshops can be taken in fiction or in poetry, as well as a course in form and theory of either genre. The instructors for these courses are professional writers. The department also offers a writing minor. Interested students should inquire at the department office.

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## **European Cultural Studies (ECS) ▼**

» <http://www.unh.edu/ecs/>

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*Coordinator:* Carmen García de la Rasilla

*Core Faculty:* Arna Beth Bronstein, Carmen García de la Rasilla, Jeffrey M. Diefendorf, Marco Dorfsman, Patricia A. Emison, Robert W. Eshbach, Aleksandra Fleszar, Piero Garofalo, Eliga H. Gould, Nicoletta F. Gullace, Eleanor M. Hight, Edward T. Larkin, Ronald D. LeBlanc, Claire-Lise Malarte-Feldman, Jaume Martí-Olivella, Catherine M. Peebles, Janet L. Polasky, Petar Ramadanovic, Mary E. Rhiel, Juliette M. Rogers, Ruth J. Sample, Robert C. Scharff, Rachel Trubowitz, Janet Aikins Yount

European Cultural Studies (ECS) is an interdisciplinary major in which students study the field of cultural analysis in conjunction with an individually designed focus on a European topic. Each student will work with an adviser and the ECS Steering Committee to design a course of study that best suits the student's interests and goals. The ECS major is driven in part by the belief that language is an integral part of culture and not merely a tool for the study of literature. By the same token, the study of European history, philosophy, politics, and so forth can only be enriched by the addition of critical perspectives developed in literature and language study.

*The ECS major has five objectives:*



1. It will introduce students to the major contours of European history, politics, languages, and arts.
2. It will introduce students to the social, political, economic, and cultural developments of the new unifying Europe.
3. The cultural studies component of the major highlights the contentious nature of this “unifying Europe.” Thus the major will prepare students for work in fields related to Europe and European/American relations. More generally, it will encourage a nuanced perception of cultural differences, which will in turn affect students’ perceptions of themselves and others as participants in an uneasily shared world.
4. Cultural studies skills will facilitate and enable students to consider the past not just as an academic subject but as an unfolding inherited tradition.
5. A B.A. in European cultural studies will be a preparatory degree for graduate study in numerous fields from international relations to the humanities.

***European Cultural Studies Major***

The ECS major consists of 40 credits to be distributed in the following way:

1. Course on Europe (ECS 400). Course on European topics, covering art, literature, history, political science or other domains (4 credits).
2. Course on cultural studies (ECS 500). Introduction to the field of Cultural Studies as applied to the study of Europe. In years when ECS 500 is not offered, students may take ENGL 619, Critical Approaches to Literature; or HIST 625, Intellectual European History (4 credits).
3. Foundation Courses (8 credits):
  - a. Languages: 504 or equivalent in a European language or an approved alternate course.
  - b. Arts/humanities or social sciences: One course from the following offerings: ARTS 580 or 581 (Survey of Art History), ENGL 651 or 652 (Comparative Literatures, when inclusive of European literatures), HUMA 501, 502, 503 (when focused on European topics), MUSI 402 (Survey of Music History), ECON 630 (Comparative Study of Economic Systems), HIST 435 or 436 (Western Civilization), HIST 565 (Women in European History), HIST 650 (European Socialism), HIST 656 (20th Century Europe), POLT 550 (Major Foreign Governments), POLT 552 (Contemporary European Politics).

4. **Focus Courses:** The focus portion of the major consists of an individually designed grouping of four courses that allows students to pursue their interests and will give coherence to the major. Students will discuss their proposed curriculum with an ECS adviser and submit a proposal to the ECS Steering Committee. Possible foci include: European art and identity; politics and culture in modern Europe; history of European science and philosophy; focus by nation. At least two courses for the focus must be at the 600-level or higher (16 credits).

5. **Course on Critical Methods in Cultural Studies (ECS 550)** prepares student for research and writing techniques needed to complete the senior thesis. (4 credits). When ECS 550 is not offered, students may take Humanities 500.

6. **Discovery Program Capstone: Senior Thesis (ECS 798 and 799).** Students will work together with their advisers to formulate their topic, consider appropriate approaches, locate relevant resources and write a thesis. At the end of the semester, students present their work to a committee of three ECS faculty members (4 credits).

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

ECS majors may use one major course to satisfy both a major requirement and a Discovery category requirement.

### ***European Cultural Studies Minor***

The minor in European cultural studies consists of 20 credits (five courses), including ECS 400, 500, 504-level in a European language, two foundation courses, and one elective.

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## **French (FREN) ▼**

» <http://www.unh.edu/french>

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*Professor:* Nadine S. Bérenguier, Barbara T. Cooper, Claire-Lise Malarte-Feldman

*Associate Professor:* Juliette M. Rogers

*Senior Lecturer:* Claire-Helene Gaudissart, Anna K. Sandstrom

*Lecturer:* Lesley Curtis, Emilie Talpin

### ***The French Major***

The French major offered by the [Department of Languages, Literatures, and Cultures](#) provides knowledge of the language, literature, and culture of France and other French-speaking countries around the world. An undergraduate major in French is useful in a variety of careers, such as business, law, government or public service, and teaching. Students considering a career in teaching should consult with the Department of Education. In addition, they should include LING 505 (which also satisfies a general education requirement for group 7) in their overall program and make special note of the LLC 791 requirement (which does not count toward completion of a major in French). Students interested in other types of careers are urged to consult with members of the French faculty and with other appropriate departments early in their studies.

A major consists of 40 credits in courses numbered 631 or above, in which readings are in French. Coursework for the French major must be completed with a grade of C or better. Majors are required to take FREN 631-632, 651, 652, 790, and at least two 700-level literature courses at the Durham campus. Students are required to enroll in at least one course each semester in their major program and to spend at least one semester abroad in a French-speaking country. The UNH-managed program in Dijon is highly recommended and offers year- and semester-long options. Students in majors with inflexible curricula (like engineering, some sciences, and health care) who wish to complete a second major in French should consult with a French advisor about possible alternate means of satisfying the study abroad requirement.

Transfer students must earn a minimum of 12 major credits at the Durham campus. Of these 12 credits, one course must be FREN 790 and at least one 700-level course in French/Francophone literature. To complement their major, students are strongly encouraged to take either HIST 647 or 648 and courses in the literature of other countries as well as in fields such as music, art, philosophy, history, political science, and sociology that provide insight into nonliterary aspects of culture. The Discovery Program Capstone requirement may be fulfilled by completing FREN 790, Advanced Language and Style.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***The French Studies Major***

This major gives students a variety of perspectives not only on French culture but also on

Francophone cultures worldwide. A major in French studies prepares graduates to negotiate successfully the economic reality of an increasingly international job market, and provides them with a wide range of career prospects after they leave the University.

The major consists of 44 credits in French courses numbered 631 or above and of cross-listed courses in other departments, including the following requirements: FREN 631-632, 651, 652, 675 or 676 or 677, 790, and two 700-level courses in French or Francophone literature. In addition, at least three elective courses (12 credits) closely related to French and Francophone cultural studies are required. These are to be chosen in consultation with a faculty advisor from among the following departments: history, geography, or anthropology, one 600- to 700-level course; art history or music, one 600- to 700-level course; economics, political science, or education, one 600- to 700-level course. Coursework for the French studies major must be completed with a grade of C or better. Students are required to enroll in at least one course each semester in their major program and to spend at least one semester abroad in a French-speaking country. The UNH-managed study abroad program in Dijon is highly recommended. It offers both year-long and spring semester programs. Other options are available, but non-UNH programs must be chosen in close consultation with a major adviser.

Transfer students must earn a minimum of 12 credits on the Durham campus. Of these 12 credits, one course must be FREN 790 and at least one 700-level course in French/Francophone literature. The Discovery Program Capstone requirement may be fulfilled by completing FREN 790, Advanced Language and Style.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***The French Minor***

A minor in French consists of 20 credits in French courses numbered 503 and above. No fewer than three courses have to be taken at UNH. No more than one course conducted in English (e.g., FREN 525, 526, 527, 621, 622) will be counted toward the minor, although students may elect to take more than one such course provided they earn more than 20 credits. Those entering the minor at FREN 504 or higher will be expected to complete FREN 651 or 652. LLC 791 does not count for the minor. Members of the department supervise the work of both majors and minors.

### ***The French Studies Minor***

The minor in French studies consists of 20 credits numbered FREN 503 or above. No fewer than three courses have to be taken at UNH. No more than one course conducted in English (FREN 525, 526, 527, 621, 622) will be counted toward the minor. Students entering the minor at FREN 504 or higher will be expected to complete FREN 651 or 652. LLC 791 does not count toward the minor. Members of the department supervise the work of both majors and minors.

### **Study Abroad in Dijon**

The department offers a junior year and spring semester abroad at the University of Burgundy in Dijon, France (see FREN 690). This program is open to all qualified students at the University of New Hampshire who have completed, with a grade of B- or better, FREN 631-632 and FREN 651-652 by the end of the semester preceding their departure. Early consultation with the director of the program is urged. Non-credit orientation meetings are required during the semester prior to departure.

### **Study Abroad in Brest**

The French program offers majors, minors, and interested students in other disciplines the opportunity to study abroad during the summer for 4 or 8 weeks at the Centre International d'Etudes des Langues (CIEL) in Brest, France. Courses equivalent to FREN 503, 504, 631, 632, as well as a post-632 language course not taught on the UNH campus and an introductory course in business French are available. Course scheduling is extremely flexible. Students interested in this program should consult the program's on-campus director in early February or sooner.

### **Summer Study in Dijon**

8 weeks of intensive French literature, culture and civilization courses at the CIEF (Centre International des Etudes Francaises) at the Universite de Bourgogne in Dijon, France. The course is only open to French double majors who cannot spend a semester abroad for documented reasons. By petition only, with a minimum GPA of 2.5. Pre-requisites: FREN 631, 632, 651, and 652. Offered summer only. Special fee. 8 credits.

### **Teaching Assistantship in France**

Each year the French government offers teaching assistantships in a French secondary school to graduating French majors. Applications are accepted during the fall semester.

### **French and Business Administration Degrees**

This program permits students to earn both a B.A. in French and a B.S. in business administration or a B.A. in economics in the Whittemore School of Business and Economics. Students interested in this program should consult with the departmental adviser to the program early in their freshman year. Study abroad is a required component of this program.

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## Geography (GEOG) ▼

» <http://www.unh.edu/geography>

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*Chairperson:* Blake Gumprecht

*Professor:* Russell G. Congalton, Alasdair D. Drysdale

*Associate Professor:* Blake Gumprecht

*Assistant Professor:* Joel N. Hartter, Mary D. Stampone

*Lecturer:* Biniam Iyob

Geography is the study of how and why things vary from place to place around the world. Geographers study the environment. They study the geography of human activity. They study places and all that makes them distinctive. They study how people interact with the natural world.

Geography is a multifaceted and inherently interdisciplinary field. It is an integrating discipline, drawing on knowledge from many other fields in order to understand geographic patterns and the character of individual places. Geography is also a way of looking at the world. Nearly any subject can be viewed through a geographic lens.

The Department of Geography at UNH is strongest in cultural, political, urban, historical, and environmental geography, climatology, and geotechniques. Individual faculty members possess regional specialties in New England, North America, the Middle East, Sub-Saharan Africa, and Japan.

The geography major provides undergraduates with a solid foundation in geography while enabling them to develop a specialization in one of the three main areas of geography — human geography, environmental geography, and geotechniques. A geography degree will prepare students to pursue a wide variety of careers or enter graduate school.

UNH geography graduates have gone on to careers as teachers, geographic information systems analysts, pilots, environmental consultants, hurricane hunters, city planners, emergency medical physicians, meteorologists, land surveyors, real estate agents, sports psychologists, “Jeopardy” clue researchers, cartographers, marketing managers, financial portfolio strategists, transportation planners, social analysts, travel consultants, college professors, and more.

## **Requirements**

To earn a bachelor of arts in geography, students must complete 10 geography courses with a minimum grade of C-minus — five core courses, four courses in one of three areas of concentration, plus one elective. Students must select an area of concentration within six months of declaring geography as their major.

## **Core courses**

All geography majors must complete five core courses:

GEOG 401, Regional Geography of the Western World

GEOG 402, Regional Geography of the Non-Western World

GEOG 572, Physical Geography

GEOG 581, Human Geography

GEOG 658, Introduction to Geographic Information Systems

The core courses are intended to provide students a basic understanding of human, physical, and world regional geography, plus geographic information systems. They should be taken as early as possible in a student's program because they provide a foundation for more advanced coursework.

Students are encouraged to complete GEOG 595, Statistics for Geographers, or another introductory statistics course approved by their advisor before enrolling in GEOG 658.

## **Human geography concentration**

Intended for students most interested in the geography of human activity, including population, urban, cultural, political, and economic geography.

Students must complete three of the following, including one course at the 600-level or above:

GEOG 582, Economic Geography

GEOG 583, Urban Geography

GEOG 584, Political Geography

GEOG 588, Geography of Food

GEOG 680, Historical Geography

GEOG 685, Geography of Population and Development

GEOG 690, Geography of Third World Development

Students must complete one of the following regional geography courses:

GEOG 510, Geography of New England

GEOG 514, Geography of the United States and Canada

GEOG 540, Geography of the Middle East

GEOG 541, Geography of Japan

GEOG 550, Geography of Sub-Saharan Africa

### **Environmental geography concentration**

Intended for students most interested in the geography of the natural environment, including weather, climate, landforms, biogeography, and human-environment interactions.

Students must complete three of the following, including one course at the 600-level or above:

GEOG 473, Elements of Weather

GEOG 560, Geography of Natural Hazards and Disasters

GEOG 573, Biogeography

GEOG 574, Geography of Landforms

GEOG 670, Climatology

GEOG 671, Advanced Weather Analysis

GEOG 673, Environmental Geography

Students must also complete GEOG 595, Statistics for Geographers, or another statistics course approved by their advisor.

### **Geotechniques concentration**

Intended for students most interested in geographic information systems, aerial photo



interpretation, remote sensing, photogrammetry, and other geographic techniques.

Students must complete three of the following:

GEOG 650, Field Methods in Geography

GEOG 757, Photo Interpretation and Photogrammetry

GEOG 759, Digital Image Processing for Natural Resources

GEOG 760, Geographic Information Systems in Natural Resources

Students must also complete GEOG 595, Statistics for Geographers, or another statistics course approved by their advisor.

### **Additional regulations**

Students entering UNH beginning in August 2010 must pass a comprehensive examination in their senior year to fulfill the Discovery capstone requirement.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

The university's foreign language requirement can be fulfilled by the following languages: French, Italian, Spanish, Portuguese, German, Russian, Chinese, Japanese, Arabic, Latin, or Greek. Other languages will be considered by petition.

No course may fulfill both a major requirement and a General Education or Discovery category requirement, except when geography is a student's second major.

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## **German (GERM) ▼**

» <http://www.unh.edu/german>

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*Professor:* Edward T. Larkin

*Associate Professor:* Mary E. Rhiel

*Senior Lecturer:* Johannes T. Frank

*Lecturer:* Mary Marshall Campbell

The German major is offered by the **Department of Languages, Literatures, and Cultures**. This program is of interest to the following groups of students:

- Those who have a special interest in the German language, literature, and culture.
- Those who intend to enter fields in which a background in foreign languages and literatures is desirable, such as international business and law, trade, journalism, science, library science, government service, and international service organizations.
- Those who plan to teach German in secondary schools. Since most secondary schools require their teachers to teach more than one subject, students planning to enter teaching at this level should plan their programs carefully. They should combine a major in one of the languages and its literature with a minor or at least a meaningful sequence of courses in another subject. Dual majors also are possible. For certification requirements, see the section coordinator.

A major consists of 10 courses in German beyond German 402. Required for the major are GERM 503, 504, 525, 601, 631, 632 (or their equivalents) and four more courses which must be taken at the 600 or 700 levels. A grade of C- or better is required in all major coursework. Majors are required to spend a minimum of one semester in an approved German-speaking study abroad program, or equivalent. For students spending one semester abroad, three of the four upper-level courses are normally taken in Durham. For students spending an academic year abroad, two of the four upper-level courses are normally taken in Durham. LLC 791 does not count for major credit; 791 is recommended as an elective and required for teacher certification. The Discovery Program capstone requirement may be fulfilled by completing any 700-level German course (including 797 and 798).

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

A minor consists of five courses in German numbered 503 and above. The minor may include one course taught in English (521, 523, 524, 525) but not LLC 791.

### ***Study Abroad***

The University allows both German majors and minors and other students at levels beyond

GERM 504 to attend approved study abroad programs for UNH credit. Students may attend accredited semester or year programs at universities such as Berlin, Freiburg, Heidelberg, Innsbruck, Marburg, Munich, Tübingen, or Vienna. Most study abroad programs require a minimum of two years of college German. Intensive language study programs include the Goethe-Institut centers in Germany, which offer four- or eight-week courses. For details, see the German coordinator or the foreign study coordinator in the Center for International Education. Students beyond the 504 level may also do an internship in a German firm or organization (see GERM 595). Financial aid applies to all approved programs.

*Short-course in Berlin, Germany*

The UNH German program manages a two-week program in January and/or June in Berlin, Germany. Students earn 4 credits through German 586, designed to give students a short immersion experience in the German language and culture. In the course of two weeks, students will receive forty hours of intensive language instruction at the appropriate level at the BSI Private Language School in central Berlin. Each weekday afternoon, students will gather for cultural excursions and discussions with the on-site UNH faculty member. A required pre- and post-meeting at UNH will prepare for, and give closure to, the Berlin experience. In line with UNH's goals to educate students to become global citizens, this immersion experience will give students insight into what it means to experience a different culture and language. For more information, contact Mary Rhiel at (603) 862-0063, or visit [berlin.program@unh.edu](mailto:berlin.program@unh.edu).

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## Greek (GREK) ▼

» <http://www.unh.edu/classics>

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*Professor:* Stephen M. Trzaskoma

*Associate Professor:* Stephen Andrew Brunet, Robert Scott Smith

*Senior Lecturer:* Richard E. Clairmont

*Lecturer:* Susan Curry, Anna Newman

The Greek major is offered by the classics program of the [Department of Languages, Literatures, and Cultures](#).

The minimum requirements for a major in Greek are 32 credits in Greek, including GREK 401-402. A Greek major must complete as a minimum a 700-level course in the Greek language. A minimum of three courses must be taken at the Durham campus. The Discovery Program

capstone requirement may be fulfilled by completing any Greek course at the 700 level or through another option (Honors thesis, etc.) approved by the advisor.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Greek majors may take GREK 503 or 504 to satisfy both the World Culture Discovery Program requirement and to satisfy major requirements.

A Greek minor requires 20 credits of coursework in Greek. Students are encouraged to take courses in related fields such as Latin, classics, and ancient history, and to take part in overseas study programs in Greece.

The coordinator is R. Scott Smith, Murkland Hall; Languages, Literatures, and Cultures, (603) 862-2388; e-mail [rss3@cisunix.unh.edu](mailto:rss3@cisunix.unh.edu).

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## History (HIST) ▾

» <http://www.unh.edu/history>

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*Chairperson:* Jan V. Golinski

*Professor:* Jeffrey M. Diefendorf, Ellen Fitzpatrick, Cathy A. Frierson, Jan V. Golinski, J. William Harris, Janet L. Polasky

*Affiliate Professor:* Stephen H. Hardy, Benjamin Harris

*Associate Professor:* Funso Afolayan, David Bachrach, W. Jeffrey Bolster, Kurk Dorsey, Marion Girard Dorsey, Eliga H. Gould, Nicoletta F. Gullace, Yan Lu, Gregory McMahon, Julia E. Rodriguez, Lucy E. Salyer, Cynthia J. Van Zandt, Ethel Sara Wolper

*Assistant Professor:* Jessica M. Lepler, Elizabeth W. Mellyn, Jason Sokol

*Research Assistant Professor:* Judith N. Moyer

*Lecturer:* Thomas Anderson, Addis Mason, Jill Silos, Marjorie Wood

The study of history is an essential element of the liberal arts education. The history major provides both an awareness of the past and the tools to evaluate and express one's knowledge. The student who majors in history will have the opportunity to study the breadth of the human past and will acquire the skills in critical reading and writing that form the foundation of the educated life. The study of history may include all of human culture and society and

provides tremendous latitude in the subjects that may be studied. The interdisciplinary nature of the field makes it a natural focus for study that may encompass a variety of other fields.

To complete a major in history, students must take 10, 4-credit history courses or their equivalent. Students who enter the University as history majors or who declare a major in history should take the first required course, HIST 500 (Introduction to Historical Thinking), as soon as possible. To declare a major in history, students must have completed two history courses with a grade of C- or better. HIST 500 is a prerequisite for the second required course, HIST 797 (Colloquium in History), which fulfills the Discovery Program Capstone requirement for history majors and is taken during the senior year. Students should consult the list of topics for HIST 797 advertised each semester. Besides HIST 500 and HIST 797, a major must take at least eight courses, of which a minimum of three must be at the 600 level or above. Only one HIST 695 (Independent Study) may be used to fulfill the 600-level requirement, and no more than two independent study courses may count toward the ten-course requirement. No more than two 400-level courses may be counted toward the major requirements. Students must receive at least a C in HIST 500, and at least a C- in the other nine courses. Majors must maintain a 2.0 or better in all history courses.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

History majors must satisfy the language requirement for the B.A. degree in an international language that they could use for historical research. That list includes: Arabic, Chinese, French, German, Greek, Italian, Japanese, Latin, Portuguese, Russian, and Spanish. Students may petition the department curriculum committee for exceptions.

A student's program of study must include two parts:

1. An area of specialization. A student must select at least four courses to serve as an area of specialization within the major. Up to two courses (each four credits or their equivalent) in the area of specialization may be taken in other departments; such courses must be 500-level or above and have the approval of the student's adviser. The area of specialization may be in a nation, region, a time period, or an interdisciplinary field.
2. Complementary courses. A student must select, in consultation with his or her adviser, at least three history courses in fields outside the area of specialization, chosen to broaden his or

her understanding of the range of history. Normally, each major should take at least one course from each of Groups I, II, and III, unless explicitly excused by his or her adviser. Group I contains all American history courses, Group II contains all European history courses, and Group III contains all other history courses.

The program must be planned in consultation with an adviser. A copy of the program, signed by the adviser, must be placed in a student's file no later than the second semester of his or her junior year. Courses at the 700-level will be judged by the adviser as to their applicability for area of specialization or complementation. The program may be modified with the adviser's approval.

For transfer students, a minimum of five of the semester courses used to fulfill the major requirements must be taken at the University. One upper-level course may be transferred to satisfy the requirement that a major must take at least three courses numbered 600 or above. Transfer students must complete both HIST 500 or its equivalent and HIST 797.

A minor in history consists of 20 semester credits with C- or better and at least a 2.0 grade-point average in courses that the Department of History approves. Courses taken on a pass/fail basis may not be used for the minor. No more than 12 credits in 400-level courses may be used for this minor. For transfer students, a minimum of two of the semester courses, or eight credits, must be taken at the University of New Hampshire with a grade of C- or better.

Students intending further work in history beyond the bachelor's degree are urged to take HIST 775, Historical Methods.

Students intending to major in history should consult with the department secretary in Horton 405. Suggested programs for students with special interests or professional plans are available in the department office.

### ***Undergraduate Awards for Majors***

*The Philip M. Marston Scholarship*, an award of \$500, is available to students who are interested in colonial or New England history and have demonstrated financial need. There are course requirements for this scholarship. More details are available from the history office.

Each spring, the members of the departmental undergraduate committee choose history majors to receive the following prizes in history:

*The William Greenleaf Prize* is given for the best senior colloquium paper. Award candidates must have a minimum grade-point average of 3.2 in history courses. Individuals may nominate

themselves or may be nominated by faculty members.

*The Allen Linden Prize* for the best senior history thesis is funded by the Signal Fund.

*The Charles Clark Prize* is for the best essay or research paper submitted by a history major and is funded by the Signal Fund.

*Phi Alpha Theta*, the history honor society, is an international scholastic organization dedicated to promoting historical study on the undergraduate and graduate levels. Admission to the UNH Psi Pi chapter is open to undergraduates with an overall grade-point average of 3.0 and a grade-point average of 3.1 or better in history courses.

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## Humanities (HUMA) ▼

» <http://www.unh.edu/humanities-program>

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*Coordinator:* Catherine M. Peebles

*Professor:* Michael K. Ferber, Jan V. Golinski, Charlotte Elizabeth Witt

*Associate Professor:* Warren R. Brown

*Senior Lecturer:* Jennifer K. Armstrong, Catherine M. Peebles

*Core Faculty:* Willem A. deVries, Marco Dorfsman, R. Valentine Dusek, Robert Haskins, Eleanor M. Hight, David R. Hiley, John R. Kayser, Edward T. Larkin, Ronald D. LeBlanc, Gregory McMahon, Petar Ramadanovic, David M. Richman

The humanities program examines the fundamental questions and issues of human civilization. Through studying diverse texts in the arts, music, literature, history, philosophy, and science, students seek answers to questions that thoughtful human beings must address in the course of their lives. Whether these questions come from Socrates (What is justice?), from Sir Thomas More (What is obligation to God?), from Raphael (What is beauty?), from Newton (What are the laws of nature?), or from Martin Luther King, Jr. (What is freedom?), they direct our attention to enduring human concerns and to texts that have suggested or illustrated the most profound and powerful answers.

### ***Humanities Major***

The humanities major consists of a minimum of 40 credits of academic work, with a minimum grade of C, including the following core requirements:

*Critical Methods in the Humanities (HUMA 500)*. Students will be made acquainted with the methods and technology required for research in the humanities. Students should take this 4-credit course during the sophomore or junior year.

*Integrated Core Courses (HUMA 510, 511, 512, 513, 514, 515)*. Each student takes at least two courses (8 credits) from the 510-515 sequence, preferably in the freshman and/or sophomore year.

*Seminar in the Humanities (HUMA 700)*. Each student takes at least one offering (4 credits) of the Seminar in the Humanities, preferably during the junior or senior year. This seminar provides an opportunity for in-depth reading, viewing, and/or listening to texts and artifacts. The emphasis is on the multiple perspectives and methodologies that can be brought to bear upon these works from several humanistic disciplines.

*Discovery Program Capstone: Research Project in the Humanities (HUMA 798/799)*. Each student participates in the research tutorial (for a total of 4 credits) throughout the senior year. The tutorial provides a context within which students may discuss and receive direction in the course of completing a major research paper, the senior thesis. At the end of the second semester, students present their research to the faculty and their fellow students.

*Additional Requirements*. Beyond the 20 credits of core requirements, each student must fulfill the following requirements: (1) a minimum of eight additional credits from other humanities program courses; (2) an additional 12 credits from humanities program offerings and from the offerings of other departments and programs, with the advice and approval of each student's major adviser or the program coordinator. These offerings should bear some relation to the student's particular interests and senior research paper, as seems appropriate in each individual case.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***Humanities Minor***

The humanities minor consists of the following courses: (1) two courses (8 credits) from the



510/511/512/513/514/515 sequence; (2) two courses (8 credits) from other humanities program courses, one of which should be at the 600-level; and (3) seminar in the humanities (HUMA 700) or another approved course.

Inquiries about the humanities major and minor should be directed to Catherine Peebles, coordinator of the humanities program, 104 Huddleston Hall, (603) 862-3638; e-mail [huma@unh.edu](mailto:huma@unh.edu).

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## International Affairs Dual Major ▼

For program description, see [Special University Programs](#).

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## Italian Studies (ITAL) ▼

» <http://www.unh.edu/italian>

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*Associate Professor:* Piero Garofalo

*Assistant Professor:* Amy Boylan

*Senior Lecturer:* Darby Tench Leicht

*Lecturer:* Mariagabriella Gangi, Kristen Swann

The Italian studies minor is offered by the [Department of Languages, Literatures, and Cultures](#). It provides students with the opportunity to explore the language, culture, and society of Italy through an interdisciplinary program. The minor consists of five courses beyond the Elementary Italian (ITAL 401-402) sequence and may include one course from a related field of study (e.g., ARTS 681-682, ECS 400, HIST 641) with a minimum grade of C. In addition, students must demonstrate linguistic proficiency at the level of intermediate Italian (ITAL 504 or an equivalent).

The Italian studies minor is advantageous for applicants to graduate and professional schools in Italian, modern languages, linguistics, film, history, theater, philosophy, and law. It is also a valuable asset for careers in economics, international affairs, international business, fashion, teaching, communications, translation, interpretation, government, and Foreign Service.

New students will be assigned to the proper course in consultation with the section coordinator.

### ***Study Abroad***

Students may participate in the UNH-in-Italy Program in the medieval city of Ascoli Piceno for a semester, year, or summer (see ITAL 685). The program allows students to register for UNH courses taught by UNH faculty. Students with advanced language skills also may enroll in courses at the University of Ascoli Piceno. Internships are available. There is no language prerequisite.

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### **Japanese (JPN) ▼**

» <http://www.unh.edu/asian>

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*Lecturer:* Pamela B. Ikegami

For program description, see [Languages, Literatures, and Cultures](#).

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### **Justice Studies Dual Major (JUST) ▼**

» <http://www.unh.edu/justice-studies/>

» [Click to view course offerings](#)

*Coordinator:* Ellen S. Cohn

*Clinical Associate Professor:* Charles T. Putnam

*Clinical Assistant Professor:* Donna M. Perkins

*Lecturer:* Jared Del Rosso

*Core Faculty:* Victoria L. Banyard, John J. Cerullo, Drew Christie, Ellen S. Cohn, Todd A. DeMitchell, Marion Girard Dorsey, Robert P. Eckstein, David Finkelhor, John T. Kirkpatrick, Michelle D. Leichtman, Alynna J. Lyon, Mary Malone, Courtney Marshall, Donna M. Perkins, Danielle Pillet-Shore, Charles T. Putnam, Cesar Rebellon, Lucy E. Salyer, Susan J. Siggelakis,

Nicholas J. Smith, Murray A. Straus, James Tucker, Karen Van Gundy

The justice studies dual major program is an interdisciplinary area that blends topics from humanities departments (e.g., philosophy), social science departments (e.g., psychology, sociology, women's studies), departments that include both humanities and social science faculty (history, political science), and professionally oriented departments (education, family studies, social work). Topics studied include courts, family violence, rights, substance abuse, juvenile justice, school law, children as witnesses, hate crimes, and community policing. Students will be required to choose a first major before they will be able to declare justice studies as a second major. The goal is to produce graduates who have a higher level of knowledge about law and justice in American society and in the world so that they will mature into more knowledgeable and effective citizens. The justice studies dual major is intended for students who are looking for careers in the justice system or who seek graduate training in law or social sciences and humanities related to the law.

### ***Required Courses***

The dual major in justice studies requires students to take a minimum of eight courses (32 credits), each completed with a grade of a C- or better. Students are required to have a grade-point average of a 2.5 or better before they can be accepted into the program. The dual major cannot be declared until after a first major has been declared. Students can count no more than two courses for both the first major and dual major and students are not allowed to take more than two courses from any one department (except for JUST). An unlimited number of dual major courses can be used to satisfy Discovery requirements.

JUST 401, Introduction to Justice Studies

JUST 501, Research Methods (prerequisite: a statistics course)

JUST 601, Internship (juniors/seniors only) *or* JUST 602, Research Internship (juniors/seniors only)

JUST 701, Senior Seminar (Writing Intensive Course)

And one of the following three courses

POLT 407, Law and Society

POLT 507, Politics of Crime & Justice

SOC 515, Introductory Criminology

### ***Elective Courses***

Students are required to select three elective courses from the Justice Studies approved course list. This list is approved and published yearly by the Justice Studies Executive Committee.

BIOL 420, Intro to Forensic Science  
CD 717, Law of Community Planning (offered every other year)  
CMN 765, Police Talk  
EDUC 767, Students, Teachers, and the Law  
FS 772, International Approaches to Child Advocacy  
FS 776, Children, Adolescents, and the Law  
FS 794, Families and the Law  
HMP 734, Health Law  
HIST 509, Law in American Life  
HIST 600, Crime and Punishment in Modern History  
HIST 609, Special Topics: American Legal History  
HIST 645, 19th Century European Great Powers—Diplomacy and International Law  
HMGT 625, Hospitality Law (only HMGT majors allowed)  
HMGT 627, Employment Law  
HUMA 650, Humanities and the Law: The Problem of Justice in Western Civilization  
INCO 404F, Medicine and Law in the United States  
JUST 401, Introduction to Justice Studies (required course)  
JUST 405, Technology, Crime & Society  
JUST 501, Research Methods (required course; prerequisite: a statistics course)  
JUST 550/551, Mock Trial (must take yearlong course)  
JUST 601/602, Internship/Research Internship (required course)  
JUST 650/651, Budapest Study Abroad  
JUST 695, Special Topics in Justice Studies (no more than two courses)  
JUST 701, Senior Seminar (required course, writing intensive course)  
JUST 767, Students, Teachers, and the Law  
JUST 795, Reading and Research (variable credit)  
KIN 798, Sports Law  
MGT 647, Business Law (only Business Administration, Accounting, and Business Administration and Management allowed)  
MGT 648, Business Law II  
NR 566, Wildlife Enforcement I  
NR 718, Law of Natural Resources and Environment  
PHIL 436, Social and Political Philosophy  
PHIL 635, Philosophy of Law  
PHIL 660, Law, Medicine, and Morals  
PHIL 701, Value Theory  
PHIL 730, Theories of Justice  
PHIL 740, Advanced Topics in Philosophy of Law  
POLT 407, Law and Society

POLT 507, Politics of Crime and Justice  
POLT 508, Supreme Court and the Constitution  
POLT 513, Civil Rights and Liberties  
POLT 520, Justice and the Political Community  
POLT 568, Intro to Intelligence (only when taught by Professor MacPherson)  
POLT 660, Terrorism and Political Violence  
POLT 701, The Courts and Public Policy  
POLT 707, Criminal Justice Administration  
POLT 708, Administrative Law  
PSYC 591, Forensic Psychology  
PSYC 755, Psychology of Law (Research Methods Prerequisite)  
PSYC 756, Psychology of Crime and Justice (Research Methods Prerequisite)  
PSYC 791, Advanced Topics: Psychology of Hate and/or Psychology of Delinquency  
RMP 772, Law and Public Policy in Leisure Services (must have junior/senior status)  
SOC 515, Introductory Criminology  
SOC 525, Juvenile Crime and Delinquency  
SOC 535, Homicide  
SOC 620, Drugs and Society  
SOC 650, Family Violence (must have junior/senior status)  
SOC 655, Sociology of Law and Justice  
SOC 697, Special Topics: Perspectives on Terrorism  
SOC 715, Criminological Theory  
SOC 720, Sociology of Drug Use  
SOC 780, Social Conflict  
SOC 797, Special Topics: Crime and Justice  
SW 525, Introduction to Social Welfare Policy  
WS 595, Special Topics: Violence Against Women

The Discovery Program capstone requirement may be fulfilled by completing either JUST 601, Internship, or JUST 602, Research Internship, AND JUST 701, Senior Seminar.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Students who are interested in a dual major in justice studies will need to file an Intent to Dual Major form. The form is available in the Justice Studies Office or can be downloaded from the program Web site at [www.unh.edu/justice-studies](http://www.unh.edu/justice-studies). Program offices are located in Room 202 of Huddleston Hall and are open Monday through Friday from 8 a.m. to 12 p.m. and 1 p.m. to 4:30 p.m. For more information please contact Ellen Cohn at (603) 862-3197, e-mail

[ellen.cohn@unh.edu](mailto:ellen.cohn@unh.edu); or Debbie Briand at (603) 862-1716, e-mail [justice.studies@unh.edu](mailto:justice.studies@unh.edu).

For program information on the justice studies minor, see [Interdisciplinary Programs](#).

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## Languages, Literatures, and Cultures (LLC) ▼

» <http://www.unh.edu/llc>

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*Chairperson:* Marco Dorfsman

*Professor:* Nadine S. Bérenguier, Barbara T. Cooper, Janet Gold, Edward T. Larkin, Ronald D. LeBlanc, Lina Lee, Claire-Lise Malarte-Feldman, Stephen M. Trzaskoma

*Associate Professor:* Arna Beth Bronstein, Stephen Andrew Brunet, John M. Chaston, Carmen García de la Rasilla, Marco Dorfsman, Aleksandra Fleszar, Piero Garofalo, Lori Hopkins, Jaume Martí-Olivella, Mary E. Rhiel, Juliette M. Rogers, Robert Scott Smith

*Assistant Professor:* Amy Boylan, Holly R. Cashman, Scott E. Weintraub

*Senior Lecturer:* Mary Kathleen Belford, Richard E. Clairmont, Johannes T. Frank, Claire-Helene Gaudissart, Darby Tench Leicht, Catherine M. Peebles, Cindy Pulkkinen, Anna K. Sandstrom, Linda J. Thomsen

*Lecturer:* Susan Curry, Lesley Curtis, Mariagabriella Gangi, Fernando González de León, Sarah E. Hirsch, Pamela B. Ikegami, Ruwa Majid-Pokorny, Leticia Mantilla-Clavijo, Anna Newman, Jeannie Nguyen, Maria I. Rossi, Kristen Swann, Emilie Talpin, Ruirui Zhang, Yiqiao Zhou

The Department of Languages, Literatures, and Cultures offers undergraduate majors in classics, French, French Studies, German, Greek, Latin, Russian, Spanish, and European cultural studies, plus a minor in Italian and coursework in Arabic, Chinese, Hittite, Sanskrit, Japanese, and Portuguese. A combined B.A. in French/M.B.A. degree and an M.A. in Spanish also are offered.

In addition, the department sponsors several study abroad programs and a variety of co-curricular activities, including conversation hours and language clubs.

A B.A. degree at the University requires the fulfillment of a foreign language requirement. Students must fulfill this requirement by the end of their sophomore year. Please see the [Bachelor of Arts Degree Requirements](#).

Undergraduates who choose to pursue a major or minor in the Department of Languages, Literatures, and Cultures may wish to consider complementing their studies with the dual major in International Affairs, with the teacher education program, or with any of the other majors and minors available through the University of New Hampshire. Such coursework will not only broaden a student's intellectual horizons, but may also serve to enhance his or her employment opportunities or prospects for graduate education.

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## Latin (LATN) ▼

» <http://www.unh.edu/classics>

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*Professor:* Stephen M. Trzaskoma

*Associate Professor:* Stephen Andrew Brunet, Robert Scott Smith

*Senior Lecturer:* Richard E. Clairmont

*Lecturer:* Susan Curry, Anna Newman

The Latin major is offered by the classics program of the [Department of Languages, Literatures, and Cultures](#).

The minimum requirements for a major in Latin are 32 credits in Latin, excluding LATN 401-402. A Latin major must complete at least one 700-level course in the Latin language. A minimum of three courses must be taken at the Durham campus. The Discovery Program capstone requirement may be fulfilled by completing any Latin course at the 700 level or through another option (Honors thesis, etc.) approved by the adviser.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Latin majors may take LATN 503 or 504 to satisfy both the World Culture Discovery Program requirement and to satisfy major requirements.

Students who intend to pursue certification in the teaching of Latin at the middle- and high-school levels should consult with their advisor and plan an appropriate curriculum.

A Latin minor requires 20 credits of coursework in Latin. Students are encouraged to take

courses in related fields such as Greek, classics, and ancient history, and to take part in overseas study programs in Italy.

The coordinator is R. Scott Smith Murkland Hall; Languages, Literatures, and Cultures, (603) 862-2388; e-mail [rss3@cisunix.unh.edu](mailto:rss3@cisunix.unh.edu).

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## Linguistics (LING) ▼

» <http://www.unh.edu/linguistics/>

» [Click to view course offerings](#)

*Coordinator:* Rochelle Lieber

*Lecturer:* Maya Ravindranath Abtahian

*Core Faculty:* Thomas A. Carnicelli, Holly R. Cashman, Richard E. Clairmont, Mary Morris Clark, Willem A. deVries, Aleksandra Fleszar, Piero Garofalo, Mardi J. Kidwell, Lina Lee, Rochelle Lieber, Gregory McMahon, Paul McNamara, Christina Ortmeier-Hooper, Danielle Pillet-Shore

Linguistics is the study of one of the most important characteristics of human beings—language. It cuts across the boundaries between the sciences and the humanities. The program is an excellent liberal arts major or preprofessional major for education, law, medicine, clergy, and others. It is a particularly appropriate major for students who want to teach English as a second language. Dual majors with a foreign language, international affairs, business administration, and the like are quite feasible.

Students interested in the major or the minor should consult with the program coordinator or with any professor who teaches linguistics courses. To declare a major in linguistics, a student must meet with the linguistics coordinator to design a course of study. Information is available from the Advising Center, Hood House, and at [www.unh.edu/linguistics](http://www.unh.edu/linguistics).

A minor in linguistics also is available and consists of any five linguistics courses, including LING 405 or ENGL 405, approved by the linguistics coordinator.

### Requirements for the Major

*All of the following*



LING 405, Introduction to Linguistics  
LING 605, Intermediate Linguistic Analysis  
LING 793, Phonetics and Phonology  
LING 794, Syntax and Semantic Theory

*One course in historical linguistics*

CLAS 506, Introduction to Comparative and Historical Linguistics  
ENGL 752, History of the English Language  
GERM 733, History and Structure of the German Language  
ITAL 733, History of Italian  
RUSS 733, History and Development of the Russian Language  
SPAN 733, History of the Spanish Language

*Two years college study (or equivalent) of one foreign language*

*One of the following cognate specialties*

One year college study (or equivalent) of a second foreign language from a different language family or subfamily (Old English may count as the second foreign language if the first foreign language is not in the Germanic family)

PSYC 712, Psychology of Language (with its prerequisite, either PSYC 512, Psychology of Primates, or PSYC 513, Cognitive Psychology)

CS 765, Introduction to Computational Linguistics (Requires permission from the professor. Knowledge of LISP, SCHEME or PERL programming languages required)

*Two elective courses from the list below*

Anthropology: 670, Language and Culture; 795, 796, Reading and Research in Anthropology:  
B. Anthropological Linguistics  
Communication: 572, Language and Social Interaction; 583, Gender and Communication; CMN 666, Conversation Analysis; 672, Theories of Language and Discourse  
Communication Sciences and Disorders: 522, The Acquisition of Language; 738, Linguistics of American Sign Language; 775, Advanced Language Acquisition  
Computer Sciences: 765, Introduction to Computational Linguistics  
English: 444B, The Secret Lives of Words; 444F, Language Matters in America; 715, TESL: Theory and Methods; 716, Curriculum, Materials, and Assessment in English as a Second Language; 717, World Englishes; 718, English Linguistics and Literature; 719, Sociolinguistics Survey; 727, Issues in Second Language Writing; 752, History of the English Language; 790, Special Topics in Linguistics; 791, English Grammar

LLC: 791, Methods of Foreign Language Teaching

German: 733, History and Structure of the German Language

Italian: 733, History of Italian

Latin: 795, 796, Special Studies in Latin (when topic is appropriate)

Linguistics: 444B, The Secret Lives of Words; 444F, Language Matters in America; 620, Applied Experience in Linguistics; 717, World Englishes; 719, Sociolinguistics Survey; 790, Special Topics in Linguistics; 795, 796, Independent Study

Philosophy: 550, Symbolic Logic; 618, Recent Anglo-American Philosophy; 650, Logic: Scope and Limits; 745, Philosophy of Language

Psychology: 512, Psychology of Primates; 513, Cognitive Psychology; 712, Psychology of Language. (Students may count either PSYC 512 or 513 toward the linguistics major or minor, but not both.)

Russian: 733, History and Development of the Russian Language

Spanish: 641, Spanish Phonetics; 645, Introduction to Spanish Linguistics; 733, History of the Spanish Language; 790, Grammatical Structure of Spanish

#### *Discovery Program Capstone Experience*

Either LING 779, Linguistic Field Methods, or LING 695, Senior Honors.

Other courses may be substituted, with the permission of the student's adviser and the Linguistics Committee, when they are pertinent to the needs of the student's program.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements, UNLESS Linguistics is your second major.

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## **Music (MUSI) ▼**

» <http://www.unh.edu/music/>

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*Chairperson:* Robert Stibler

*Professor:* Andrew A. Boysen, Lori E. Dobbins, Christopher Kies, Nicholas N. Orovich, David K. Ripley, David E. Seiler, Robert Stibler, Peggy A. Vagts

*Affiliate Professor:* Clark Terry

*Associate Professor:* Michael J. Annicchiarico, Daniel Beller-McKenna, Jenni Carbaugh Cook, Mark S. DeTurk, Robert W. Eshbach, Robert Haskins, William G. Kempster, Peter W. Urquhart, Larry J. Veal

*Assistant Professor:* Elizabeth Gunlogson

*Senior Lecturer:* Arlene P. Kies

*Lecturer:* Casey S. Goodwin, Rose Pruiksma, David Upham, Ryan Vigil, Mark Zielinski

The Department of Music offers two degree programs: the bachelor of arts in music and the bachelor of music.

The University of New Hampshire Department of Music is an accredited institutional member of the National Association of Schools of Music.

Prospective majors in music are advised to contact the department for information on acceptance into the major.

All music students must earn grades of C- or better in all required music and music education courses.

### **Bachelor of Arts in Music**

The bachelor of arts in music program offers students an opportunity to major in music within the liberal arts curriculum. This program is intended for those who wish to pursue the serious study of music and to acquire at the same time a broad general education; it is recommended for those considering the five-year undergraduate-graduate program in teacher education or graduate study leading to the M.A. or Ph.D. degrees. The bachelor of arts degree is offered with four options: music liberal studies, performance study, music composition, and preteaching.

To be admitted formally to the B.A. program, students must give evidence of satisfactory musical training by taking an admission audition. Students wanting to declare composition as their option must submit a music portfolio, in addition to an audition on their major instrument. Students enrolling in the B.A. music liberal studies program—a program that stresses the development of skills in analysis, writing, and critical thinking about a wide variety of musics and their larger connections with history, culture, and society—are required to interview with one of the program faculty members.

The music preteaching option is a part of the five-year undergraduate-graduate certification program (see Department of Education). (The department also offers a four-year program leading to teacher certification, the bachelor of music in music education.)

Students must declare music as a major before the beginning of the junior year, but it is highly recommended that they declare as early as possible, considering the large number of required courses.

For all options listed above, the Discovery Program Capstone requirement is fulfilled by a final project or a public performance given during the senior year. For students in the music liberal studies option, there is a choice of completing a half recital or comparable final project; for those in performance study, a full recital; for students in the music composition option, a half lecture, half lecture-recital, or a half recital including at least one original composition; for those in the preteaching option, a half recital is required.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

Requirements for the bachelor of arts in music and its options are listed below.

#### Bachelor of Arts in Music Core Curriculum

Abbreviation	Course Number	Title	Credits
MUSI	471-472	Theory I	6
MUSI	473-474	Ear Training I	2
*MUSI	475-476	Functional Piano I	2
MUSI	571-572	Theory II	6
MUSI	573-574	Ear Training II	2
*MUSI	575-576	Functional Piano II	2
MUSI	501-502	History and Literature of Music	6
MUSI	703-715	Advanced Music History	3
MUSI	771, 781 or 782	Advanced Music Theory	3
MUSI	541-564, 741-764	Performance Study (Applied Lessons)	Variable
**MUSI	441-442, 448, 450-464	Ensemble Study	Variable

\*Students will be given the opportunity to test out of MUSI 475-476 and MUSI 575-576.

\*\*A maximum of 8 ensemble credits may count toward graduation for all bachelor of arts in

music students.

#### Option 1, Music Liberal Studies

Abbreviation	Course Number	Title	Credits
*MUSI	771, 775-777, 779, 781-782, 703-715	Various advanced theory and music history courses	12 total
**MUSI	536-564 or 736-764 and/or 441-464	Performance Study and/or Ensemble Study	8 total

\* Any combination of advanced theory and history (12 credits) in addition to the core curriculum.

\*\* Any combination of performance and/or ensemble study (8 credits total). B.A. music liberal studies students, if not in a lesson studio, will attend a weekly colloquium.

#### Option 2, Music Composition

Abbreviation	Course Number	Title	Credits
MUSI	771, 775-777, 779, 781-782	Advanced Music Theory	12 total
MUSI	541-564/741-764	Performance Study (Applied Lessons)	8 total
MUSI	731	Conducting	3
MUSI	441-464	Ensemble Study	4 total

#### Option 3, Performance Study

Abbreviation	Course Number	Title	Credits
*MUSI	541-565/741-764	Performance Study (Applied Lessons)	16 total
MUSI	731	Conducting	2
MUSI	441-464	Ensemble Study	8 total
**MUSI	520-521	Diction for Singers I & II	4 credits total

\*2 credits per semester

\*\* Required for voice performance majors only

#### Option 4, Music Preteaching

Abbreviation	Course Number	Title	Credits
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EDUC	500	Exploring Teaching	4
MUSI	731-731	Conducting I & II	6
MUSI	779	Orchestration	3
MUED	745	Techniques & Methods in String Instruments	2
MUED	751	Techniques & Methods in Percussion Instruments	2
MUED	747	Techniques & Methods in Woodwind Instruments	3
MUED	749	Techniques & Methods in Brass Instruments	2
MUED	741	Techniques & Methods in Choral Music	2
MUSI	541-564/736-764	Performance Study (Applied Lessons)	8 total
*MUSI	441-464	Ensemble Performance	8 total

\*Of the 8 credits in ensemble performance (MUSI 441-464) required during the course of study, it is expected that at least 4 credits will be from Concert Choir (MUSI 441), Symphony (MUSI 450), Wind Symphony (MUSI 452), Symphonic Band (MUSI 453), and/or Concert Band (MUSI 451). At least 1 credit of performance in a jazz ensemble (MUSI 460) and 1 credit of Marching Band (MUSI 454) are highly desirable.

### **Bachelor of Music Degree Program**

The bachelor of music degree program is offered to students who wish to develop their talent in performance, composition, or music education to a high professional level. The program is recommended to those considering graduate study leading to the M.M. or D.M.A. degrees. The music education option is part of the undergraduate certification program (see the Department of Education).

To be admitted to the B.M. program, students must demonstrate a high degree of musical competence or significant creative ability during an audition or examination. Selection is made on the professional requirements appropriate to each option. Students must formally declare the B.M. as a degree program before the beginning of the sophomore year. Continuation into the upper level of the program is subject to review by the department faculty.

Three degrees are offered in the bachelor of music curriculum: **bachelor of music in music education**; bachelor of music in performance; bachelor of music in theory. Students wanting to

declare theory as their option must submit a music portfolio in addition to an audition on their major instrument.

Students in the bachelor of music in theory degree programs may use a maximum of 8 ensemble credits toward graduation.

Students in the bachelor of music in performance degree program are required to perform a junior recital.

All bachelor of music students are required to give a public performance during their senior year, which fulfills the Discovery Program capstone requirement. For students in the performance option, a full recital is required; for those in theory, a full lecture, lecture-recital, or recital including at least one original composition is required.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

Additional requirements, grouped by option, are shown below the core curriculum table.

#### Bachelor of Music Core Curriculum

Abbreviation	Course Number	Title	Credits
MUSI	471-472	Theory I	6
MUSI	473-474	Ear Training I	2
*MUSI	475-476	Functional Piano I	2
MUSI	571-572	Theory II	6
MUSI	573-574	Ear Training II	2
*MUSI	575-576	Functional Piano II	2
MUSI	501-502	History & Literature of Music	6
MUSI	731	Conducting	2
MUSI	703-715	Advanced Music History	3
MUSI	771, 781 or 782	Counterpoint or Analysis: Form & Structure	3
**MUSI	541-564/741-764	Performance Study (Applied Lessons)	Variable
***MUSI	441, 442, 448, 450-460,	Ensemble Study	Variable

462-464

\* Students will be given the opportunity to test out of MUSI 475-476 and MUSI 575-576.

\*\* Performance study credits vary depending on degree, read about specific degree requirements under the appropriate sections.

\*\*\* Ensemble study credits vary depending on degree, read about specific degree requirements under the appropriate sections.

#### Bachelor of Music in Performance (Voice)

Abbreviation	Course Number	Title	Credits
MUSI	520-521	Diction for Singers	4 total
*ITAL	401-402	Elementary Italian	8 total
*GERM	401-402	Elementary German	8 total
*FREN	401-402	Elementary French	8 total
MUED	755	Vocal Pedagogy	2
MUED	741	Techniques & Methods in Choral Music	2
**MUSI	545/745	Performance Study (voice lessons)	25 total
MUSI	441-442, or 448	Ensemble Study	8 total

\*The language requirement for a B.M. voice performance major is satisfied by taking ITAL 401-402 OR GERM 401-402 OR FREN 401-402. A student does not need to take all three for the curriculum.

Please note that General Education Group 5 requirement must be fulfilled with an intermediate level foreign language.

\*\* 3 credits of lessons each semester until the semester of the student's senior recital semester; then it is 4 credits.

#### Bachelor of Music in Performance (Piano)

Abbreviation	Course Number	Title	Credits
*MUSI	771, or 781-782	Counterpoint or Analysis: Form & Structure	3
MUED	743	Material & Methods in Piano Music	2
MUSI	795E	Special Studies - piano literature	1-2
MUSI	785V	Special Studies - advanced piano pedagogy	2



**MUSI	703-715	Advanced Music History	3
**MUSI	775-777, or 779	Compostion or Orchestration	3
***MUSI	541/741	Performance Study (piano lessons)	25 total
MUSI	455	Ensemble Study (Piano Ensemble)	4 total
MUSI	441-464	Ensemble Study	4 total

\*A B.M. piano performance major must take an additional course from this selection.

\*\*A B.M. piano performance major must take an additional 700-level music history or music theory course.

\*\*\* 3 credits of lessons each semester until the semester of the senior recital; then it is 4 credits.

#### **Bachelor of Music in Performance (all other instruments)**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
*MUED	745-751	Techniques & Methods	2-3
**MUSI	700-level	Advanced music history or advanced music theory	3
***MUSI	541-546/741-764	Performance Study	25 total
MUSI	441-464	Ensemble Study	12 total

\* BM Instrumental Performance majors take one methods class in the appropriate instrumental family. i.e. A trumpet player would take MUED 749, Techniques & Methods in Brass Instruments to fulfill this requirement.

\*\* This is in addition to the advanced music history and advanced music theory class already required.

\*\*\* 3 credits of lessons are taken each semester until the student's senior recital semester; then it is 4 credits.

#### **Bachelor of Music in Music Theory**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
GERM	401-402	Elementary German	8 total

MUSI	771-772	Counterpoint	6 total
MUSI	781-782	Analysis: Form & Structure	6 total
MUSI	775-776	Composition	6 total
MUSI	777	Advanced Composition	6 total
MUSI	779	Orchestration	3
*MUSI	700 level	Advanced Music Theory	3

\*This is in addition to the the other 700 level theory classes outlined above.

### Minor in Music

All students wishing to receive a minor in music must complete a minimum of 20 credits of coursework in music, of which the following are required: MUSI 471-474 or MUSI 411-412; and MUSI 501-502, or MUSI 401 or MUSI 402 and 511.

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### Music Education (MUED) ▼

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The bachelor of music degree program is offered to students who wish to develop their talent in performance, composition, or music education to a high professional level. The music education option provides a route to undergraduate certification.

To be admitted to this B.M. program, students must demonstrate a high degree of musical competence. Selection is made with the recommendation of the appropriate applied faculty member and contingent upon personal commitment to the teacher licensure program.

Students in music education must maintain an overall minimum 2.8 grade-point average at the time of application for student teaching (February 15 of junior year). Techniques and methods courses must include MUED 745 (strings), 747 (woodwinds), 749 (brass), 751 (percussion), 741 (choral), and 765 (instrumental).

All bachelor of music students are required to give a public performance during their senior year, which fulfills the Discovery Program capstone requirement. For music education students, a half recital is required.

The bachelor of music program in music education leads to State of New Hampshire teacher certification in music, grades K-12 (cert. #612.13). New Hampshire also participates in a reciprocal agreement with many other states, the Interstate Certification Compact.

Students in the bachelor of music in music education degree program may use a maximum of 8 ensemble credits toward graduation. Of the 8 credits in ensemble performance (MUSI 441-464) required during the course of study, it is expected that at least 4 credits will be from Concert Choir (MUSI 441), Symphony (MUSI 450), Wind Symphony (MUSI 452), Symphonic Band (MUSI 453), and/or Concert Band (MUSI 451). At least 1 credit of performance in a jazz ensemble (MUSI 460) and 1 credit of Marching Band (MUSI 454) are highly desirable.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program.

B.M. music education majors may use MUSI 501 (a required core course for the major) to satisfy the Fine and Performing Arts Discovery category requirement.

### **BM Music Education Curriculum**

The four year, Bachelor of Music in Music Education curriculum is highly structured due to the number of required courses to complete. In the table below is the list of all required music, music education, and education classes required to earn a degree and a certificate to teach. The Discovery Program classes required by the University are not included on this list but should be taken into account when planning each semester's schedule.

#### **BM Music Education Curriculum**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
MUED	741	Techniques & Methods in Choral Music	2
MUED	745	Techniques & Methods in String Instruments	2
MUED	747	Techniques & Methods in Woodwind Instruments	3
MUED	749	Techniques & Methods in Brass Instruments	2
MUED	751	Techniques & Methods in Percussion Instruments	2
MUED	765	Instrumental Music Methods	2
MUED	790	Teaching Elementary School Music	2
MUED	791	Teaching Secondary School Music	2
MUSI	471-472	Theory I	6 total

MUSI	473-474	Ear Training I	2 total
*MUSI	475-476	Functional Piano I	2 total
MUSI	571-572	Theory II	6 total
MUSI	573-574	Ear Training II	2 total
*MUSI	575-576	Functional Piano II	2 total
MUSI	501-502	History & Literature of Music	6 total
MUSI	731-732	Conducting	4 total
MUSI	703-715	Advanced Music History	3
MUSI	771, 781, or 782	Counterpoint or Analysis: Form & Structure	3
MUSI	779	Orchestration	3
MUSI	541-564/741-764	Performance Study (Applied Lessons)	8 total
**MUSI	441, 442, 448, 450-460, 462-464	Ensemble Study	8
EDUC	500	Exploring Teaching	4
EDUC	700	Educational Structure & Change	4
EDUC	701	Human Development & Learning Educational Psychology	4
EDUC	705	Alternative Perspectives on the Nature of Education	4
EDUC	751B	Educationg Exceptional Learners: Secondary	4
EDUC	694	Courses in Supervised Teaching	8

\* Students are given the opportunity to test out of MUSI 475,476, 575, and 576.

\*\* Please refer to the paragraph about ensemble study for music education majors.

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## Neuroscience and Behavior (NSB) ▼

» <http://www.unh.edu/psychology/neuroscience-behavior>

This interdisciplinary major is jointly housed in the College of Liberal Arts and the College of Life Sciences and Agriculture.

See description under [College of Life Sciences and Agriculture](#) for full program information.

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## Philosophy (PHIL) ▼

» <http://www.unh.edu/philosophy/>

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*Chairperson:* Drew Christie

*Professor:* Willem A. deVries, R. Valentine Dusek, David R. Hiley, Robert C. Scharff, Duane H. Whittier, Charlotte Elizabeth Witt

*Associate Professor:* Drew Christie, Paul McNamara, Ruth J. Sample, Nicholas J. Smith, Timm A. Triplett

*Senior Lecturer:* Jennifer K. Armstrong

*Lecturer:* Matt Dowd

*Each semester, detailed course descriptions are posted in the department office and on the department web page.*

Philosophy has always been at the heart of liberal education, deepening and enriching the lives of those who pursue it. The philosophy major provides students with the opportunity to confront a wide variety of questions, especially those that cannot be dealt with in the framework of other disciplines. Such questions include those about the ultimate nature of reality: Does God exist? Are minds distinct from bodies? Are there more things between heaven and Earth than are dreamed of in science? Other questions probe what it is to know: Do we know that material bodies external to our minds exist? What does it mean to justify a belief? Still other questions are about how we ought to act: What is a good person? Are there moral rules? How are they justified? Must we obey them?

Philosophy also concerns itself with other disciplines: What makes something a work of art? What distinguishes a scientific theory from a religious theory or myth? Is capitalism amoral? Is legal authority moral or political?

The Department of Philosophy offers a wide range of courses exposing students to the full scope of philosophical activity. Grappling with major primary texts from the history of philosophy is an important emphasis of the program, for philosophy today is the continuation of a conversation that extends back to the ancient Greeks and the Vedic scriptures. Philosophy also always has wrestled with cutting-edge topics emerging in the current culture. Some recent examples are: What are the prospects for machines with mental lives? What are the

implications of new views in cosmology? How do we handle the pressing ethical dilemmas brought on by emerging medical technologies, or by the historically unparalleled rate of destruction of the Earth's environment? Are gender and race socially constructed concepts rather than biological concepts?

### ***Career Opportunities***

Philosophy offers excellent training for a variety of careers by providing a unique combination of life-long skills: analytic and interpretive skills; critical reasoning skills; the enhanced capacity to detect problems and to solve them; excellence in oral and written presentation and defense of one's ideas; skill at asking probing and central questions about the ideas of others (as well as about one's own ideas); and skill at effectively understanding, organizing, and evaluating complex systems of thought.

Considering these skills, it is not surprising that philosophy majors score in the very top percentiles on the GRE, LSAT, and GMAT standardized exams. For example, in a recent GRE study, philosophy majors were ranked among the very top majors in their mean scores on the verbal, analytic, and quantitative components of the exam; in a recent LSAT study, philosophy majors had a higher mean score than even pre-law majors; and for recent GMAT tests, the mean score for philosophy majors exceeded that of any type of business major. Virtually no other major does this well on such a wide cross-section of standardized exams.

These results reflect the fact that the unique combination of skills acquired in philosophy, along with the breadth of subject matter reflected on, provide the philosophy major with an extremely adaptive and resilient mind-set. Philosophy provides superior preparation for a variety of vocational and professional endeavors, and perhaps more importantly, for being a professional.

### ***The Philosophy Major***

Majors must take a total of 10 philosophy courses. The following courses constitute a core required of all majors: PHIL 412, 500, 530, 570, 580, and one additional course in the history of philosophy (525, 571, 610, 616, 618, 620, or an approved seminar). Majors also must take two seminars (i.e., courses at the 700 level). Please note that a single course can satisfy multiple requirements for the major. PHIL 495, 795, and 796 normally do not count toward fulfilling major requirement credits; exceptions may be granted by special permission. The Discovery Program capstone requirement may be fulfilled by writing a thesis (PHIL 798 and PHIL 799), or submitting a senior portfolio, or presenting independent research in the Undergraduate Research Conference, or fulfilling an undergraduate research grant during the senior year.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts

candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements, with the exception of PHIL 412, which may be used to satisfy both.

### ***Special-Interest Program***

Students may add to the above major a special-interest program that is of value in planning for postgraduate education or entry into such areas as law, medicine, business, education, theology, or social work. Special advisers are prepared to provide informal counsel to philosophy majors interested in these areas.

### ***Graduate Preparatory Emphasis***

This emphasis is strongly recommended for students who plan to do graduate work in philosophy. Beyond the 10 program courses, such students should select, with their advisers' approval, two additional philosophy courses above the 400 level, for a total of 12 courses. One of these should be PHIL 550.

### ***Distinction on Senior Thesis***

Distinction on Senior Thesis is granted by a unanimous determination of the student's committee that the thesis exceeds A level work and is worthy of special recognition.

### ***Honors in Philosophy***

To receive Honors in Philosophy, students will be expected to pursue a philosophy curriculum that demands greater depth and rigor than what is required by the major; they will be expected to complete the curriculum at a consistently high level of achievement; they will be expected to engage in independent study and research (under the supervision of a faculty member) beyond the requirements of their coursework; and they will be expected to present and defend a culminating project that synthesizes aspects of their study. Students can demonstrate these expectations in either of two ways: a thesis option or a portfolio option. Consult the Department of Philosophy website for more details.

### ***Philosophy Minor***

A philosophy minor consists of five philosophy courses, one of which must be at the 500 level or higher (PHIL 495, 795, 796 with special approval only).

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## Political Science (POLT) ▼

» <http://www.unh.edu/political-science/>

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*Chairperson:* Lawrence C. Reardon

*Professor:* Marla A. Brettschneider, Melvin J. Dubnick, Mark W. Huddleston

*Affiliate Professor:* Kenneth M. Johnson

*Associate Professor:* Warren R. Brown, John R. Kayser, Alynna J. Lyon, Lawrence C. Reardon, Dante J. Scala, Susan J. Siggelakis, Andrew E. Smith, Stacy D. VanDeveer

*Affiliate Associate Professor:* Tom Kelly, James Varn

*Assistant Professor:* Roslyn Chavda, Mary Malone, Jeannie L. Sowers

*Senior Lecturer:* Lionel R. Ingram

*Lecturer:* Richard Aliano, Tama Andrews, Kirk Buckman, Jeffrey Haight

The study of government and politics, to which the courses and seminars of the Department of Political Science are devoted, includes the development of knowledge of political behavior by individuals and groups as well as knowledge about governments: their nature and functions; their problems and behavior; and their interactions—at the national and international levels and at the local, state, and regional levels.

Much of the learning offered by the Department of Political Science also can be regarded as essential for good citizenship, since political knowledge helps to explain the formal and informal institutions by which we are governed and the forces that lead to policy decisions, and also seeks to clarify the issues and principles that encourage people toward political involvement. It contributes to the store of knowledge necessary for informed citizenship. In addition, such learning is especially valuable to students planning to enter local or national government or other public service, including the Foreign Service, and it will be of great help to those who intend to study law and enter the legal profession. For teaching, particularly at the college level, and for many types of government service, graduate work may be indispensable. An undergraduate major in political science will provide a helpful foundation for any further study of politics and related fields in the social sciences and humanities. Such an emphasis also will be valuable for students seeking careers in journalism, international organizations, and the public affairs and administrative aspects of labor, financial, and business organizations.

The major program in political science consists of at least 10 courses (40 credits) and not more than 12 courses (48 credits). The minimum grade requirement is C- per course. Any grade lower will not count toward major. Courses are to be distributed in the following way:

1. Three 400-level courses: 401, 402, and 403. Once they declare the major, students must



complete these three courses within the first calendar year.

2. Six 500-level courses. Of these, at least one shall be chosen from each of the four fields in which the department's courses are organized: American politics, political thought, comparative politics, and international politics.

3. One 700-level course.

The Discovery Program capstone requirement may be fulfilled by completing any 700-level Political Science course.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***Five year B.A./M.A. Program***

The five-year political science B.A./M.A. program (also known as a "dual degree, early admission" program) aims to (1) improve opportunities for excellent undergraduates to prepare for competitive Ph.D. programs or add an additional credential before entering a competitive job market; and (2) allow students interested in politics to advance and further specialize their political science education in only one additional year at UNH.

Students must fulfill all programmatic requirements for the current master's degree program, as well as fulfill all programmatic requirements for their bachelor's degree.

Interested students must submit a full graduate application (no GRE requirement) by February 15 of their junior year. Minimum GPA required for admission is 3.2.

For additional information you may contact either the Graduate Coordinator, Tama Andrews, 603-862-2321, [tama.andrews@unh.edu](mailto:tama.andrews@unh.edu) or Professor Stacy VanDeveer, 603-862-0167, [stacy.vandever@unh.edu](mailto:stacy.vandever@unh.edu).

### ***Minor in Political Science***

The political science minor consists of five courses (20 credits total). These courses may be taken in any combination of the four fields and levels (400-700) offered. The fields to choose from are: American politics, political thought, comparative politics, and international politics. No more than two courses can be taken at the 400 level.

The minimum grade requirement is C- per course. Any grade lower than a C- will not count toward the minor. Students wishing to use transfer credits from abroad or other universities

should meet with a political science adviser to determine eligibility toward the minor.

### ***Internships and Advanced Study***

In addition to the courses regularly offered, the department could have available selected topics, advanced study in political science, and internships. Interested students should check with the department office to learn about the offerings for a given semester.

The department also offers several internship opportunities that give students experience in various aspects of government, policy making, and the legal system at the local, state, and national levels. Student must have taken certain course prerequisites for each kind of internship. In addition, students must have junior or senior standing and normally have a 3.2 average or higher to be eligible for consideration. Students desiring to undertake internships must fully comply with the departmental guidelines as stated on the application forms, which are available on the department website. Applications must be received by first day of the preregistration period prior to the semester the course will be undertaken. Internships can only fulfill non-subfield requirements at the 500-level. Washington placements are made either through the Department of Political Science or through the Washington Center located in the National Student Exchange Office in Hood House; major credit must be arranged through the department.

### ***Political Science Language Requirement***

The bachelor of arts degree at the University of New Hampshire requires that a student satisfy the foreign language proficiency requirement. The requirement may be met by demonstrating language proficiency equal to a one-year college-level course (401 and 402, 403 and 503, or 503 and above in spoken language).

The Department of Political Science does not allow American Sign Language (ASL) to count toward the language requirement effective for students who declare the major as of fall 2007.

Exceptions to this must be petitioned and approved by the Department of Political Science's Undergraduate Committee and a student's adviser.

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## **Portuguese (PORT) ▼**

» <http://www.unh.edu/spanish>

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For program description, see [Languages, Literatures, and Cultures](#).

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## Psychology (PSYC) ▼

» <http://www.unh.edu/psychology/>

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*Chairperson:* Robert G. Mair

*Professor:* Victoria L. Banyard, Victor A. Benassi, Ellen S. Cohn, Robert C. Drugan, Peter S. Fernald, Kenneth Fuld, Benjamin Harris, Robert G. Mair, John D. Mayer, Edward J. O'Brien, David B. Pillemer, Rebecca M. Warner, William R. Woodward

*Associate Professor:* J. Pablo Chavajay, Brett M. Gibson, Michelle D. Leichtman, Jill A. McGaughy, Carolyn J. Mebert, William Wren Stine

*Research Associate Professor:* Lisa M. Jones, Kimberly J. Mitchell

*Affiliate Associate Professor:* Julie E. Williams

*Assistant Professor:* Katie Edwards, Andrew B. Leber, Edward P. Lemay

*Senior Lecturer:* Mark J. Henn, Peter Yarensky

*Lecturer:* Ryhannon Bemis, Robert P. Eckstein, Joan Glutting, Michael A. Mangan, Kelly Peracchi, Zorana Ivcevic Pringle

The psychology major provides students with a broad education, while also allowing some specialization. The program exposes students to the scientific study of behavior and encourages an increased understanding of the behavior of humans and animals.

Students who wish to declare psychology as a major after enrolling in the University should consult with the department's academic counselor for application procedures and criteria.

Students majoring in psychology must complete 44 credits with a minimum grade of C- in each course and a 2.0 overall average in all major requirements. The psychology department does not accept other departments' statistics courses toward the psychology major. Students who have taken a statistics course other than PSYC 402 must pass a competency exam in order to apply to the major and/or register for PSYC 502. Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements. Students who use PSYC 402 for the Discovery requirement must take an additional psychology course that is eligible for major credit to replace PSYC 402 in the major. (PSYC 444 and 595 may NOT be used for this purpose.)

**Requirements for the Major**

A. Three core courses: PSYC 401, 402, and 502

B. Four breadth (500-level) courses as follows

*Two courses from Group I*

PSYC 511, Sensation and Perception

PSYC 512, Psychology of Primates

PSYC 513, Cognition

PSYC 521, Behavior Analysis

PSYC 522, Behaviorism (offered in Manchester only)

PSYC 531, Psychobiology

*Two courses from Group II*

PSYC 552, Social Psychology

PSYC 553, Personality Psychology

PSYC 561, Abnormal Behavior

PSYC 571, Pioneers of Psychology

PSYC 581, Child Development

PSYC 582, Adult Development and Aging

C. Four depth (700-level) courses as follows

*Two courses from Group I*

PSYC 702, Advanced Statistics (if not used in group II)

PSYC 705, Tests and Measurements (if not used in group II)

PSYC 710, Visual Perception

PSYC 712, Psychology of Language

PSYC 713, Psychology of Consciousness

PSYC 720, Animal Cognition

PSYC 722, Behaviorism, Culture, and Contemporary Society

PSYC 731, Brain and Behavior

PSYC 733, Drugs and Behavior

PSYC 735, Neurobiology of Mood Disorders

PSYC 736, Attention Disorders

PSYC 737, Behavioral Medicine

PSYC 741, A-D Advanced Topics

*Two courses from Group II*

PSYC 702, Advanced Statistics (if not used in group I)

PSYC 705, Tests and Measurements (if not used in group I)

PSYC 755, Psychology and Law

PSYC 756, Psychology of Crime and Justice

PSYC 758, Health Psychology

PSYC 762, Counseling

PSYC 763, Community Psychology

PSYC 765, Dysfunctional Families and Therapy

PSYC 771, Psychology in 20th Century Thought and Society

PSYC 775, Madness in America

PSYC 780, Prenatal Development/Infancy

PSYC 783, Cognitive Development

PSYC 785, Social Development

PSYC 791, A-G Advanced Topics

PSYC 793, Internship

*Note: Most offerings have one or more prerequisite courses. Students (with the help of their advisers) are expected to select breadth courses that will later enable them to select depth courses appropriate to their interests and career goals.*

The Discovery Program capstone requirement, taken during the senior year, may be fulfilled by completing one of the following options: (1) the Honors-in-Major program with honors project, Honors Seminar, and research presentation; (2) a 4-credit independent study project and presentation; (3) PSYC 793, Internship; (4) Capstone Seminar.”

Transfer students who elect to major in psychology must complete at least 24 credits in the program at UNH to qualify for the degree in psychology. Transfer students must earn a total of 44 approved credits for completion of the psychology major. The distribution of these credits will be determined by the department’s academic counselor. Transfer students should note that courses are allotted only the number of credits granted by the original institution (after adjustments for semester-hour equivalents). Thus, students transferring from an institution at which courses carry less than four credits each must make up for any credit deficit created by acceptance of transfer credits into the psychology major. Of the four 700-level courses required for the major, at least three must be taken at UNH.

Specific course selections should be discussed with advisers. Exceptions to the requirements for the major require compelling circumstances and a petition to the department.

Psychology majors planning to go on to graduate study in psychology are advised to include PSYC 702 and/or 705 among their courses.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

The minor in psychology consists of five psychology department courses (20 credits), including PSYC 401. No more than 4 credits of PSYC 795 may be applied to the minor. A maximum of 9 approved psychology transfer credits can be applied to the UNH psychology minor.

See the department student services assistant for further details on the major or minor in psychology.

### ***Advising System***

Students who enter the University as psychology majors are considered “provisional majors” and are advised in the University Advising and Career Center through their freshman year. Provisional psychology majors are encouraged to complete PSYC 401 and 402 during their first year. During the summer after the freshman year, provisional psychology majors' advising files are transferred to the psychology department. Provisional majors then “confirm” their major in psychology during the fall semester of their sophomore year by attending a major orientation session scheduled by the department. “Provisional majors” are accorded all the rights and privileges of any psychology major. Undergraduate advising in the department is conducted jointly by the department’s academic counselor and the full-time faculty. The academic counselor has primary responsibility for advising confirmed and newly declared freshman and sophomore psychology majors and is the initial contact for all majors in a state of transition (readmitted, transfer, newly declared, etc.). The academic counselor assists students in all phases of educational planning and decisionmaking, including registration, long-range academic planning, degree and program requirements, and career selection and planning. Junior and senior psychology majors are assigned to a faculty adviser with appropriate consideration for student preferences. The advising relationship with a faculty member is designed to encourage refining career and educational decisions.

### ***Undergraduate Awards for Majors***

Each year the faculty chooses psychology undergraduates as the recipients of the following awards: the Herbert A. Carroll Award for an outstanding senior in psychology, the George M. Haslerud Award for an outstanding junior in psychology, and the Fuller Foundation Scholarship for an outstanding junior in psychology with demonstrated interests in clinical psychology. Psychology majors with at least a 3.2 grade-point average are eligible for these awards. Faculty nominate students from the eligibility list and final selection of recipients is made by vote of the full-time psychology faculty.

### ***Honors Program in Psychology***

The Department of Psychology sponsors an honors program for outstanding students in the major. Students may apply to the honors program in psychology in their sophomore or junior year.

#### **Eligibility criteria include**

1. Overall grade-point average of 3.2 or above and 3.4 in major courses
2. Completion of PSYC 401, 402, and 502 with a grade of B or above in each

#### **Requirements of the program include**

1. Three 700-level psychology honors courses or equivalent
2. PSYC 797, Senior Honors Tutorial (fall)
3. PSYC 799, Senior Honors Thesis (spring)

Students interested in applying to the honors program should contact the department's academic counselor by the end of their sophomore year.

### ***Undergraduate Research Conference***

The Department of Psychology sponsors the annual George M. Haslerud Undergraduate Research Conference each spring. Undergraduate honors students present their theses at the conference. Contact the department's academic counselor for more information.

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## **Religious Studies (RS) ▼**

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## **Russian (RUSS) ▼**

» <http://www.unh.edu/russian>

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*Professor:* Ronald D. LeBlanc

*Associate Professor:* Arna Beth Bronstein, Aleksandra Fleszar

The Russian major provides students with an opportunity to study one of the world's most

important languages, its literature, and its culture. In addition to the intrinsic value of Russian language, literature, and culture as a liberal arts experience, the Russian major leads to a number of careers, such as teaching, translation and interpreting, government, and the Foreign Service. It is also a valuable asset in preparing for careers in law, economics, and international trade, and it can serve as a double major with business administration, international affairs, the natural and physical sciences, and other liberal arts fields such as English, history, political science, sociology, philosophy, theatre, communication, linguistics, and other foreign languages.

New students will be assigned to the proper course after consultation with the Russian faculty. A student may not receive UNH credit for elementary Russian courses if he or she has had two or more years of secondary school Russian; however, a student may petition the Russian program to be admitted to the 400-level courses for credit. In the 503-790 range, a grade of C or better is required to advance to the next course in the language series (503, 504, 631, 632, 790).

The Russian major consists of a minimum of 40 credits above RUSS 504. Specific course requirements are RUSS 425, 521, 522, 601, 631-632, 691, and 790 and two or three electives, depending upon choice of option and concentration. Majors are required to spend a semester or summer on an approved study abroad program in Russia. Majors are required to take RUSS 631-632 and at least one 700-level Russian course at the Durham campus. The Discovery Program capstone requirement may be fulfilled by completing one of the following: the Honors-in-Russian Thesis, RUSS 721, RUSS 725, RUSS 733, or RUSS 790. Transfer students must earn a minimum of 12 major credits at the Durham campus.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Russian majors may take RUSS 521 to satisfy both a Discovery Inquiry requirement and a major requirement, and RUSS 525 to satisfy both a Discovery category requirement and a major elective requirement.

The minor in Russian consists of a minimum of 20 credits above RUSS 402; it must include RUSS 503-504 and at least one of the following: RUSS 631, 632, 691, 721, 725, or 790.

Students wishing to major in Russian should contact the program coordinator in Murkland Hall 303.

### ***Russian Studies Minor***



The Russian studies minor offers students an opportunity to pursue area study of Russia and the new states through an interdisciplinary program. The minor consists of a minimum of 20 credits (five courses) with a minimum grade of C. In addition to the required courses and electives, students must demonstrate a Russian language proficiency at the level of RUSS 504 or an equivalent.

Students wishing to minor in Russian studies should consult with any faculty member in Russian studies.

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## Social Science (SCSC) ▼

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## Sociology (SOC) ▼

» <http://www.unh.edu/sociology/>

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*Chairperson:* Michele Dillon

*Professor:* Michele Dillon, David Finkelhor, Lawrence C. Hamilton, Kenneth M. Johnson, Murray A. Straus, Heather A. Turner, Sally Ward

*Associate Professor:* Benjamin C. Brown, Sharyn J. Potter, Cesar Rebellon, James Tucker, Karen Van Gundy

*Research Associate Professor:* Wendy A. Walsh, Barbara A. Wauchope

*Assistant Professor:* Rebecca Glauber, Thomas G. Safford

*Research Assistant Professor:* Marybeth J. Mattingly, Kristin E. Smith

*Clinical Professor:* John T. Kirkpatrick

*Lecturer:* Jared Del Rosso, Jennifer Esala, Catherine L. Moran

Sociology is the study of social life, social change, and the social causes and consequences of human behavior. Sociologists investigate the structure of groups, organizations, and societies, and how people interact within these contexts.

Since human behavior is shaped by social factors, the subject matter of sociology ranges from the intimate family to the hostile mob; from organized crime to religious cults; from the divisions

of race, gender, and social class to the shared beliefs of a common culture.

Majoring in sociology provides a solid, multifaceted foundation in the liberal arts, including analytical thinking and writing, and skills in collecting and analyzing data. Students learn diverse theoretical approaches to the social world and acquire tools for conducting and understanding social science research. The wide range of substantive areas taught in the UNH Department of Sociology includes courses concentrating on family and work; environmental sociology; social policy; inequalities of race, class, and gender; criminology, social control, and deviant behavior; medical sociology; and religion.

Undergraduate training in sociology is an excellent background for a variety of careers, including the business world, where majors might work in marketing and sales or human resources; government and nonprofit services, where majors might work in education, health services, social welfare, criminal justice; and research. An undergraduate degree in sociology is also excellent preparation for graduate work in law, social work, criminal justice, counseling, public administration, public health, business administration, urban planning, or further studies in sociology.

To declare a major in sociology, students must have completed at least one introductory level sociology course with a grade of C or better. New students who declare the major upon admission to UNH must enroll in SOC 400 during their first semester and earn a grade of C to maintain status in the program.

Majors must complete a minimum of 40 semester credits in sociology courses with grades of C- or better in each course and a GPA of 2.0 or better in sociology courses. SOC 400, 502, 599, 601, and 611 are required. At least two of the additional five major courses must be at the 600 or 700 level (upper-level electives). Majors may meet the Discovery Program capstone requirement in a variety of ways, including the satisfactory completion of a senior thesis (SOC 699), IROP, SURF, a 700-level course, or a capstone project within a 600-level course. Both SOC 502 and 599 are prerequisites for SOC 601; SOC 599 must be completed no later than the junior year and is a prerequisite for majors taking 600- and 700-level courses. SOC 595 can be used to fulfill one lower-level elective or SOC 699 can be used to fulfill one upper-level elective. Courses taken to complete the major requirements cannot be used to satisfy Discovery category requirements. (Statistics courses taken in other disciplines are generally not acceptable as a substitute for SOC 502).

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. B.A. candidates must also satisfy the foreign language proficiency requirement.

Conjoint minors (allowing double-counting of one or two courses) are available for justice studies; gerontology; American studies; race, culture, and power; women's studies; and other approved minors. Students also have the opportunity to pursue a second major, including justice studies. Students interested in social work or teaching can develop programs in conjunction with the appropriate departments. The departmental honors program is recommended for students with cumulative grade-point averages over 3.4, and especially for those anticipating graduate study.

Students interested in majoring in sociology should consult with the chair of the Undergraduate Committee in the sociology department for guidance. It is the responsibility of all sociology majors to obtain the latest information from the department office. A minor consists of any five 4-credit courses in sociology with a C- or better in each course and a grade-point average of 2.0 or better in these courses.

### ***Sociology Language Requirement***

The bachelor of arts degree at the University of New Hampshire requires that students satisfy the foreign language proficiency requirement. The requirement may be met by demonstrating language proficiency equal to a one-year college-level course (401 and 402, 403 and 503, 501 [Latin only], or 503 and above in a spoken language). American Sign Language courses do not meet the foreign language requirement for sociology majors.

The Department of Sociology requires all students declaring the major after fall 2006 to choose from one of the following languages: Arabic, Chinese, French, German, Greek, Italian, Japanese, Latin, Portuguese, Russian, and Spanish. Exceptions to this list must be petitioned and approved by the Department of Sociology's Undergraduate Committee and a student's adviser.

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## **Spanish (SPAN) ▼**

» <http://www.unh.edu/spanish>

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*Professor:* Janet Gold, Lina Lee

*Associate Professor:* John M. Chaston, Carmen García de la Rasilla, Marco Dorfsman, Lori

Hopkins, Jaume Martí-Olivella

*Assistant Professor:* Holly R. Cashman, Scott E. Weintraub

*Senior Lecturer:* Mary Kathleen Belford, Cindy Pulkkinen, Linda J. Thomsen

*Lecturer:* Mariagabriella Gangi, Fernando González de León, Sarah E. Hirsch, Leticia Mantilla-Clavijo, Maria I. Rossi

The major in Spanish is offered by the **Department of Languages, Literatures, and Cultures**.

It is designed to help students develop proficiency in the Spanish language and an appreciation of the cultural and literary achievements of Hispanic societies around the globe. This dual emphasis on communication and understanding prepares students to live in a world community where Spanish is becoming increasingly important for both personal and professional reasons. In addition, the program offers courses in Portuguese. Students also have the option to complete honors in the major providing they complete the necessary classes and a senior thesis in Spanish.

Students who major in Spanish may prepare themselves for a variety of fields in which proficiency in the Spanish language and knowledge of Hispanic cultures are desirable. Such fields might include international relations, business administration, government work, social service, and communications. In addition, students can prepare to teach Spanish at the elementary and secondary levels and in bilingual education programs through the foreign language teacher education program. The undergraduate major also provides a basis for graduate study in preparation for scholarly research and teaching at the college level. When combined with coursework or a dual major in other disciplines, the major prepares students for work in Spanish-speaking areas of the world as well as in bilingual regions of the United States.

The UNH study abroad program in Granada, Spain, open to majors and nonmajors, offers students the opportunity to live and study abroad for a spring semester. A six-week summer immersion program in Puebla, Mexico, also is available to students. Financial aid is available for eligible students. Contact the departmental program directors for further information.

### **Six-week Summer Immersion**

*(Temporarily inactive until further notice, pending Mexico's status as per recommendations from the U.S. Department of State.)*

The University of New Hampshire offers a six-week Spanish summer study abroad program sponsored by the International Center for Language and Culture at La Universidad de las Américas—**UDLA, Puebla**, Mexico. The program offers a variety of courses from the elementary to the advanced level. Students are able to fulfill UNH requirements for GE, Spanish major and minor. The program combines two Spanish courses during the day, cultural workshops, fieldtrips and optional weekend trips. Students will earn the equivalent of up to 8

credit hours upon the completion of the program. For more information, visit <http://www.unh.edu/puebla>; e-mail Prof Lina Lee at [llee@unh.edu](mailto:llee@unh.edu).

### ***The Spanish Major***

The major consists of a minimum of 40 credits. All coursework required for the Spanish major must be completed with a grade of C or better. Specific course requirements are 1) language and culture: 525 or 526, 631, and 632; 2) four 600-level electives from the following: 641, 645, 647, 648, 650, 651, 652, 653, 654 or equivalent; 3) three courses taught in Spanish at the 700 level. An approved foreign study experience in a Spanish-speaking country of a minimum of one semester is required; a full academic year is highly recommended. The Discovery Program capstone requirement may be fulfilled by completing SPAN 798, Special Studies in Spanish Language and Literature.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

### ***The Spanish Minor***

The Spanish minor consists of 20 credits in courses numbered 503 and above, including 631 and 632. At least three courses must be taken in residence at UNH. All coursework required for the Spanish minor must be completed with a grade of C or better and may not be taken pass/fail.

### ***The Latin American Studies Minor***

Spanish program faculty coordinate an interdisciplinary minor in Latin American studies. Coursework is drawn not only from the Spanish program, but from other programs across campus, such as the anthropology, history, and political science. See the Latin American studies page for more information.

For more information on the major, the minor, and options for the study abroad experience, please see the coordinator of Spanish.

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## Theatre and Dance (THDA) ▼

» <http://www.unh.edu/theatre-dance/>

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*Chairperson:* David J. Kaye

*Professor:* H. Gay Nardone, David L. Ramsey, David M. Richman, Charles L. Robertson

*Associate Professor:* Raina S. Ames, David J. Kaye, Deborah A. Kinghorn

*Assistant Professor:* Szu-Feng Chen

*Senior Lecturer:* Carol J. Fisher, Sarah Jane Marschner, Daniel J. Raymond

*Lecturer:* John Berst, Aimee Blesing, Susan Endrizzi, Evelyn Mann, Mary Beth Marino

The Department of Theatre and Dance offers emphases in acting, design and theatre technology, musical theatre, secondary education and youth drama. We also offer a Dance option within our BA in Theatre degree. Performance opportunities include six main-stage faculty-directed productions, three touring productions, and over 20 student-directed productions including plays, musical theatre, dance, puppetry, improvisation, comedy, and creative drama.

The award-winning faculty provides theatre majors with superlative training within a broad liberal arts context. Students may take courses in acting; voice and movement; dialects; directing; choreography; design and theatre technology; the history, theory and criticism of drama and theatre; youth drama; secondary school certification; playwriting; storytelling; puppetry; ballet; theatre dance (jazz and tap); aerial dance and musical theatre. Students interested in performance, technical, and historical aspects are trained to step into professional careers. The program affords means for independent study and internships, special projects, and active personal involvement in lecture and laboratory classes, with the possibility for integration with other departments. To assist with financial needs, the department awards scholarships to undergraduates each spring.

### Requirements for the Major

In addition to general liberal arts preparation, six specific course sequences are available within the theatre major:

1. courses leading to a theatre major with an emphasis in acting;
2. courses leading to a theatre major with an option in dance: ballet, theatre dance (tap and

jazz), and aerial dance;

3. courses leading to a theatre major with an emphasis in design and theatre technology;

4. courses leading to a theatre major with an emphasis in musical theatre;

5. courses leading to a theatre major that, if desired, may be combined with requirements of the **Department of Education**, in conjunction with a fifth year master of arts in teaching (M.A.T.) program, to prepare students for secondary school certification with an undergraduate specialization in secondary theatre education;

6. courses leading to a theatre major that, if desired, may be combined with requirements of the **Department of Education**, in conjunction with a fifth year of master in education (M.Ed.) program, to prepare students for elementary school certification with an undergraduate specialization in youth drama.

The general theatre major allows students to explore a variety of areas. In the freshman and sophomore years, students should enroll for at least two theatre and two Discovery courses per semester. The minimum grade requirement is C- per course. Any grade lower than the minimums stated above will not count toward the major. Under department policy, students who complete both COMM 401 and 402 satisfy the language competency requirement. All majors must take courses in the following areas: performance, design/theatre technology, and theory/history as well as fulfill between four and eight practicums and complete a capstone course. Although timing will vary with each emphasis, it is strongly suggested that all introductory courses be taken prior to the end of the student's sophomore year.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Major department courses taken to satisfy major requirements cannot be used to satisfy Discovery category requirements.

All UNH B.A. degrees require a minimum of 128 credit hours. Within those 128 credit hours, the theatre major offers seven specific course sequences:

### **Theatre (B.A.) General Theatre**

Contact David Richman, Paul Creative Arts Center, (603) 862-2218, [dmr@cisunix.unh.edu](mailto:dmr@cisunix.unh.edu).

#### **I. 22-30 Credits Required**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>

THDA	436 or 438	History of Theatre I or II	4
THDA	459	Stagecraft	4
THDA	460	Elements of Design	4
THDA	462 or 463	Ballet I or Theatre Dance I	4
THDA	551	Acting I	4
THDA	589 A-D	Practicum	0-8*
THDA	798 or 799	Senior Thesis or Capstone Project	2

\*Students are required to take at least one practicum for every semester they are a major in the Department of Theatre and Dance. In addition, each student must take each type of practicum at least once (Technical, Costume, Performance, Marketing & Promotion). Practicum may be taken for 1 or 0 credits.

#### II. 4 Credits from Theory/History

Abbreviation	Course Number	Title	Credits
THDA	436 or 438	History of Theatre I or II	4
THDA	450	History of Musical Theatre in America	4
THDA	520	Creative Drama	4
THDA	541	Arts and Theatre Administration	4
THDA	632	Interpretation of Shakespeare in Theatre	4
THDA	638	American Theatre: 1920-1970	4
THDA	657	Play Reading	4
THDA	721	Education Through Dramatization	4
THDA	727	Methods of Teaching Theatre	4
THDA	750	Writing for Performance (Playwriting)	4
THDA	762	Women in 20th and 21st Century American Theatre	4

#### III. 4 Credits from Design/Theatre Technology

Abbreviation	Course Number	Title	Credits
THDA	458	Costume Construction	4
THDA	475	Stage Makeup	2
THDA	546	Costume Design for the Theatre	4
THDA	547	Stage Properties	4



THDA	548	Stage Lighting Design and Execution	4
THDA	583	Introduction to Puppetry	4
THDA	641	Stage Management	2
THDA	650	Scene Painting for the Theatre	2
THDA	651	Rendering for the Theatre	2
THDA	652	Scene Design	4
THDA	683	Advanced Puppetry	4

#### IV. 4 Credits from Performance

Abbreviation	Course Number	Title	Credits
THDA	462	Ballet I	4
THDA	463	Theatre Dance I	4
THDA	470	Movement and Vocal Production	4
THDA	532	The London Experience	2
THDA	552	Acting II	4
THDA	592A	Special Topics	4
THDA	622	Storytelling, Story Theatre, and Involvement Drama	4
THDA	624	Theatre for Young Audiences	4
THDA	655	Musical Theatre Scene Study	4
THDA	741	Directing I	4
THDA	755	Advanced Musical Theatre	4
THDA	756	Producing & Directing the Musical	4
THDA	758	Acting III	4

#### V: 8 Credits from any 600-800 level course

Abbreviation	Course Number	Title	Credits
		Includes those in Sections II, III, and IV	
THDA	691/791	Internship in Theatre & Dance	1-8
THDA	795/796	Independent Study	1-8
THDA	798	Senior Thesis	2
THDA	799	Capstone Project	2

**Total: 42-50 Credit Hours****Theatre (B.A.) Emphasis in Acting**

The acting emphasis was created for students with an intense interest in acting and/or directing. The emphasis was designed to develop all aspects of the actor and the director as both an interpretive and creative artist. Students in the acting emphasis program are expected to strive for excellence in all areas of the art and craft of acting through highly challenging coursework, performance-based projects, and productions and special workshops with guest artists and instructors.

Contact David Kaye, Paul Creative Arts Center, (603) 862-0667, [djk@unh.edu](mailto:djk@unh.edu).

**I. 42-50 Credits Required**

Abbreviation	Course Number	Title	Credits
THDA	436	History of Theater I	4
THDA	438	History of Theater II	4
THDA	459	Stagecraft	4
THDA	460	Elements of Design	4
THDA	462 or 463	Ballet I or Theatre Dance I	4
THDA	470	Movement and Vocal Production	4
THDA	551	Acting I	4
THDA	552	Acting II	4
THDA	589 A-D	Practicum	0-8*
THDA	758	Acting III	4
THDA	759	Acting: Period and Style	4
THDA	799	Capstone Project	2

\*Students are required to take at least one practicum for every semester they are a major in the Department of Theatre and Dance. In addition, each student must take each type of practicum at least once (Technical, Costume, Performance, Marketing & Promotion). Practicum may be taken for 1 or 0 credits.

**II. 4 Credits from Theory/History**

Abbreviation	Course Number	Title	Credits
THDA	450	History of Musical Theatre in America	4

THDA	632	Interpretation of Shakespeare in Theatre	4
THDA	638	American Theatre: 1920-1970	4
THDA	657	Play Reading	4
THDA	750	Writing for Performance (Playwriting)	4
THDA	762	Women in 20th and 21st Century American Theatre	4

### III. 12 Credits from any THDA course offering

Abbreviation	Course Number	Title	Credits
THDA		Choose from any THDA course	12

**Total: 58-66 Credit Hours**

### Theatre (B.A.) Option in Dance

A diverse program in dance is offered as an option within the Department of Theatre and Dance. This option is designed to give the dance teacher, choreographer, and/or performer the skills needed to embark on a successful career. Technique courses in ballet, pointe, tap, jazz, and the aerial arts are at the core of this program. Courses in pedagogy, composition, dance history, and choreography allow dancers to explore a variety of disciplines in the dance field. In addition, dancers are introduced to the technical aspects involved in staging a full-scale performance. Performance opportunities include yearly faculty-directed dance concerts and student-created dance showcases each semester. Dancers may focus on one or all dance forms.

Contact Larry Robertson, Newman Dance Studio, (603) 862-3032, [collarrob@yahoo.com](mailto:collarrob@yahoo.com).

### I. 16-26 Credits Required

Abbreviation	Course Number	Title	Credits
THDA	459 or 460	Stagecraft or Elements of Design	4
THDA	487	The Dance	4
THDA	551	Acting I	4
THDA	589 A-D	Practicum	0-8*
THDA	795W/796W	Independent Study in Performance (Writing Intensive)	2-4
THDA	799	Capstone Project	2

\*Students are required to take at least one practicum for every semester they are a major in the Department of Theatre and Dance. In addition, each student must take each type of practicum at least once (Technical, Costume, Performance, Marketing & Promotion). Practicum may be taken for 1 or 0 credits.

### II. 12 Credits Required from Theory

Abbreviation	Course Number	Title	Credits
THDA	633	Dance Composition	4
THDA	732	Choreography	4
THDA	786	Dance Pedagogy	4

### III. 8 Credits from Fine Arts

Abbreviation	Course Number	Title	Credits
THDA	459	Stagecraft	4
THDA	460	Elements of Design	4
ARTS	572	Art of the Age of Humanism	4
ARTS	573	Art of the Modern World	4
MUSI	411-412	Fundamentals of Music Theory	4
MUSI	709	Music of the Romantic Period	4
MUSI	711	Music of the 20th Century	4
PHIL	421	Philosophy of the Arts	4
THDA	546	Costume Design for the Theatre	4
THDA	548	Stage Lighting Design and Execution	4
THDA	655	Musical Theatre Scene Study	4
THDA	798	Senior Thesis	2

### IV. 16 Credits from Performance

Abbreviation	Course Number	Title	Credits
THDA	462	Ballet I	4
THDA	562	Ballet II (May be repeated to 4 cr)	2
THDA	662	Ballet III (May be repeated to 16 cr)	2
THDA	463	Theatre Dance I	4
THDA	563	Theatre Dance II (May be repeated to 4 cr)	2

THDA	663	Theatre Dance III (May be repeated to 16 cr)	2
THDA	576	Pointe	2
THDA	597	Dance Theatre Performance (Repeatable to 16 cr )	2
THDA	665	Aerial Dance (May be repeated to 16 cr)	2
THDA	684	Special Topics	2-4

**Total: 52-62 Credit Hours**

### **Theatre (B.A.) Emphasis in Design and Theatre Technology**

The design and theatre technology emphasis prepares students for both practical and aesthetic work in the theatre through class work, production assignments, and everyday problem solving. UNH's theatre technicians and designers are in demand throughout the country, utilizing transferable skills not only in the theatre but in the allied arts and beyond. UNH-trained graduates hold careers across the nation as lighting, scenic, and costume designers; technical directors; property masters; head electricians; and scene painters.

Contact David Ramsey, Paul Creative Arts Center, (603) 862-2587,  
[dramsey@metrocast.net](mailto:dramsey@metrocast.net).

#### **I. 22-30 Credits Required**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
THDA	436 or 438	History of Theater I or II	4
THDA	459	Stagecraft	4
THDA	460	Elements of Design	4
THDA	462 or 463	Ballet I or Theatre Dance I	4
THDA	551	Acting I	4
THDA	589 A-D	Practicum	0-8*
THDA	799	Capstone Project	2

\*Students are required to take at least one practicum for every semester they are a major in the Department of Theatre and Dance. In addition, each student must take each type of practicum at least once (Technical, Costume, Performance, Marketing & Promotion). Practicum may be taken for 1 or 0 credits.

**II. 12 Credits from**

Abbreviation	Course Number	Title	Credits
THDA	458	Costume Construction	4
THDA	546	Costume Design for the Theatre	4
THDA	548	Stage Lighting Design and Execution	4
THDA	652	Scene Design	4

**III. 8 Credits from**

Abbreviation	Course Number	Title	Credits
THDA	475	Stage Makeup	2
THDA	541	Arts and Theatre Administration	4
THDA	546	Costume Design for the Theatre	4
THDA	547	Stage Properties	4
THDA	548	Stage Lighting Design and Execution	4
THDA	641	Stage Management	2
THDA	650	Scene Painting for the Theatre	2
THDA	651	Rendering for the Theatre	2
THDA	652	Scene Design	4
THDA	741	Directing I	4

**IV. 8 Credits from**

Abbreviation	Course Number	Title	Credits
ARTS	455	Introduction to Architecture	4
ARTS	525	Woodworking	4
ARTS	532	Introduction to Drawing	4
ARTS	546	Introduction to Painting	4
ENGL	631, 657, 746, 758, 781, 782	The Drama, Shakespeare, Studies in American...*	4
FREN	522	French Drama in Translation	4
GERM	640	German Drama	4
SPAN	752, 757, 771	Drama & Poetry of the Siglode Oro, Spanish...**	4
THDA	532	The London Experience	2
THDA	583	Introduction to Puppetry	4

THDA	691/791	Internship in Theatre	1-8
THDA	795/796	Independent Study	1-8

\*The Drama, Shakespeare, Studies in American Drama, Shakespeare, The Drama of Shakespeare's Contemporaries, English Drama, Modern Drama

\*\*Drama & Poetry of the Siglo de Oro, Spanish Drama of the 20th Century, Latin American Drama

**Total: 50-58 Credit Hours**

### Theatre (B.A.) Emphasis in Musical Theatre

The musical theatre emphasis is designed to cultivate and nurture the creative artistry of those highly motivated students who wish to develop their combined talent as singers, actors, and dancers. Students in the musical theatre emphasis program will thrive in this intense and dynamic program of coursework, practical application, performance-based projects, faculty- and student-directed productions, and special workshops with guest artists and instructors. Students will be expected to fully integrate their rigorous training as actors, dancers, and singers with the outstanding liberal arts education they will receive at UNH to become well-rounded and marketable musical theatre artists.

Contact David Kaye, Paul Creative Arts Center, (603) 862-0667, [djk@unh.edu](mailto:djk@unh.edu).

#### I. 30-38 Credits Required

Abbreviation	Course Number	Title	Credits
THDA	436 or 438	History of Theatre I or II	4
THDA	459	Stagecraft	4
THDA	460	Elements of Design	4
THDA	462	Ballet I	4
THDA	463	Theatre Dance I	4
THDA	470	Movement & Vocal Production	4
THDA	551	Acting I	4
THDA	589 A-D	Practicum	0-8*
THDA	799	Capstone Project	2

\*Students are required to take at least one practicum for every semester they are a major in the Department of Theatre and Dance. In addition, each student must take each type of practicum

at least once (Technical, Costume, Performance, Marketing & Promotion). Practicum may be taken for 1 or 0 credits.

## II. 22 Credits Required

Abbreviation	Course Number	Title	Credits
THDA	450	History of Musical Theatre in America	4
THDA	500	Musical Theatre Voice I (1 credit; repeatable)	2
THDA	600	Musical Theatre Voice II (1 credit; repeatable)	2
THDA	655	Musical Theatre Scene Study	4
THDA	700	Musical Theatre Voice III (1 credit; repeatable)	2
THDA	755	Advanced Musical Theatre	4
MUSI	411	Fundamentals of Music Theory	4

## III. 4 Credits from

Abbreviation	Course Number	Title	Credits
THDA/MUSI		Non-repeating credits*	4

\*Choose four non-repeating credits from any THDA course or any MUSI course that involves vocal training/performance, music theory, ear training, or piano.

## Total: 56-64 Credit Hours

### Theatre (B.A.) Emphasis in Secondary Theatre Education

For candidates who want to teach drama courses and/or direct high school productions, the secondary theatre education emphasis offers practical and theoretical training for teachers. Through laboratory work, students obtain hands-on theatre teaching experience, so that by the time they reach their graduate school internship, they have spent significant hours in the classroom working with children. Students are provided with extensive training and practical teaching experience specifically geared toward the goal of being a theatre teacher. Students will be expected to fully integrate education and theatre coursework so that they leave UNH prepared for the rigorous task of teaching at the secondary level.

Contact Raina Ames, Paul Creative Arts Center, (603) 862-3044, [raina.ames@unh.edu](mailto:raina.ames@unh.edu).

## I. 52-60 Credits Required from Theatre



Abbreviation	Course Number	Title	Credits
THDA	436	History of Theater I	4
THDA	438	History of Theater II	4
THDA	459	Stagecraft	4
THDA	460	Elements of Design	4
THDA	463	Theatre Dance I	4
THDA	475	Stage Makeup	2
THDA	551	Acting I	4
THDA	589 A-D	Practicum	0-8*
THDA	624	Theatre for Young Audiences	4
THDA	721	Education Through Dramatization	4
THDA	727**	Methods of Teaching Theatre	4
THDA	729	Community-Oriented Drama Programs	4
THDA	741	Directing I	4
THDA	760	Teacher Planning for Theatre	4
THDA	799	Capstone Project (must be taken in senior year)	2

\*Students are required to take at least one practicum for every semester they are a major in the Department of Theatre and Dance. In addition, each student must take each type of practicum at least once (Technical, Costume, Performance, Marketing & Promotion). Practicum may be taken for 1 or 0 credits.

\*\*Must be taken before student teaching internship.

#### II. 4 Credits from Design/Theatre Technology

Abbreviation	Course Number	Title	Credits
THDA	458	Costume Construction	4
THDA	546	Costume Design for the Theatre	4
THDA	548	Stage Lighting Design and Execution	4

#### III. 4 Credits From Education

Abbreviation	Course Number	Title	Credits
EDUC	500/935**	Exploring Teaching	4

**B.A. in Theatre with emphasis in Secondary Theatre Education****Total: 60-68 Credit Hours****IV. 16 Credits Required from Education\***

Abbreviation	Course Number	Title	Credits
EDUC	700/800	Educational Structure and Change	4
EDUC	701/801	Human Development & Learning: Educational Psychology	4
EDUC	705/805	Alternate Perspectives on the Nature of Education	4
EDUC	751B/851B	Educational Exceptional Learners: Secondary	4

\*May be taken at the undergraduate level or the graduate level.

**B.A. in Theatre plus undergraduate coursework toward the M.A.T. in Education****Total: 76-84 Credit Hours****THDA Electives**

*Students should take at least 8 credits from the following courses (one of which should be another Design course):*

THDA 450, History of Musical Theatre in America; 520, Creative Drama; 547, Stage Properties; 583, Introduction to Puppetry; 622, Storytelling, Story Theatre, and Involvement Dramatics; 632: Interpretation of Shakespeare in Theatre; 638, American Theatre: 1920-1970; 641, Stage Management; 652, Scene Design; 657, Play Reading; 683, Advanced Puppetry; 750, Writing for Performance; 762, Women in 20th and 21st Century American Theater.

NOTE: It is understood that students will fulfill 20 internship contact hours with theatre students in their emphasis area: elementary, middle, or high school. Projects for 729 cannot count as internship hours. Students may fulfill this requirement through a variety of teaching opportunities with the department's outreach program (both during the school year and in the summer), or they may work with local schools teaching, coaching actors, assistant directing, choreographing, or in some other capacity as specifically arranged with their theatre adviser.

It also is understood that students involved in the above course curriculum in order to get state theatre arts certification must apply to either the UNH Department of Education or another university for acceptance into a fifth-year master of arts in teaching (M.A.T.) or master of education (M. Ed.) degree program that fulfills state requirements for certification.

### Theatre (B.A.) Emphasis in Youth Drama

The youth drama emphasis is for those students who wish to use dramatic arts as a teaching tool, either in the elementary classroom or as a teaching artist. Our comprehensive curriculum is specifically designed to train teachers. Through laboratory work, students obtain hands-on theatrical teaching experience, so that by the time they reach their graduate school internship, they have spent significant hours in the classroom working with children. Students will be expected to fully integrate education and theatre coursework so that they leave UNH with sound theoretical training in addition to practical instruction on how to use drama to enhance learning outcomes, address classroom discipline issues, and, of course, bring the arts to life in the classroom.

Contact Raina Ames, Paul Creative Arts Center, (603) 862-3044, [raina.ames@unh.edu](mailto:raina.ames@unh.edu).

#### I. 50-58 Credits Required

Abbreviation	Course Number	Title	Credits
THDA	435	Introduction to Theatre	4
THDA	459	Stagecraft	4
THDA	460	Elements of Design	4
THDA	463	Theatre Dance I	4
THDA	520	Creative Drama	4
THDA	583	Introduction to Puppetry	4
THDA	589 A-D	Practicum	0-8*
THDA	622	Storytelling, Story Theatre & Involvement Drama	4
THDA	624	Theatre For Young Audiences	4
THDA	683	Advanced Puppetry	4
THDA	721	Education Through Dramatization	4
THDA	729	Community-Oriented Drama Programs	4
THDA	760	Teacher Planning for Theatre	4
THDA	799	Capstone Project (must be taken in senior year)	2

\*Students are required to take at least one practicum for every semester they are a major in the Department of Theatre and Dance. In addition, each student must take each type of practicum at least once (Technical, Costume, Performance, Marketing & Promotion). Practicum may be taken for 1 or 0 credits.

#### II. 4 Credits Required from Education

Abbreviation	Course Number	Title	Credits
EDUC	500 / 935**	Exploring Teaching	4

\*\*Must be taken before student teaching internship.

#### B.A. in Theatre with emphasis in Youth Drama

Total: 54-62 Credit Hours

#### III. 24 Credits Required from Education

Abbreviation	Course Number	Title	Credits
EDUC	700 / 800	Educational Structure & Change	4
EDUC	701 / 801	Human Development & Learning	4
EDUC	703F / 803F	Teaching Science	2
EDUC	703M / 803M	Teaching Elementary Science & Social Studies	2
EDUC	705 / 805*	Alternative Perspectives on Nature of Education	4
EDUC	706 / 806*	Introduction to Reading Instruction	4
EDUC	751A / 851A	Educating Exceptional Learners: Elementary	4

\*Must be taken before student teaching internship.

#### IV. Four Credits From Math Education\*\*

Abbreviation	Course Number	Title	Credits
MATH	601 or 602	Exploring Mathematics for Teachers I or II	4
MATH	621	Number Systems for Teachers	4

MATH	622	Geometry for Teachers	4
MATH	623	Topics in Mathematics for Teachers	4
MATH	703	Teaching of Mathematics, K-6	4
MATH	910	Teaching Elementary School Mathematics	4
EDUC	741 / 841	Exploring Mathematics for Young Children	4

\*May be taken at the undergraduate level or the graduate level.

\*\*Must be taken before student teaching internship.

### **B.A. in Theatre plus undergraduate coursework toward the M.Ed. in Elementary Education**

#### **Total Up To 90 Credit Hours**

#### **Minor in Theatre and Dance**

A minor acknowledges a level of competence and academic focus without the depth a major requires. Students may pursue a minor while majoring in another subject when the demands of that major prevent the possibility of a double major.

#### **General Minor in Theatre**

The general theatre minor provides the broadest overview of the discipline, allowing students to create their course of study by exploring theory and technique classes from acting, design and theatre technology, and history.

Contact David Kaye, 862-0667, [djk@unh.edu](mailto:djk@unh.edu).

#### **I: 8 Credits From**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
THDA	435	Introduction to Theatre	4
THDA	442	Introduction to the Art of Acting	4

#### **II. 4 Credits from Theory/History**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
THDA		Choose from section II of General Theatre Major Requirements	4

**III. 4 Credits from Design/Theatre Technology**

Abbreviation	Course Number	Title	Credits
THDA		Choose from section III of General Theatre Major Requirements	4

**IV. 4 Credits from any THDA Course**

Abbreviation	Course Number	Title	Credits
THDA		Choose from any THDA course	4

**Total: 20 Credit Hours****Dance Minor**

Students completing the dance minor demonstrate a basic knowledge in the two areas of dance learning, technique and nontechnique courses. A student will minor in dance to keep open the option of pursuing a career in dance by maintaining a level of dance skill.

Contact Larry Robertson, 862-3032, [collarrob@yahoo.com](mailto:collarrob@yahoo.com).

**I. Up to 16 Credits**

Abbreviation	Course Number	Title	Credits
THDA	462	Ballet I	4
THDA	562	Ballet II	2
THDA	662	Ballet III	2
THDA	463	Theatre Dance I	4
THDA	563	Theatre Dance II	2
THDA	663	Theatre Dance III	2
THDA	665	Aerial Dance	2
THDA	597	Dance Theatre Performance	2
THDA	576	Pointe	2

**II. At Least 4 Credits Required**

Abbreviation	Course Number	Title	Credits
THDA	487	The Dance	2-4

THDA	633	Dance Composition	4
THDA	684	Special Topics	2-4
THDA	732	Choreography	4
THDA	786	Dance Pedagogy	4

**Total: 20 Credit Hours**

### **Musical Theatre Minor**

The musical theatre minor offers the student basic knowledge of the history and canon of this uniquely American art form while providing for hands-on experience in both singing and dancing.

Contact David Kaye, 862-0667, [djk@unh.edu](mailto:djk@unh.edu).

#### **I. 8 Credits Required**

Abbreviation	Course Number	Title	Credits
THDA	450	History of Musical Theatre in America	4
THDA	655	Musical Theatre Scene Study	4

#### **II. 6 Credits from**

Abbreviation	Course Number	Title	Credits
THDA	463	Theatre Dance I	4
THDA	563	Theatre Dance II	2
THDA	663	Theatre Dance III	2

#### **III. 8 Credits Required**

Abbreviation	Course Number	Title	Credits
THDA	755	Advanced Musical Theatre	4
THDA	756	Producing & Directing the Musical	4

**Total: 22 Credit Hours**

### **Youth Drama Minor**

The youth drama minor is ideal for those who wish to explore the dramatic arts. Anyone with an

interest in theatre for young audiences, either in acting or as a way to augment teaching strategies with activated and arts-infused methodology, would benefit from this minor.

Contact Raina Ames, 862-3044, [raina.ames@unh.edu](mailto:raina.ames@unh.edu).

### I. 24 Credits Required

Abbreviation	Course Number	Title	Credits
THDA	520	Creative Drama	4
THDA	583	Introduction to Puppetry	4
THDA	622	Storytelling, Story Theatre & Involvement Drama	4
THDA	624	Theatre for Young Audiences	4
THDA	683	Advanced Puppetry	4
THDA	721	Education Through Dramatization	4

**Total: 24 Credit Hours**

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## Women's Studies (WS) ▼

» <http://www.unh.edu/womens-studies/>

» [Click to view course offerings](#)

*Coordinator:* Marla A. Brettschneider

*Professor:* Marla A. Brettschneider

*Associate Professor:* Carol B. Conaway

*Affiliate Associate Professor:* Mary M. Moynihan

*Assistant Professor:* Courtney Marshall

*Affiliate Assistant Professor:* Sharon Gershoni, Christine W. Saltzberg

*Affiliate Faculty:* Lesley Curtis, Jane Stapleton

*Lecturer:* Joelle Ryan

*Core Faculty:* Victoria L. Banyard, Jennifer L. Borda, Diane P. Freedman, Robin Hackett, Marc W. Herold, Lori Hopkins, Delia C. Konzett, Janet L. Polasky, Mary E. Rhiel, Juliette M. Rogers, Christine W. Saltzberg, Judy Sharkey, Sarah M. Stitzlein, Reginald A. Wilburn



Women's studies provides students with an understanding of the status of women and gender roles in various cultures and historical eras. Students learn the use of gender as a category of analysis, and increase their knowledge of women's contributions to many fields and the roles gender plays in them. Women's studies courses offer students critical perspectives on such basic questions of the social order as assumptions about gender roles and gender identity and the ways cross-cutting phenomena such as racism, heterosexism, ableism, and ageism are a part of them.

A major or minor in women's studies prepares students for careers where the changing roles of women, and gender more broadly, have a perceptible impact. Women's studies graduates go on to law school and graduate school in a variety of disciplines. Some have taken positions with social change or family service agencies, while others have found work in such fields as politics, communications, community organizing, education, affirmative action, healthcare, and personnel.

### ***Women's Studies Major***

For the women's studies major, students must complete 40 credits of women's studies courses (or 32 in the case of a second major) with grades of C- (1.67) or better and an overall grade-point average of 2.0 or better. These courses must include the following three: 1) WS 401, Introduction to Women's Studies, and/or WS 405: Gender, Power, and Privilege, normally taken at the beginning of the course sequence; 2) WS 632, Feminist Thought; and 3) a 700-level WS-designated course (for instance, WS 795, 796, 797, 798, or 799). Electives are chosen in consultation with a faculty adviser principally from other women's studies courses, including WS 505 (Survey in Women's Studies) and cross-listed departmental offerings. Students must take at least half of their courses at the 600 level and above to complete the major and at least half of their courses must be WS-designated classes. A maximum of two 400-level courses may count toward the major. The Discovery Program capstone requirement may be fulfilled by completing one of the following: WS 796, WS 797, or WS 798.

*Departmental offerings include the following courses offered by other UNH departments:*

ARTS 690, Women Artists of the Nineteenth and Twentieth Centuries

CMN 567, Gender, Race, and Class in the Media

CMN 583, Gender and Expression

ECON 698, Topics: Women in Economic Development

ECON 698, Topics: Consumption

EDUC 507, Mentoring Adolescents

ENGL 585, Introduction to Women in Literature

ENGL 685, Women's Literary Traditions

ENGL 785, Major Women Writers  
ENGL 798, Special Studies: LGBT Writing, Queer Reading  
FS 545, Family Relations  
FS 757, Race, Class, Gender, and Families  
GERM 520, Women in German Literature and Society  
GERM 524, Topics in German Film  
HIST 565, Women in Modern Europe  
HIST 566, Women in American History  
HIST 600, Advanced Explorations: The History of Childhood  
HIST 665, Themes in Women's History  
HUMA 401, Intro: Sex and Love in Literature and Philosophy  
NURS 595, Women's Health  
POLT 525, Multicultural Theory  
POLT 721, Feminist Political Philosophy  
PHIL 510, Philosophy and Women  
PSYC 571, Pioneers of Psychology  
PSYC 711, Psychology in 20th Century Thought and Society  
PSYC 763, Community Psychology  
SOC 630, Sociology of Gender  
SW 697, Special Topics: Practice with GLBT People

Students may also select from other courses that are offered as special topics by the departments. In the past, such offerings have included the following: ANTH 697, Women in the Middle East; CMN 616, Women and Film; FREN 525, French Women: Subject and Object; POLT 797, Queer Gender Theory.

Electives must be distributed between upper (600 and 700) and lower (400 and 500) level courses; no more than four electives may be from the same department. No fewer than five courses should be taken at the upper level (for a first major). Strongly recommended are a practicum or internship course, and courses that focus on women of color, cross-cultural, and queer perspectives.

Candidates for a degree must satisfy all of the University Discovery Program requirements in addition to satisfying the requirements of each individual major program. Bachelor of arts candidates must also satisfy the foreign language proficiency requirement.

Women's studies majors may use up to two major courses to satisfy both major requirements and Discovery requirements.

***Women's Studies Minor***

For the women's studies minor, students must complete 20 credits of women's studies courses with a grade of C or better. Courses taken pass/fail may not be used toward the minor. No more than eight credits used to satisfy the requirements for the major may be used for a minor. Students electing the Women's Studies minor must complete WS 401, Introduction to Women's Studies, or WS 405, Gender, Power, and Privilege, and WS 798, Colloquium in Women's Studies, normally taken at the beginning and end of the course sequence, respectively. It may be possible to substitute WS 797, Internships, or WS 796, Capstone Experiences, for WS 798, Colloquium with permission from a women's studies adviser. Additionally, students must complete three other women's studies courses, either program courses or those that are cross-listed with other departments. (For a more complete description of the women's studies minor, see [COLA/Interdisciplinary Programs](#).)

Students who wish to major or minor in women's studies should consult with the coordinator or assistant coordinator, 203 Huddleston Hall, (603) 862-2194.

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### College of Life Sciences and Agriculture

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## Undergraduate Course Catalog 2011-2012

### College of Life Sciences and Agriculture ▼

» <http://www.colosa.unh.edu/>

*Associate Dean:* Kimberly J. Babbitt , Jon M. Wraith

### Introduction ▼

The objectives of the College of Life Sciences and Agriculture (COLSA) are to give students a fundamental education in the biological, natural, and social sciences and to introduce them to the arts and humanities. In addition, advanced technical and professional courses are offered to prepare students for graduate school or entry-level positions in areas concerned with improving the quality of life. Preparation can vary from fundamental studies of cancer cells to community service planning, resource protection to genetic engineering, and molecular biology to biotechnology.

A blend of the basic and applied aspects of life sciences and agriculture, coupled with careful selection of supportive courses ensures graduates develop the background and experiences necessary to be competitive in the job market. Potential employers include federal, state, and local governments; consulting firms; and industrial organizations. Graduates are employed as watershed, soil, and natural resource managers; associates in biomedical and agricultural research laboratories; marketing analysts and extension specialists; nutrition supervisors and environmental regulators; and information educators and communication experts. Community governments employ graduates as service planners and land-use specialists, teachers in traditional education, public health technicians, and urban pest control specialists. Positions are available in private and commercial organizations in production agriculture, food processing, landscaping, agribusiness, sales, and private planning. Graduates may also pursue entrepreneurial careers as greenhouse, nursery, farm, and natural resource managers; or as consultants, arborists, and environmental planners. For those graduates with international aspirations, the Peace Corps and the Foreign Agriculture Service employ farm production experts, soil and water managers, market analysts, agricultural engineers, teachers, plant and animal breeders, and nutrition specialists.

Additionally, COLSA prepares students for advanced study in their chosen field of interest where graduate study is required for attaining their career goals.

## Degrees ▼

The college offers three undergraduate degrees: the bachelor of arts, the bachelor of science, and the bachelor of science in forestry. Some of the courses prescribed in these degree programs partially fulfill the Discovery requirements. Students should see their advisers for specific information.

### General Science Certification

Students majoring in biochemistry, molecular and cellular biology, biomedical science, biology, environmental conservation studies, environmental sciences, forestry, plant biology, wildlife and conservation biology, or zoology may seek certification to teach science at the middle, junior, or high school level.

For further information, contact the coordinator of teacher education in the [Department of Education](#).

### Advising System

A member of the faculty whose area of interest is closely related to the student's is appointed as an adviser to assist the undergraduate in planning his or her academic program. Further advising is also available in the dean's office, Rudman Hall.

### Undeclared Status

Students may select a major upon entering the college or may wait until registration for the sophomore year. Students who are uncertain about choosing a specific major may remain undeclared during their freshman year. In most cases they should take the following courses, after which they should be ready to declare a major:

#### Fall

LSA 400

CHEM 403

BIOL 411

Discovery Program requirement

An introductory course in any department in the college

#### Spring

CHEM 404

BIOL 412

MATH 424B

Discovery Program requirement

Undeclared freshmen should explore possible majors by taking courses in the areas or programs that interest them most. They should talk to faculty, students, and their adviser concerning requirements, job opportunities, etc., in the various programs and should be prepared to declare a major when they register for the first semester of the sophomore year.

### **Combined Programs of Study**

In addition to pursuing a single major, students may combine programs of study as follows (see University Academic Requirements for more information):

Minors: See [University Academic Requirements](#).

Second major: See [University Academic Requirements](#).

Dual-degree programs: See [University Academic Requirements](#).

Student-designed majors: See [Special University Programs](#).

Other combined and interdisciplinary opportunities: See [Special University Programs](#).

### **UNH-EcoQuest New Zealand Study Abroad Program**

The Department of Natural Resources and the Environment offers highly motivated students the opportunity to study abroad through the UNH-EcoQuest New Zealand applied field studies program. Students engage in a unique multidisciplinary, research-oriented program and receive grade-point average credit for a semester abroad. Four fully integrated courses (NR 660, 661, 662, and 663 for 16 credit hours) focus on the ecological, resource management, and conservation and sustainability issues important to the natural environment, economy, and culture of New Zealand. Alternatively, students may participate in a two-course (NR 660, 662 for 8 credit hours) summer session. Contact Donna Dowal, (603) 862-2036.

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### College of Life Sciences and Agriculture

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### College of Life Sciences and Agriculture ▼

» <http://www.colsa.unh.edu/>

### Bachelor of Arts ▼

The bachelor of arts degree is available in plant biology and zoology. Students must accumulate 128 credits, attain a 2.0 cumulative grade-point average, satisfy Discovery requirements, and complete a foreign language requirement (see [University Academic Requirements](#) for specific B.A. language requirements). Check individual departmental listings for specific major requirements and minimum acceptable grades in major courses.

#### Bachelor of Arts

#### Plant Biology

#### Zoology

### Bachelor of Science ▼

The bachelor of science degree is available in all departments or programs except forestry. University requirements are the same as for the bachelor of arts degree, except that a foreign language is not required and minimum acceptable grades may differ in some programs. Check individual departmental or program listings for specific major requirements.

#### Bachelor of Science

#### Biochemistry, Molecular and Cellular Biology

#### Biology

#### Biomedical Science

Medical Laboratory Science

Medical Microbiology

Medical and Veterinary Sciences

#### Community and Environmental Planning

#### Dairy Management

**Ecology, Evolution and Behavior**

**Environmental and Resource Economics**

**Environmental Conservation Studies**

**Environmental Horticulture**

**Environmental Sciences**

Ecosystems

Hydrology

Soil and Watershed Management

**Equine Studies**

Equine Industry and Management

Therapeutic Riding

Equine Science

**Genetics**

Genomics

**International Affairs (Dual Major)**

**Marine, Estuarine and Freshwater Biology**

**Nutrition**

Dietetics

Nutrition and Wellness

Nutritional Sciences

**Plant Biology**

**Tourism Planning and Development**

**Wildlife and Conservation Biology**

**Zoology**

**Bachelor of Science in Forestry ▼**

The bachelor of science in forestry is a professional, designated degree available to students majoring in forestry.

**Bachelor of Science in Forestry**

**Forestry**



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### College of Life Sciences and Agriculture

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- Community Planning
- Green Real Estate
- Marine Biology
- Sustainable Living
- Water Resources Management
- Wetland Ecology

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### College of Life Sciences and Agriculture ▼

» <http://www.colsa.unh.edu/>

#### Agribusiness ▼

The agribusiness minor is designed to provide students in disciplines other than environmental and resource economics training in the economics and management of agricultural and other natural resource business firms. This program prepares students to work for private companies, governmental agencies, or nonprofit, nongovernmental organizations. Students who are interested in operating their own businesses will also find this minor very useful. The courses in the agribusiness minor emphasize the applications of economic and business management principles.

#### Required

EREC 411, Environmental and Resource Economics Perspectives or equivalent

EREC 501, Agriculture and Natural Resource Product Marketing or MKTG 550, Survey of Marketing

EREC 504, Business Management for Natural Resource Firms

EREC 606, Land Economics Perspectives: Uses, Policies, and Taxes

TOUR 700, Marketing Communications Research: Methodological Foundations

For additional information, contact John M. Halstead, Environmental and Resource Economics Program coordinator, 114 James Hall, (603) 862-3914.

#### Animal Behavior ▼

The animal behavior minor is designed for students who are interested in learning more about the mechanisms underlying the behavior of many different types of animals, as well as the reasons why certain behaviors may have evolved. Students interested in the animal behavior minor must complete a total of 20 credits of coursework (approximately five courses), from the list of courses below. Students must receive a grade of C- or better in each of these courses and no more than eight major requirement credits can be counted toward the minor. If a student is interested in using a relevant course that is not included in the following list, they

must seek permission from Dr. Win Watson in the Department of Biological Sciences.

**Required Courses:**

ZOOL 713, Animal Behavior

ZOOL 777, Neurobiology and Behavior

**Elective Courses (must take three, and one must be a psychology course):**

PSYC 512, Psychology of Primates

PSYC 521, Behavior Analysis

PSYC 531, Psychobiology

PSYC 710, Visual Perception

PSYC 720, Animal Cognition

PSYC 731, Brain and Behavior

PSYC 733, Drugs and Behavior

PSYC 735, Neurobiology of Mood Disorders

PSYC 737, Behavioral Medicine

BMS 702, Endocrinology

ZOOL 714, Ecology of Animal Behavior (Shoals)

ZOOL 733, Behavioral Ecology

**Animal Sciences ▼**

A minor in animal sciences consists of 20 credits of animal science courses with a C- or better and a 2.0 grade point average in courses that the minor department approves. A maximum of six credits can be taken at the 400-level. ANSC 405 (Food and Society) cannot be used.

Please contact the Department of Biological Sciences at 603-862-3205 for additional information and questions regarding the minor in animal sciences.

**Community Planning ▼**

Land use and its impact on the quality of life has emerged as a major policy issue in both New Hampshire and New England as a region as well as nationally and globally. Planning is a multi-disciplinary profession that requires professionals who understand both social and natural systems and have command of professional tools required to guide the selection and implementation of alternative approaches compatible with long-term environmental and socio-economic objectives. Students may supplement their major and Discovery Program requirements with specific courses that will enhance their ability to find employment that requires knowledge of planning concepts and tools used in the formulation and implementation

of effective land and resource planning by government agencies, nonprofit organizations and private business firms. Required: 20 hours of credit

**Required:**

*Group I-Theory and practice of planning. (All courses required)*

CEP 415, Community Development Perspectives

CEP 508, Applied Community Development

CEP 614, Fundamentals of Planning (prereq: EREC 411)

*Group II-Tools and applications in planning (Choose one)*

CEP 673, Green Real Estate

NR 724, Resolving Environmental Conflicts and Public Participation

NR 501, Studio Soils (prereq: CHEM 403)

NR 658, Introduction to Geographic Information Systems

SOC 660, Urban Sociology

NR 504, Freshwater Resources

*Group III-Resource Management Theory (Choose one)*

EREC 606, Land Economic Perspectives: Uses, Policies and Taxes (prereq: EREC 411)

EREC 627, Community Economics (prereq EREC 411 or equivalent)

EREC 756, Rural and Regional Economic Development

TOUR 767, Social Impact Development

NR 711, Wetland Ecology and Management (prereq: BIOL 541; NR 703)

For additional information, contact Dr. Mimi Larsen Becker, Community and Environmental Planning Program Coordinator, 134 James Hall.

**Green Real Estate ▼**

The green real estate minor will include the basic fundamentals of real estate (a class which is accredited by the New Hampshire Real Estate Commission). Students will learn about local and regional planning, environmental economics and market forces, and environmental issues as they pertain to real estate. In addition to this, students may choose complementary classes, such as architecture, surveying, land design, soils, wetland delineation, law, etc. Students must complete 18-20 credits totaling five courses, and maintain a 2.0 average or better.

**Required Courses:**

CEP 672, Fundamentals of Real Estate

CEP 673, Green Real Estate

CEP 508, Applied Community Development

**Select two from ONE of the following groups:**

**Green Design and Building (ideal for future architects and builders)**

AM 275, Building Science/Residential Construction

ARTS 455, Introduction to Architecture

CHE 410, Energy and the Environment

CIE 444, Housing, Everyone Needs a Place to Live

CT 223, Introduction to Surveying and Mapping

CT 237, Land Design and Regulations

CT 240, Legal Aspects of Surveying

CT 247, Construction Contracting

CT 281, Architecture I History and Design

**Land Conservation (ideal for future conservation commission members, planners and environmental advocates in general)**

EREC 606, Land Economics Perspectives: Uses, Policies, and Taxes

NR 716, Wetland Delineation (summer offering only)

NR 735, Land Conservation Principles and Practices

NR 785, Systems Thinking for Sustainable Living

**Finance and Law (ideal for future green mortgage lenders and social choice investment portfolio managers. NOTE: Business majors only)**

ACFI 701, Financial Policy

ACFI 702, Investments Analysis

MGT 798, Topics

For more information, contact Kelly Cullen in the Department of Natural Resources and the Environment, (603) 862-4811 or [kelly.cullen@unh.edu](mailto:kelly.cullen@unh.edu).

**Marine Biology ▼**

The minor is designed to provide a foundation in marine biology and related sciences to any UNH undergraduate student with the exception of students majoring in marine, estuarine and freshwater biology. It is offered through the Department of Biological Sciences. The minor consists of 20 credits with grades of C- or better and no pass/fail courses. No more than eight major requirement credits may be used towards the minor. All courses in the program are selected in consultation with the minor adviser (contact Larry Harris, Department of Biological

Sciences).

Students should declare their intention to minor in marine biology before the end of the junior year. During the final term, students should apply to the dean to have the minor shown on their transcript.

**Required**

Five courses (20 credits); two of the five courses (eight credits) can count toward the major.

*Introductory course in Marine Science (choose one):*

ZOOL/PBIO 503, Introduction to Marine Biology

ESCI 501, Introduction to Oceanography

ZOOL 674, Field Marine Science

Four additional courses selected in consultation with the minor adviser.

In addition, students are encouraged to become involved in a research project, either by working in a professor's laboratory or by participating in the Undergraduate Ocean Research Project (TECH 797).

**Sustainable Living ▼**

Issues of sustainable living involve every aspect of life. Humans are part of, and dependent upon, healthy functioning ecosystems. Sustainable living requires learning to live with ecosystem limits. Students increase their knowledge and awareness of environmental issues and problems, study and apply principles of sustainability, and develop thinking and communication skills in order to help solve complex problems and move humanity toward a more sustainable future. The minor consists of 20 credits with grades of C- or better, and no pass/fail courses.

**Required Courses**

1. NR 784, Sustainable Living
2. NR 601, Environmental Conservation and Sustainable Living Internship
3. NR 785, Systems Thinking for Sustainable Living

*4. Environmental Issues - One course below*

NR 415, Global Biological Change

NR 435, Contemporary Conservation Issues and Environmental Awareness

NR 502, Forest Ecosystems and Environmental Change  
NR 701, Ecological Sustainability and Values  
NR 720, International Environmental Politics and Policies for the 21st Century  
NR 724, Resolving Environmental Conflicts  
SOC 565, Environment and Society

*5. Ecology - One course below*

NR 433, Wildlife Ecology  
BIOL 541, General Ecology  
NR 527, Forest Ecology  
NR 660, Ecology and Biogeography of New Zealand  
ZOOLOGY 474, Intro to Marine Science (Shoals Marine Lab)  
ZOOLOGY 503, Intro to Marine Biology  
NR 650, Principles of Conservation Biology

For additional information, contact Robert Eckert, Department of Natural Resources and the Environment, (603) 862-2508 or [r.eckert@unh.edu](mailto:r.eckert@unh.edu)

**Water Resources Management ▼**

Students in biology, environmental conservation studies, forestry, plant biology, wildlife and conservation biology, environmental engineering, environmental and resource economics, community and environmental planning, and related fields should consider a minor in water resources management. There is a strong demand among consulting firms, state and federal agencies, and not-for-profit organizations for persons with knowledge and experience relevant to water resource management.

**Required**

1. NR 504, Freshwater Resources
2. NR 703, Watershed Water Quality Management
3. ESCI 705, Principles of Hydrology

*Choose from the list below for eight additional credits:*

NR 658, Introduction to Geographic Information Systems  
NR 711, Wetland Ecology and Management  
NR 716, Wetland Delineation  
NR 719, Wetlands Restoration and Mitigation  
NR 751, Aquatic Ecosystems  
NR 760, Geographic Information Systems in Natural Resources  
NR 542, Forestland Measurement and Mapping

ESCI 710, Groundwater Hydrology

ZOOL 708, Stream Ecology

ZOOL 717, Lake Ecology

For additional information, contact William McDowell, Department of Natural Resources and the Environment, (603) 862-2249.

### **Wetland Ecology** ▼

Students in biology, environmental conservation studies, forestry, plant biology, environmental sciences, wildlife and conservation biology, and related majors should consider obtaining a minor in wetland ecology. There is a strong demand among consulting firms, and state and federal agencies for employees with knowledge and experience relevant to wetland resource management.

#### **Required**

NR 504, Freshwater Resources or NR 703, Watershed Water Quality Management

NR 711, Wetland Ecology and Management

NR 716, Wetland Delineation or NR 719, Wetlands Restoration and Mitigation, or ZOOL 708, Stream Ecology

#### **Recommended**

PBIO 566, Systematic Botany

PBIO 625, Introduction to Marine Botany

PBIO 722, Marine Phycology

PBIO 747, Aquatic Plants in Restoration, Management and Conservation

GEN 713, Microbial Ecology and Evolution

NR 527, Forest Ecology

NR 765, Community Ecology

NR 751, Aquatic Ecosystems

NR 425, Field Dendrology

NR 501, Studio Soils

NR 602, Natural Resources and Environmental Policy

NR 621, Field Description of Soils

NR 706, Soil Ecology

ZOOL 725, Marine Ecology

For additional information, contact David Burdick, (603) 862-4523, or William McDowell, (603)



862-2249.

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### Departments ▼

The College of Life Sciences and Agriculture is organized into three departments: Biological Sciences; Molecular, Cellular, and Biomedical Sciences; and Natural Resources and the Environment.

#### Department of Biological Sciences

**Majors:** Biology; Dairy Management; Ecology, Evolution & Behavior; Environmental Horticulture; Equine Studies (Equine Industry and Management; Therapeutic Riding; Equine Science); Marine, Estuarine and Freshwater Biology; Neuroscience and Behavior (Animal Behavior; Integrative Neuroscience); Plant Biology; Sustainable Agriculture and Food Systems; Zoology

**Chairperson:** Christopher D. Neefus

**Professors:** William E. Berndtson, John F. Burger, Donald S. Chandler, William A. Condon, Thomas M. Davis, Curtis V. Givan, James F. Haney, Larry Harris, William H. Howell, Leland S. Jahnke, James B. Loy, Arthur C. Mathieson, Subhash C. Minocha, Christopher D. Neefus, Robert L. Taylor, Jr., Winsor H. Watson

**Affiliate Professors:** Ann Bucklin, Clinton J. Dawes, Molly E. Lutcavage, Ron Rompalla, Walter C. Shortle, Kevin T. Smith

**Extension Professors:** Alan T. Eaton, Catherine A. Neil, Jeffrey T. Schloss, Cheryl A. Smith, Stanley R. Swier

**Research Professors:** Raymond E. Grizzle

**Associate Professors:** Alan L. Baker, Patricia D. Bedker, David L. Berlinsky, Jessica A. Bolker, Elizabeth P. Boulton, Peter S. Erickson, James E. Pollard, John M. Roberts, Anita S. Klein

**Affiliate Associate Professors:** James E. Byers, Pingguo He, Richard Langan, Janet Sullivan, John C. Wallace

**Extension Associate Professors:** Rebecca C. Sideman

**Assistant Professors:** André F. Brito, Kirk D. Broders

**Affiliate Assistant Professors:** Jennifer Dijkstra, Michelle Dionne, Kathy J. Soder, Dwight D. Trueblood, Barry J. Wicklow

**Extension Assistant Professors:** Brian A. Krug, Kenneth J. La Valley, Michal Lunak

**Research Assistant Professors:** Elizabeth A. Fairchild, Gregg E. Moore

**Lecturers:** Christina Keim

### **Department of Molecular, Cellular, and Biomedical Sciences**

**Majors:** Biochemistry, Molecular and Cellular Biology; Biomedical Science (Medical Laboratory Science; Medical Microbiology; Medical and Veterinary Sciences); Genetics (Genomics); Nutrition (Nutritional Sciences; Dietetics; Nutrition and Wellness)

**Chairperson:** Rick H. Cote

**Professors:** Thomas E. Brady, Gale B. Carey, Rick H. Cote, Joanne Curran-Celentano, Clyde L. Denis, Wayne R. Fagerberg, Thomas L. Foxall, Thomas M. Laue, Aaron B. Margolin, Thomas G. Pistole, Frank G. Rodgers, Anthony R. Tagliaferro, W. Kelley Thomas, Louis S. Tisa, Paul C. Tsang, Charles W. Walker

**Affiliate Professors:** Steven K. Crawford, John A. McCracken, Stacia A. Sower

**Clinical Professors:** Richard A. French

**Extension Professors:** Deborah Luppold, Catherine A. Violette

**Research Professors:** Michael P. Lesser, Vernon N. Reinhold

**Associate Professors:** Dennis J. Bobilya, John J. Collins, Vaughn S. Cooper, Eleanne S. Dowd, Estelle M. Hrabak, Colette Janson-Sand, Andrew P. Laudano, David H. Townson

**Affiliate Associate Professors:** Arthur F. Stucchi

**Clinical Associate Professors:** Mary Katherine Lockwood, Ruth A. Reilly

**Assistant Professors:** Feixia Chu, Cheryl A. Whistler

**Affiliate Assistant Professors:** Dean R. Elder, Bo R. Rueda, John A. Ryan, Deena Small,

Gary B. Smejkal, Nathan L. Smith, James A. Sulikowski

**Clinical Assistant Professors:** Joanne D. Burke, Barry J. Corriveau, Michelle Fleetwood, Adele J. Marone, Alice D. Roudabush, Inga F. Sidor, Elise R. Sullivan

**Research Assistant Professors:** Kevin M. Culligan, Jennifer A. Durant, Dennis E. Mathews

**Lecturers:** Joyce R. Stone, Jesse S. Morrell

### **Department of Natural Resources and the Environment**

**Majors:** Community and Environmental Planning; Environmental Conservation Studies; Environmental and Resource Economics; Environmental Sciences (Ecosystems; Soil and Watershed Management; Hydrology [CEPS]); Forestry; Tourism Planning and Development; Wildlife and Conservation Biology

**Chairperson:** John M. Halstead

**Professors:** John D. Aber, Kimberly J. Babbitt, John E. Carroll, Russell G. Congalton, Mark J. Ducey, Robert T. Eckert, Lyndon E. Goodridge, John M. Halstead, Theodore E. Howard, Bruce E. Lindsay, John A. Litvaitis, Marianne K. Litvaitis, William W. Mautz, William H. McDowell, Peter J. Pekins, Barrett N. Rock; Andrew A. Rosenberg, James T. Taylor, Jon M. Wraith

**Affiliate Professors:** Christopher Eagar, Jeffrey E. Gove, George C. Hurtt, Jeffrey S. Kahl, William B. Leak, Changsheng Li, Rakesh Minocha, Lawrence J. Prelli

**Extension Professors:** Karen P. Bennett, Julia M. Peterson, Michael R. Sciabarrasi, Sarah S. Smith

**Research Professors:** Fredrick T. Short

**Associate Professors:** Heidi Asbjornsen, Mimi L. Becker, Kelly L. Cullen, Serita D. Frey, Paul C. Johnson, Thomas D. Lee, Alberto B. Manalo, Douglas E. Morris, Scott V. Ollinger, Robert A. Robertson

**Affiliate Associate Professors:** Andrew B. Cooper, Linda S. Heath, Herman A. Karl, Peter A. Maddison

**Extension Associate Professors:** Charles A. French, Matthew D. Tarr

**Research Associate Professors:** David M. Burdick, Stephen H. Jones

**Assistant Professors:** A. Stuart Grandy, Richard G. Smith, Wilfred M. Wollheim

**Affiliate Assistant Professors:** Matthew Baber, Ria Brejaart, John L. Campbell, Richard A.

Hallett, Joel N. Hartter, Erik A. Hobbie, Christopher Longson, William Maddocks, Mary E. Martin, Irina Trubetskova, Bruce S. Wildblood-Crawford; Mariko Yamasaki

**Research Assistant Professors:** Adrienne I. Kovach

**Lecturers:** Mary A. Friedman

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Behavior
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- Environmental  
Horticulture
- Environmental  
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- Forestry
- Genetics
- International Affairs  
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- Marine, Estuarine and  
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- Neuroscience and  
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- Nutrition
- Plant Biology
- Sustainable Agriculture  
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- Wildlife and  
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## Undergraduate Course Catalog 2011-2012

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### Animal Sciences (ANSC) ▼

» <http://www.animalsci.unh.edu/>

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*Professor:* William E. Berndtson, William A. Condon, Thomas L. Foxall, Robert L. Taylor Jr.,  
Paul C. Tsang

*Associate Professor:* Patricia D. Bedker, Peter S. Erickson, David H. Townson

*Clinical Professor:* Richard A. French

*Clinical Assistant Professor:* Alice D. Roudabush, Inga F. Sidor

*Lecturer:* Christina Keim

Courses required for the degree programs equine studies and dairy management are listed under animal sciences (ANSC).

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### Biochemistry, Molecular and Cellular Biology (BMCB) ▼

» <http://www.bmcb.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Thomas E. Brady, Richard H. Cote, Clyde L. Denis, Wayne R. Fagerberg, Thomas L. Foxall, Thomas M. Laue, Charles W. Walker

*Research Professor:* Vernon N. Reinhold

*Affiliate Professor:* Stacia A. Sower

*Associate Professor:* Estelle M. Hrabak, Andrew P. Laudano, David H. Townson

*Assistant Professor:* Feixia Chu

*Research Assistant Professor:* Kevin Culligan, Jennifer Durant

»Click to view faculty participating in the program [<http://www.bmcb.unh.edu/faculty>]

The field of biochemistry, molecular and cellular biology (BMCB) encompasses a broad range of the life sciences, from biophysics and biochemistry to applied biology and medicine. The B.S. in biochemistry, molecular and cellular biology is based on a solid foundation in biology, chemistry, physics and math, along with advanced courses in molecular biology, biochemistry, cell biology, and genetics. Our program offers specialized training in the areas of molecular genetics, gene regulation, cellular structure and function, cancer biology, endocrinology, macromolecular interactions, glycobiology, and lipid metabolism. BMCB students are highly-motivated and seek exposure to cutting-edge techniques and “hands-on” experience through laboratory- and research-based opportunities. Our graduates are “profession-ready” people who are well-prepared for entry-level positions in the health care and biotechnology industries, for graduate education, and for post-baccalaureate professional programs (i.e., medical school, veterinary school, dental school, etc.).

Our curriculum provides most of the required and recommended courses for students seeking admission to graduate schools and to professional schools in medicine, dentistry, veterinary medicine, and pharmacy. Students who major in BMCB can also use their training in conjunction with advanced degrees in law and business. Students obtaining the B.S. in BMCB enjoy excellent job prospects immediately upon graduation. There is currently a demand for skilled research technicians in biotechnology companies, pharmaceutical companies, government agencies, forensics, academic research laboratories, and hospitals. Our graduates also have knowledge that is valuable in the fields of management, sales, marketing, regulatory affairs, technical writing, and scientific journalism. With additional courses in education, the B.S. in biochemistry, molecular and cellular biology also qualifies graduates to teach at the elementary, junior high, and high school levels.

Faculty participating in the BMCB major combine a passion for teaching and student advising with strong research expertise in their chosen discipline. BMCB faculty are committed to providing independent research experiences for undergraduate students, and many faculty have well-funded research programs utilizing state-of-the-art equipment and techniques. On-campus research facilities that students can use to enhance their research experience include the Hubbard Center for Genome Studies, the Center to Advance Molecular Interaction Science, and the Center for Comparative and Molecular Endocrinology, among others.

## **Bachelor of Science in Biochemistry, Molecular and Cellular Biology**

Students majoring in BMCB must take: i) five BMCB core courses; ii) three major elective courses chosen from an extensive list; iii) four bioscience core courses; and iv) eight foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. In addition, courses for the **Discovery Program** and the **University Writing Requirement** must be completed. For a detailed list of curriculum requirements, go to the biochemistry, molecular and cellular biology homepage.

### **BMCB Core Courses**

Opportunities in Biochemistry, Molecular & Cellular Biology (1 sem)

Genetics of Prokaryotic Microbes, or Molecular Genetics (1 sem)

Principles of Biochemistry (2 sem)

Cell and Developmental Biology (1 sem)

### **BMCB/Biology Major Electives**

One laboratory techniques course and two other major elective courses in the areas of cell biology, biochemistry, molecular biology, genetics, biomedical sciences and health issues.

### **Bioscience Core Courses**

Biology w/laboratory (2 sem)

Microbiology w/laboratory (1 sem)

Genetics (1 sem)

### **Foundation Courses**

General Chemistry w/laboratory (2 sem)

Organic Chemistry w/laboratory (2 sem)

Calculus (1 sem)

Statistics (1 sem)

Physics w/laboratory (2 sem)

### **Pre-Professional Health Programs**



Students interested in postgraduate careers in the health care professions should visit the Pre-Professional Health Programs Advising Office online ([www.unh.edu/premed-advising](http://www.unh.edu/premed-advising)) or in person (Hood House, Room 102). Requirements for specific professional schools (e.g., medical, dental, physician's assistant, pharmacy, etc.) are provided at <http://www.unh.edu/premed-advising/hlthprof.htm>. Students interested in veterinary medicine should consult the Pre-Veterinary Medicine Program website. While many of the prerequisite courses required by professional schools are also requirements of the BMCB major, you should consult with your faculty advisor to create a plan of study that best prepares you for pursuing a career in one of these health professions.

### **Minor in Biochemistry, Molecular and Cellular Biology (BMCB)**

Students who wish to develop focused competencies in biochemistry, molecular biology, and/or cell biology can complement their major academic program with a minor in Biochemistry, Molecular, and Cellular Biology (BMCB). The general requirements for completion of a minor can be found in the [Minor section](#) of the Undergraduate Catalog. Specific courses that fulfill the requirements for the BMCB minor can be found at <http://www.bmc.unh.edu/Minor>. The intent to complete a minor in BMCB should be communicated by the end of the junior year.

During the final semester, students should file the Certification of Completion of Minor in order to have the minor shown on the academic record. For additional information on the BMCB minor, contact the Undergraduate Program Coordinator, Professor David Townson ([dave.townson@unh.edu](mailto:dave.townson@unh.edu)).

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### **Biology (BIOL) ▼**

» <http://www.biology.unh.edu/>

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*Professor:* William E. Berndtson, John F. Burger, Donald S. Chandler, William A. Condon, Wayne R. Fagerberg, Curtis V. Givan, Larry G. Harris, Subhash C. Minocha, Christopher D. Neefus, Winsor H. Watson III

*Affiliate Professor:* Stacia A. Sower

*Associate Professor:* Alan L. Baker, Patricia D. Bedker, David L. Berlinsky, David H. Townson

*Research Associate Professor:* Stephen H. Jones

*Affiliate Associate Professor:* Janet R. Sullivan

*Research Assistant Professor:* Adrienne I. Kovach, Gregg E. Moore

*Affiliate Assistant Professor:* Erik A. Hobbie

*Extension Assistant Professor:* Kenneth J. LaValley

The biology program is designed to provide a strong, broad background in biological sciences to students interested in education in the life sciences. The biology program integrates theoretical and practical (hands-on laboratory and field work) courses in different aspects of the biology of animals, microbes, and plants. The curriculum is designed to reflect the diversity of the biological systems in nature. It encompasses the study of structural and functional relationships of living organisms at the molecular, cellular, and organismal level; the interactions of the living systems with the environment and with each other; and the evolutionary relationships of various forms of life. The goal is to create a facilitative environment for those with a scholarly interest in the biological sciences, and to extend their understanding, awareness, and appreciation of the diversity of the biological sciences.

The program is aimed at promoting excellence in biological science education by involving undergraduate students in strong interaction with faculty both in the classroom and research laboratories, and encouraging the development of quality undergraduate programs in all aspects of biology.

The biology program prepares students for graduate work in the biological, medical, and agricultural sciences, and for job opportunities in industry (biomedical, pharmaceutical, agrochemical, environmental, and biotechnological) and governmental research, secondary school teaching or a general education about living organisms. Completion of the four-year undergraduate program plus a fifth-year internship will be necessary for biology teaching certification. Students who plan to enter medical, dental, or related professional schools are advised to confer with their faculty adviser to build the requirements for these programs into their academic majors.

Courses in the biology program are selected from departments that constitute the biological sciences community at UNH. The flexibility of the curriculum allows students wide selection of courses in various departments. Students in the major take a biology core curriculum involving introductory and upper level courses. They must also take ten additional courses in the biological sciences, eight of these must be selected from course lists in three broad categories.

While students are advised to declare the biology major as incoming first-year students to assure adequate program planning, transfer into the program at a later stage is also possible. Since several of the other biological sciences majors share the same biology core curriculum, it is quite easy to change to or from other biological sciences majors.

### ***Academic Requirements***

To receive the B.S. degree in biology, students must complete 128 credit hours with a 2.0 cumulative grade-point average. Courses must include all UNH Discovery Program requirements, biology core curriculum requirements, plus ten additional courses from the biological sciences. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C- is required in all biological science courses that are counted towards the requirements for a degree in biology. The only exception is that a passing grade below a C- will be accepted in a student's first biology course (BIOL 411 or 412). Students who expect to compete successfully for post-baccalaureate programs should attain a cumulative GPA of 3.0 or higher by the end of the sophomore year and maintain it at that level.

### ***Biology Core Curriculum***

The biology courses in the core curriculum constitute an integrated sequence of courses imparting basic skills and concepts of biology to expose students to the breadth of knowledge inherent in the biological sciences. The biology core allows a student to obtain a broad background in biology and related physical sciences and math.

### ***Biology Core Curriculum Courses***

BIOL 400, Professional Perspectives on Biology<sup>1</sup>  
 BIOL 412, Introductory Biology: Evolution, Biodiversity and Ecology  
 BIOL 411, Introductory Biology: Molecular and Cellular  
 BIOL 541, General Ecology  
 BMS 503, General Microbiology  
 GEN 604, Principles of Genetics  
 CHEM 403 & 404, General Chemistry  
 CHEM 545/546 Organic Chemistry and BMCB 658/659, General Biochemistry, or CHEM 651/653 and CHEM 652/654, Organic Chemistry<sup>2,3</sup>  
 MATH 424B, Calculus for Life Sciences or 425, Calculus I  
 BIOL 528, Applied Biostatistics I, or BIOL 555, Experimental Design and Analysis Lab  
 PHYS 401 and 402, Introduction to Physics  
 ENGL 501, Introduction to Creative Nonfiction, or equivalent<sup>3</sup>  
 EDUC 500, Exploring Teaching<sup>4</sup>

Typically, students take BIOL 400; BIOL 412 & 411; CHEM 403-404; and MATH 424B in the

first year, and then complete the remainder of their core requirements during the sophomore and junior years.

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<sup>1</sup>BIOL 400 is required only for first-year biology majors.

<sup>2</sup>The sequence CHEM 545/546-BMCB 658/659 is preferred to CHEM 651/653-652/654, for Biology Majors, except for those who are pre-medical or pre-health profession students.

<sup>3</sup>CHEM 651/653 and 652/654 and ENGL 501 are required for pre-medical or affiliated professional programs.

<sup>4</sup>Required only for those preparing for teacher certification.

### ***Biology Electives***

In addition to the biology core curriculum, students must complete 10 biology elective courses. Eight of the 10 courses are to be selected from courses listed in three categories/disciplines; the other two can come from the category lists or can be any other biological sciences course with approval of the student's adviser. The eight selected courses should include at least two from each of the three categories and must include two animal courses, two plant courses, and one microbe course. A complete list of approved courses in each category/discipline is available from the student's adviser, the Department of Biological Sciences office, and the biology website at [biology.unh.edu](http://biology.unh.edu). Co-requisite lecture and lab courses count as one course. Courses listed in more than one category will satisfy requirements in only one category. All UNH students must take four writing intensive courses and one must be in their major.

*Note:* It is strongly recommended that students participate in an exchange semester at another university or in a field-oriented program or internship. There are many exchange opportunities available in which a full semester of credits toward the major may be earned. In addition, students should explore the courses at the Shoals Marine Laboratory (SML), which provides an excellent setting for several "field-oriented" courses during the summer. Often there is financial support available for the SML programs (see the SML website for details ([www.shoals.unh.edu](http://www.shoals.unh.edu)) or the Cornell website at [www.sml.cornell.edu](http://www.sml.cornell.edu)). It is further recommended that students explore possibilities of one or more semesters of independent investigation (research projects). For details, students should contact their adviser. Financial support is available for most of these programs.

One 600, 795, or 796 experience totaling three or more credits or any two 795-796 experiences of two credits each can fulfill one course requirement in any category with adviser approval. A Petition for Academic Variance approved by the chair of the Department of Biological Sciences is required to count 795-796 experiences for more than one major required course. Students

should check the biology website ([biology.unh.edu](http://biology.unh.edu)), and the UNH online catalog for updates and current course offerings.

### ***Prehealth Professional Program***

Students who wish to pursue postgraduate degrees in the health care professions should visit the premedical advising office in Room 102, Hood House for additional information on requirements for specific professional schools. Call (603) 862-2064 or visit the program's web page at [www.unh.edu/premed-advising](http://www.unh.edu/premed-advising). The following elective courses will be helpful in preparing for admission to post-baccalaureate programs in the health professions and for their required aptitude examinations: BMS 702, ZOO 518, ZOO 625/626, BMB 605, BMB 751/752, ANSC 511/512.

### ***Biology Teacher Certification and General Science Certification***

Biology teacher certification for students preparing to teach high school biology may be obtained through the Department of Education's five-year, undergraduate-graduate degree program. Students are required to take EDUC 500 (preferably in the sophomore year), earn a bachelor's degree in one of the biological sciences, and complete a fifth year, which includes an internship and coursework leading to a master's degree in education. General science certification for students preparing to teach science in middle and junior high schools can be obtained through the Department of Education's general science certification program. For further information, see education, or contact the Department of Education's teacher education coordinator.

### ***Biology Minor***

A biology minor may be earned by completing the following requirements: 1) BIOL 411-412 or PBIO 412 and ZOO 412; 2) one course from each of the three major organism groups: a) animal/zoology courses, b) microbiology courses, and c) plant biology courses; 3) two additional biological science courses at the 600-700 level.

Students interested in a biology major or minor should contact the Department of Biological Sciences, (603) 862-3205.

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## **Biomedical Science (BMS) ▼**

» <http://www.biomedical.unh.edu/>

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*Professor:* Thomas L. Foxall, Aaron B. Margolin, Thomas G. Pistole, Frank G. Rodgers, Paul C. Tsang

*Clinical Professor:* Richard A. French

*Clinical Associate Professor:* Mary Katherine Lockwood

*Clinical Assistant Professor:* Barry Corriveau, Michelle Fleetwood, Adele Marone, Alice D. Roudabush, Inga F. Sidor, Elise R. Sullivan

*Lecturer:* Joyce R. Stone

»Click to view faculty participating in the program [<http://www.biomedical.unh.edu/faculty>]

### **Biomedical Science (BMS)**

Biomedical science lies at the interface between biology-based science and the application of medicine and veterinary medicine. With the complexity of 21<sup>st</sup> century human and animal healthcare, the biomedical sciences have become increasingly sophisticated and involve a wide variety of disciplines that study all aspects of life processes. The biomedical sciences have as primary objectives the development and application of bioscience to the diagnosis and prevention of disease, to the development of treatments and to the monitoring and promotion of health and wellness in both humans and animals.

The biomedical science (BMS) major at UNH encompasses three options: medical laboratory sciences (MLS), medical microbiology (MM), medical and veterinary sciences (MVS). These options possess diverse curricula but are linked by their common interests in the disciplines of medical and veterinary sciences. Students are attracted to these options by a profound interest in human and animal physiology and diseases. Each of the options in the BMS degree is based on solid foundations in biology, chemistry, physics and math, along with advanced courses in laboratory-based disciplines, mechanisms of disease induction, and therapy, as well as courses dealing with structure and function of diseased and non-diseased states. For descriptions of each option and their curricular details, visit [www.biomedical.unh.edu](http://www.biomedical.unh.edu).

Biomedical science is a dynamic profession with excellent long-term career prospects in research, clinical practice, education, management, and laboratory-based disciplines. At UNH the BMS curriculum provides graduating students with the required and recommended courses for admission to graduate school and the professional schools of medicine, veterinary medicine, dentistry, and pharmacy, as well as to physician assistant and pathology assistant programs. With the current high demand for skilled biomedical scientists as research technicians in biotechnology companies, pharmaceutical companies, government agencies, forensics, academic research laboratories, and hospitals, BMS majors also enjoy excellent job

prospects immediately upon graduation. BMS graduates also have a knowledge base that is valuable in the fields of sales, marketing, regulatory affairs, technical writing, patent law, and scientific journalism. With additional courses in education, the B.S. in biomedical science also qualifies graduates to teach at the elementary, junior high, and high school levels.

Faculty participating in the BMS curriculum have expertise in a variety of areas of biomedical science, including infectious diseases, veterinary pathology, virology, disease mechanisms, laboratory medicine, and treatment. The biomedical science faculty strongly encourage students to complement their academic courses with experiential learning opportunities through internships, field experience, and independent research projects conducted with biomedical research faculty on campus. State-of-the-art facilities include a fully equipped BSL-2 teaching facility that permits students to work in biosafety cabinets. The New Hampshire Veterinary Diagnostics Laboratory (NHVDL) provides unique opportunities for students interested in veterinary medicine and pathobiology to work alongside veterinary pathologists in the diagnostic laboratories.

### ***Biomedical Science: Medical Laboratory Sciences (MLS) Option***

The medical laboratory sciences (MLS) program at UNH is NAACLS accredited and follows accreditation requirements. Students in this option take six required MLS core courses, five major elective courses, five bioscience core courses, and four foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). A grade of C- or above is required in courses within the major. For a detailed list of curriculum requirements, visit the biomedical science homepage. In addition, all other university academic requirements for the [Discovery Program](#) and the [University Writing Requirement](#) must be completed.

### **BMS-MLS Core Courses**

Introduction to Biomedical Science Careers (1 sem)

Pathogenic Microbiology w/lab (1 sem)

Clinical Immunology and Serology w/lab (1 sem)

Body Fluids w/lab (1 sem)

Molecular Diagnostics (1 sem)

Mycology/Parasitology/Virology w/lab (1 sem)

### **BMS-MLS Major Electives**

A total of five unique courses from a range of subject areas that includes histology, pathology,

microbiology, phlebotomy, immunology and serology, hematology, or medical biochemistry.

### **Bioscience Core Courses**

Anatomy and Physiology w/lab (2 sem)

Microbes in Human Disease or General Microbiology w/lab (1 sem)

Principles of Genetics (1 sem)

General Biochemistry w/lab (1 sem)

### **Foundation Courses**

General Chemistry w/lab (2 sem)

Organic Chemistry w/lab (1 sem)

Statistics (1 sem)

### ***Biomedical Science: Medical Microbiology (MM) Option***

Students in the medical microbiology (MM) option take three required MM core courses, six major elective courses, five bioscience core courses, and seven foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). A grade of C- or above is required in offerings within the major. For a detailed list of curriculum requirements, visit the biomedical science homepage. In addition, all other university academic requirements for the [Discovery Program](#) and the [University Writing Requirement](#) must be completed.

### **BMS-MM Core Courses**

Introduction to Biomedical Science Careers (1 sem)

Pathogenic Microbiology w/lab (1 sem)

Immunology w/lab (1 sem)

### **BMS-MM Major Elective Courses**

A total of five unique major elective courses is required. At least one course must be taken in each of the following groups: host-microbe interactions, microbial systems, and community systems. Three additional courses are taken either from these groups or as approved by the faculty, including the capstone course/experience.

### **Bioscience Core Courses**

General Biology w/lab (2 sem)



General Microbiology w/lab (1 sem)

Principles of Genetics (1 sem)

General Biochemistry w/lab (1 sem)

### **Foundation Courses**

General Chemistry w/lab (2 sem)

Organic Chemistry w/lab (1 sem)

Calculus (1 sem)

Biostatistics (1 sem)

Physics w/lab (2 sem)

### ***Biomedical Sciences: Medical and Veterinary Sciences (MVS) Option.***

Students in the medical and veterinary sciences (MVS) option take three MVS core courses, seven MVS major elective courses, five bioscience core courses, and eight foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). A grade of C- or above is required in courses within the major. For a detailed list of curriculum requirements, visit the biomedical science homepage. In addition, all other university academic requirements for the **Discovery Program** and the **University Writing Requirement** must be completed.

### **BMS-MVS Core Courses**

Introduction to Biomedical Science Careers (1 sem)

Anatomy and Physiology w/lab (2 sem)

### **BMS-MVS Major Elective Courses**

A total of seven unique major elective courses are required. At least two courses must be taken in each of the following subject areas: biomedical systems, pathobiology and disease, and health and environmental issues. One additional course is taken from the entire set of approved major elective courses that include dairy management, histology, endocrinology, physiology, microbiology, cell biology and public health.

### **Bioscience Core Courses**

General Biology w/lab (2 sem)

General Microbiology w/lab (1 sem)

Principles of Genetics (1 sem)

General Biochemistry w/lab (1 sem)

### **Foundation Courses**

General Chemistry w/lab (2 sem)

Organic Chemistry w/lab (2 sem)

Calculus (1 sem)

Biostatistics (1 sem)

Physics w/lab (2 sem)

### **Pre-Professional Health Programs**

Students interested in postgraduate careers in the health care professions should visit the Pre-Professional Health Programs Advising Office online ([www.unh.edu/premed-advising](http://www.unh.edu/premed-advising)) or in person (Hood House, Room 102). Requirements for specific types of professional schools (e.g., medical, dental, physician's assistant, pharmacy, etc.) are provided at <http://www.unh.edu/premed-advising/hlthprof.htm>. Students interested in veterinary medicine should consult the Pre-Veterinary Medicine Program website. While many of the prerequisite courses required by professional schools are also requirements of the Biomedical Science major, you should consult with your faculty advisor to create a plan of study that best prepares you for pursuing a career in one of these health professions.

### **Minor in Biomedical Science (BMS)**

Students who wish to develop focused competencies in the broad area of the biomedical sciences can complement their major academic program with a minor in Biomedical Science (BMS). The general requirements for completion of a minor can be found in the [Minor section](#) of the Undergraduate Catalog. Courses that fulfill the requirements of the BMS minor and groups from which they must be selected can be found at <http://www.biomedical.unh.edu/Minor/BMSminor>. The intent to complete a minor in BMS should be communicated by the end of the junior year. During the final semester, students should file the Certification of Completion of Minor in order to have the minor shown on the academic record. For additional information on the BMS minor, contact the Undergraduate Program Coordinator, Professor Frank Rodgers ([frank.rodgers@unh.edu](mailto:frank.rodgers@unh.edu)).

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## Community and Environmental Planning (CEP) ▼

» <http://www.plan.unh.edu/>

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*Professor:* Robert T. Eckert, John M. Halstead, Bruce E. Lindsay

*Associate Professor:* Mimi Larsen Becker, Kelly L. Cullen, Robert A. Robertson

*Lecturer:* Mary Adamo Friedman

*Extension Associate Professor:* Charles A. French

The community and environmental planning (CEP) program is designed to provide students with the theoretical and applied knowledge and skills that will equip them to be effective community planners. They will be expected to develop knowledge and skills that will enable them to anticipate and foster sustainable development at various landscape scales and to help communities and environmental and resource management agencies manage development.

They will be able to facilitate protection of the natural resources and environmental services upon which people and other living things depend. This program has high expectations for student performance as the practice of this profession has important consequences for the health of communities these future planners will serve.

Both natural resource and human systems sustainability principles are embedded in all aspects of this program. Students will develop their capacities to integrate human and natural systems as they develop critical thinking and technical planning skills. They will have the ability to facilitate citizens' engagement in planning for their communities' future. They will be able to analyze community and environmental problems, and recommend viable alternative solutions designed to ensure that a desirable quality of life exists in the future. They will have a clear understanding of what sustainability means, and of the criteria they will use to assess progress toward a sustainable community. They will have a strong interest and belief that they can make a difference in bringing about a sustainable future.

- Students will have an explicit awareness of both the necessity of and means for protecting natural resource systems and the environmental services they provide to human communities. Students will have the ability to assess the consequences of proposed changes to the landscape at different scales, from the very local to regional, as well as to anticipate the consequences of the land use changes that will require community resources and regulatory tools.
- Students will understand how local governments function, and will have basic administrative and technical planning skills to support the development and implementation of sound community level development and land use change decisions.

- Students will be clear communicators, able to foster and facilitate informed citizen participation in planning processes that provide the links between the citizens of a community and their government and which serve to determine a common community vision.
- Students will be effective ethical collaborators, trained to foster interdisciplinary, multi-stakeholder approaches to planning.
- Students will have successfully completed an approved planning internship.

Students interested in planning may wish to take elective courses in watershed management, wetlands management (DNREN), pollution control (engineering), forest management, sustainable agriculture, justice studies, environmental policy, and tourism to develop a foundation in both natural and human built systems. Students must complete a minimum of 128 credit hours to graduate and achieve a grade of C- or better in all courses toward the major.

The CEP core requirements include planning and decision making; communications, law, governance and conflict resolution; environmental and social systems; economics and statistics, as well as applied internship experience. Students are encouraged to undertake independent research. In addition to the core, students, in consultation with their adviser, design a focus area or minor, in which they can develop specialty tools and field experiences geared toward entry level jobs in the community and environmental planning fields. For example, elective courses in geographic information systems and remote sensing, watershed management, wetlands management, pollution control, forest management, sustainable agriculture, justice studies, environmental policy, or tourism can form a focus area of expertise.

The program also provides a firm base for graduate study in a variety of areas such as regional planning, public administration, environmental planning, environmental information, and law.

Students interested in contributing their energy and talents to mastering the challenges of community and environmental planning should consult with Mimi Larsen Becker, CEP program coordinator, Department of Natural Resources and the Environment, 134 James Hall, (603) 862-3950 or by e-mail: [mimi.becker@unh.edu](mailto:mimi.becker@unh.edu).

### **Required Core Courses**

CEP 415, Community Development Perspectives, or CSL 401, Intro to Community Service & Leadership

CEP 508, Applied Community Development

CEP 614, Fundamentals of Planning

CEP 777, Topics in Community Planning (Capstone for the major)

CEP 794, Community Planning Internship  
CMN 600, Public Speaking as a Civic Art  
ENGL 401, First-Year Writing  
ENGL 502, Professional and Technical Writing  
EREC 411, Environmental and Resource Economics Perspectives  
EREC 525, Statistical Methods and Applications, PSYC 402, Statistics in Psychology, or SOC 502, Statistics  
EREC 627, Community Economics  
ESCI 409, Geology and the Environment  
NR 435, Contemporary Conservation Issues and Environmental Awareness  
NR 527, Forest Ecology or BIOL 541, General Ecology  
NR 658, Introduction to Geographic Information Systems  
NR 718, Law of Natural Resources and Environment  
NR 724, Resolving Environmental Conflicts  
NR 785, Systems Thinking for Sustainable Living  
PBIO 412, Introductory Botany

Choose one of these:

POLT 502, State and Local Government, or POLT 508, Supreme Court and the Constitution, or alternative approval by adviser.  
SOC 530, Race and Ethnic Relations  
SOC 540, Private Troubles, Public Issues: Contemporary Social Problems  
ECON 669, Women and Economic Development or alternative approval by adviser.

Living Green (Choose two):

CIE 444, Housing, Everyone Needs a Place to Live  
CHE 410, Energy and Environment  
NR 784, Sustainable Living  
CEP 673, Green Real Estate

Sustainable/Organic Food System Course (e.g.):

NUTR 698, Intro to Ecogastronomy

**Electives (21-25 hours) Focus area or a minor**

These may include a second internship, directed research, independent study, community service and leadership, economics (EREC 606 Land Economics Perspectives, EREC 756 Rural and Regional Economic Development, ECON 707 Economic Growth and Environmental

Quality, CEP 672, Fundamentals of Real Estate) and/or other courses that help students add expertise to their CEP "toolbox."

### **Discovery Program Requirements**

Writing Skills (ENGL 401)

Quantitative Reasoning (Statistics)

Inquiry Course (may be taken in a category below or within the major)

Sciences (3 courses, 1 must be a lab course)

    Biological Sciences (PBIO 412)

    Env., Tech. & Society (NR 435)

    Physical Sciences (ESCI 409)

Historical Perspectives

World Cultures (Study Abroad, Language Courses)

Fine & Performing Arts

Social Science (EREC 411)

Humanities

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## **Dairy Management ▼**

» <http://www.dairy.unh.edu/>

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*Professor:* Andrew B. Conroy

*Associate Professor:* Peter S. Erickson

*Extension Assistant Professor:* Michal Lunak

The dairy management program is designed to provide students with solid training in areas important to the successful management of a dairy enterprise, for employment in related agribusinesses (e.g., pharmaceutical and feed industries), or for those wishing to pursue additional training leading to the M.S. or Ph.D. degree in dairy science or its related disciplines. Dairy management students receive training in areas such as nutrition, reproduction, diseases, genetics, lactation physiology, forages, agribusiness finance, personnel management, computer science, and public relations. In addition, junior and senior students enrolled in this program will be given complete responsibility for managing the UNH teaching herd with other students, acquiring actual management experience along with their basic subject matter

training. The Fairchild Teaching and Research Center, a modern dairy facility, houses approximately one hundred milking cows plus a similar number of nonlactating animals. The Burley-Demeritt Organic Dairy Farm houses 45 milking cows and a similar number of nonlactating animals.

In addition to UNH Discovery Program requirements, a typical dairy management student will take the following courses:

### **First Year**

ANSC 408 (optional), 409, 410, 430; BIOL 411; CHEM 403-404; ENGL 401; EREC 411

### **Second Year**

ANSC 432, 511, 512, 543, 650

### **Summer Internship**

ANSC 600

### **Third Year**

ANSC 609, 612, 530, 710, 701 and/or 715 or 724

### **Fourth Year**

ANSC 698, 708, 727, 728; MGT 580 or EREC 504 or EREC 501

One **capstone experience**, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors.

Students interested in pursuing graduate studies take MATH 424B, CHEM 545-546, BMCB 658-659, and BMS 503.

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## **Ecology, Evolution and Behavior (EEB) ▼**

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The ecology, evolution and behavior (EEB) B.S. program is designed to provide broad training in organismal and environmental biology, and to provide an opportunity for limited specialization in the field of ecology, conservation, evolution or behavior. The program integrates theoretical and practical (hands-on laboratory and field) courses. Students are encouraged to become involved in one or more of the undergraduate research opportunities available in the areas of ecology, evolution and the behavioral sciences.

Students who complete the major requirements will be qualified to pursue advanced degrees in the biological sciences, professional degrees in the health-related professions, secondary school teaching certification, or employment in a wide variety of public and private sector jobs requiring training in ecology and biology.

### ***Academic Requirements***

To receive the B.S. degree in ecology, evolution and behavior, students must complete 128 credit hours with a 2.0 cumulative grade-point average. Courses must include all UNH Discovery Program requirements, the EEB core curriculum requirements, and eight courses from the EEB electives list. A capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C- is required in all biological science courses that are counted towards the requirements for a degree in EEB. The only exception is that a passing grade below a C- will be accepted in a student's first biology course (BIOL 411 or 412). Students who expect to compete successfully for post-baccalaureate programs should attain a cumulative GPA of 3.0 or higher by the end of the sophomore year and maintain it at that level.

### ***EEB Core Curriculum***

The EEB major uses the same core curriculum as the biology B.S. major. The core curriculum forms an integrated sequence of courses imparting basic knowledge of biology that exposes students to the breadth of knowledge inherent in the biological sciences. The core allows a student to obtain a broad background in biology and related physical sciences and math and prepares them for upper level and more specialized courses in EEB.

### **EEB Core Curriculum Courses**

BIOL 400, Professional Perspectives on Biology<sup>1</sup>

BIOL 411 & 412, Principles of Biology I, II<sup>2</sup>

BIOL 541, General Ecology



BMS 503, General Microbiology  
GEN 604, Principles of Genetics  
CHEM 403 & 404, General Chemistry  
CHEM 545/546 Organic Chemistry and BMB 658/659, General Biochemistry, or CHEM 651/653 and CHEM 652/654, Organic Chemistry<sup>3,4</sup>  
MATH 424B, Calculus for Life Sciences or MATH 425, Calculus I  
BIOL 528, Applied Biostatistics I, or MATH 426, Calculus II<sup>5</sup>  
PHYS 401 and 402, Introduction to Physics  
ENGL 501, Introduction to Creative Nonfiction, or equivalent<sup>4</sup>  
EDUC 500, Exploring Teaching<sup>6</sup>

Typically, students take BIOL 400; BIOL 411 & 412; CHEM 403-404; and MATH 424B in the first year, and then complete the remainder of their core requirements during the sophomore and junior years.

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<sup>1</sup>BIOL 400 is required only for first-year EEB majors.

<sup>2</sup>BIOL 411 and 412 are not sequential and may be taken in reverse order.

<sup>3</sup>The sequence CHEM 545/546-BMB 658/659 is preferred to CHEM 651/653-652/654, for EEB majors, except for those who are pre-medical or pre-health profession students.

<sup>4</sup>CHEM 651/653 and 652/654 and ENGL 501 are required for pre-medical or affiliated professional programs.

<sup>5</sup>MATH 426, Calculus II can be substituted for BIOL 528 Applied Biostatistics I, but Biostatistics is strongly recommended.

<sup>6</sup>Required only for those preparing for teacher certification.

### ***EEB Electives***

In addition to the EEB core curriculum, students must complete ZOO 690 plus seven EEB electives. A complete list of approved EEB elective courses is available from the student's adviser, the Department of Biological Sciences office, and the EEB website at [www.biology.unh.edu/eebcurriculum.html](http://www.biology.unh.edu/eebcurriculum.html). Co-requisite lecture and lab courses count as one course. Courses listed in more than one category will satisfy requirements in only one category.

*Note:* It is strongly recommended that students participate in an exchange semester at another university, in a field-oriented program or internship or an experience in independent investigation. There are many exchange opportunities available in which a full semester of credits toward the major may be earned. In addition, students should explore the courses at the

Shoals Marine Laboratory (SML), which provides an excellent setting for several “field-oriented” courses during the summer. Often there is financial support available for the SML programs (see the SML website for details ([www.shoals.unh.edu](http://www.shoals.unh.edu)) or the Cornell web site at [www.sml.cornell.edu](http://www.sml.cornell.edu). Students should explore possibilities of one or more semesters of independent investigation (research projects). For details, students should contact their adviser. Financial support is available for some of these programs.

One 600 or 795 experience totaling three or more credits or any 795 experience of two credits each can fulfill one course requirement in any category with adviser approval. A Petition for Academic Variance approved by the chair of the Department of Biological Sciences is required to count 795-796 experiences for more than one major required course. Students should check the EEB web site (<http://biology.unh.edu/eeb.html>), and the UNH online catalog for updates and current course offerings.

### ***Prehealth Professional Program***

EEB majors who wish to pursue post-graduate degrees in the health care professions should visit the pre-medical advising office in Room 102, Hood House for additional information on requirements for specific professional schools. Call (603) 862-2064 or visit the program’s web page at [www.unh.edu/premed-advising](http://www.unh.edu/premed-advising). The following elective courses will be helpful in preparing for admission to post-baccalaureate programs in the health professions and for their required aptitude examinations: BMS 702, ZOO 518, ZOO 625/626, BMCB 605, BMCB 751/752, ANSC 511/512.

Students interested in the ecology, evolution and behavior (EEB) B.S. major can contact the Department of Biological Sciences at (603) 862-3205.

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## **Environmental and Resource Economics (EREC) ▼**

» <http://www.envecon.unh.edu/>

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*Professor:* Lyndon E. Goodridge, John M. Halstead, Theodore E. Howard, Bruce E. Lindsay

*Associate Professor:* Kelly L. Cullen, Alberto B. Manalo, Douglas E. Morris

*Lecturer:* Mary Adamo Friedman

*Extension Professor:* Michael R. Sciabarrasi

*Extension Associate Professor:* Charles A. French

This program offers training in environmental and resource economics, including public resource policy, resource management, natural resource and environmental economics, and community economics and finance. The curriculum emphasizes applied economics in the context of public policy. Training is also available in agricultural economics, including agribusiness, small business management, food marketing, agricultural policy, and world food supplies.

Students majoring in environmental and resource economics will normally concentrate in one of the following three areas: environmental and natural resource economics, agricultural economics, or community economics. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. In addition, students must satisfy Discovery Program requirements, which lead to a broad university education. Majors interested in the economic or business aspects of agriculture and natural resources will be expected to take courses in the biological sciences.

Students majoring in any of the social science, life science, and agriculture departments of the University may find it to their advantage to elect courses or a minor in environmental and resource economics or agribusiness. By doing so, their basic training can be supplemented in a specific area of interest, such as resource development and natural resource policy for social science majors, farm management and agricultural marketing for agricultural majors, and community economics and finance for students interested in local government and development.

### **Required Courses**

*All of the following:*

ECON 401, Principles of Economics (Macro)

ECON 605, Intermediate Microeconomic Analysis

ECON 611, Intermediate Macroeconomic Analysis, or ECON 635, Money and Banking

EREC 411, Environmental and Resource Economics Perspectives or equivalent

(EREC 411 cannot be used to satisfy the Social Science Discovery program requirement)

EREC 504, Business Management for Natural Resource Firms

EREC 525, Statistical Methods and Applications

MATH 420, Finite Mathematics, or MATH 424B, Calculus for Life Sciences

*At least five of the following, of which two must be 700 level:*

EREC 501, Agriculture and Natural Resource Product Marketing

EREC 572, Introduction to Natural Resource Economics

EREC 606, Land Economics Perspectives: Uses, Policies, and Taxes

EREC 627, Community Economics

EREC 633, Economics of Travel and Tourism

EREC 680, Agricultural and Food Policy

EREC 708, Environmental Economics

EREC 756, Rural and Regional Economic Development

NR 643, Economics of Forestry

TOUR 700, Marketing Communications Research: Methodological Foundations

Students who major in environmental and resource economics are qualified for a wide variety of opportunities upon graduation. Private business, public institutions, and government agencies currently have a strong demand for specialists trained in natural resource development; land and water use policy; natural resource and small business management; agricultural, fisheries, and forestry marketing; and community development. In many cases, students may wish to improve their qualifications by pursuing more specialized graduate studies in one or more of the above areas.

### ***Departmental Honors***

Honors in environmental and resource economics will be awarded to students who complete 16 credits of honors courses in environmental and resource economics (including a minimum of four credits of a senior research project), and who maintain a minimum grade-point average of 3.4 in the major. Students interested in the environmental and resource economics honors program should contact the environmental and resource economics coordinator in James Hall for more information.

Students interested in a major or minor in environmental and resource economics should contact John M. Halstead, James Hall, (603) 862-3914.

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## **Environmental Conservation Studies ▼**

» <http://www.envconservation.unh.edu/>

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*Professor:* John E. Carroll, Russell G. Congalton, Robert T. Eckert, Theodore E. Howard, Paul C. Johnson, Marianne Klausner Litvaitis, William W. Mautz

*Associate Professor:* Mimi Larsen Becker, Thomas D. Lee

The environmental conservation studies (ECS) major gives students a broad, interdisciplinary background for developing their understanding of environmental and resource problems and what is needed to solve them. It also provides a solid foundation for the development of critical thinking skills. The program is designed to ensure that graduates possess broad-based, integrated knowledge of how local and global ecological systems work as well as an understanding of the interdependency between people and the environment. Building on a solid natural science base, students discover how political, institutional, and economic systems relate to environmental quality and learn ways to sustainably manage human activities within the constraints of the Earth's ecological systems. Students acquire a set of basic skills and problem solving tools that enable them to tackle complex environmental conservation problems. Graduates will have gained hands-on practical experience integrating and applying their accumulated knowledge and skills in real world situations.

International education to support ECS students' educational goals is encouraged as a means to broaden their perspectives and knowledge, particularly through the UNH-Ecoquest New Zealand field studies program. ECS students may also take advantage of a wide range of undergraduate research opportunities.

ECS students meet a set of 19 core requirements, through which they develop a foundation in natural resources, biology, ecology, chemistry, water quality management, soils, natural resources and environmental policy, economics, environmental ethics, and environmental law. They also acquire basic statistics, oral communication, writing, and geographic information skills. Students develop abilities to apply knowledge and skills professionally through a practicum (internship) and a capstone course.

In addition to the core, each student chooses a 36-credit-hour specialization, which may be selected from a range of natural resources and environmental policy and management course sequences that provide a specific focus as each student develops an area of academic competency and the skill sets to help meet her or his career goals. For example, students can choose specializations in the following subject areas: land and water resource policy and management; international environmental and natural resource policy and sustainable development; or environmental education, communication, public participation and leadership. A student may also design a specialization in consultation with his or her adviser.

Students with strong interests in field-based natural resource management careers can choose

a focus on a particular land or water natural resource system, such as forest resources, marine and coastal resources, watersheds or wetlands, or food production to build their expertise. Students with interests in environmental policy, politics, law and administration, or sustainable community development may want to gain additional background through selected courses in the social sciences. Those with interests in environmental education may want to obtain a teaching certificate or develop expertise in outdoor education or leadership. Others may want to pursue interests in environmental communication through courses in journalism or the visual or theater arts. Many undergraduates in ECS participate in faculty research or gain experience through UNH's undergraduate research opportunities programs. Students with particular interests in international environmental studies may want to participate in the dual major in International Affairs.

Students graduating with a B.S. degree in ECS with excellent academic records are qualified for graduate work in environmental studies, environmental sciences, natural resources and environmental policy, resource management, conservation biology, environmental law, or environmental education and communication. ECS graduates work with private or nongovernmental conservation organizations; local, state or federal natural resources or planning agencies; industrial firms (e.g., waste management, compliance, land protection, watershed management, community planning, energy conservation, etc.); in primary and secondary education; field studies programs; journalism; and specialized environmental consulting firms. A number of graduates also choose to serve in the Peace Corps or with AmeriCorps prior to making more specific career path commitments.

In addition to the degree core requirements (below), students must complete the Discovery Program and the University Writing Requirements. Please note that environmental conservation studies majors cannot take NR 435 as their Environment, Technology & Society Discovery requirement.

### **Degree Core Requirements**

NR 400, Professional Perspectives in Natural Resources

NR 401, Introduction to Natural Resources

PBIO 412, Introductory Botany and ZOOL 412, Biology of Animals, OR

BIOL 411 and BIOL 412, Principles of Biology I and II

NR 504, Freshwater Resources

NR 501, Studio Soils

NR 602, Natural Resources and Environmental Policy

NR 658, Introduction to Geographic Information Systems

NR 718, Law of Natural Resources and Environment

NR 637, Practicum in Environmental Conservation (Internship)

NR 735, Land Conservation Principles and Practices, or NR 663, Applied Directed Research in New Zealand

EREC 411, Environmental and Resource Economics Perspectives, or ECON 402, Principles of Economics (Micro)

*One introductory resource system course, as follows:*

ESCI 405, Global Environmental Change

NR 425, Field Dendrology

NR 433, Wildlife Ecology

NR 502, Forest Ecosystems and Environmental Change

*One ecology elective:*

BIOL 541, General Ecology

NR 527, Forest Ecology

NR 660, Ecology and Biogeography of New Zealand (only for UNH-EcoQuest NZ program students)

ZOOL 503, Introduction to Marine Biology

*One physical science (relevant to specialization):*

CHEM 403, General Chemistry

ESCI 409, Geology and the Environment

PHYS 401, Intro to Physics I

ENE 520, Environmental Pollution and Protection

CHE 410, Energy and Environment

*One course in environmental ethics and values:*

NR 701, Ecological Sustainability and Values

NR 784, Sustainable Living

HIST 618, American Environmental History

SOC 665, Environmental Sociology

*One statistical skills course:*

BIOL 528, PSYC 402, SOC 502 or equivalent

*One communication skills course:*

CMN 600, Public Speaking as a Civic Art

THDA 520, Creative Drama (Children's Theater)

THDA 583, Introduction to Puppetry

THDA 622, Storytelling, Story Theater and Involvement Dramatics

THDA 624, Theater for Young Audiences

NR 725, Environmental Communication and Advocacy

*One writing skills course (beyond ENGL 401):*

ENG 502, 503, 521, 621, or 623

### ***Specialization (36 credits required)***

Students select one from the following listed specialization areas to develop their expertise in an area of interest. Alternatively, a student may, in consultation with the his or her adviser, design a specialization area.

A. Land and Water Resource Policy and Management; International Environmental and Natural Resource Policy and Sustainable Development

B. Environmental Education, Communication, Public Participation, and Leadership

*For each area of specialization students are required to select one listed course from each of five specified categories:*

Category 1: Ecology (a listed 600 or higher-level course)

Category 2: Economics (a listed 600 or higher-level course)

Category 3: Theory (from identified courses relevant to the specialization)

Category 4: Problem Solving Skills (from identified courses relevant to the specialization)

Category 5: Professional and/or Field Skills (from identified courses relevant to the specialization)

Students select four additional courses in their specialization to complete their 36-hour-specialization. These four courses may be selected from any of the five categories. The majority of courses selected for the student's specialization should be at the 600 or 700 level. Special permission will be required to apply a 400 level course to fulfill a specialization requirement. Students must achieve a grade of C- or better for all courses they wish to be counted for their environmental conservation studies major. Students work closely with a faculty adviser to plan their program of study.

Students interested in the environmental conservation studies program may consult with program coordinator Robert Eckert, (603) 862-2508, r.eckert@unh.edu

### ***Environmental Conservation Studies Minor***

A minor in environmental conservation studies (five courses totaling at least 20 credits) is available to students outside of the environmental conservation studies major.



### Required Courses

1. *Any one of the following:* PBIO 412, ZOOL 412, BIOL 411, BIOL 412
  
2. NR 435, Contemporary Conservation Issues and Environmental Awareness, or NR 502, Forest Ecosystems and Environmental Change
  
3. One course in ecology: Possibilities include: NR 433, NR 425, NR 527, NR 660, BIOL 541
  
4. *One intermediate course in environmental policy, or ecological or resource economics:*  
NR 724, Resolving Environmental Conflicts  
NR 731, Ecosystem-Based Governance: Policies and Management Strategies  
NR 662, Environmental Policy, Planning and Sustainability in New Zealand  
NR 718, Law of Natural Resources and Environment  
NR 720, International Environmental Politics and Policies for the 21st Century  
EREC 606, Land Economics Perspectives: Uses, Policies, and Taxes or EREC 627, Community Economics
  
5. *Choose one:*  
NR 504, Freshwater Resources  
NR 501, Studio Soils  
NR 661, Restoration Ecology and Ecosystem Management in New Zealand  
NR 785, Systems Thinking for Sustainable Living

Students interested in the ECS minor should contact Mimi Larsen Becker, Department of Natural Resources and the Environment, (603) 862-3950.

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## Environmental Horticulture ▼

» <http://www.envhorticulture.unh.edu/>

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*Professor:* J. Brent Loy

*Associate Professor:* John M. Roberts

*Assistant Professor:* Kirk D. Broders

*Extension Professor:* Alan T. Eaton, Catherine A. Neal, Cheryl A. Smith

*Extension Associate Professor:* Rebecca Grube Sideman

For (PBIO) courses, see [Plant Biology](#).

This program offers a flexible curriculum for students interested in a multifaceted view of plant agriculture that also embraces issues of environmental stewardship, food safety, international development, and other topics of broad public concern. A degree in environmental horticulture will prepare students for careers managing greenhouses, nurseries, farms, and golf courses; in teaching; in consulting and applied research; in practicing journalism; in working for park and highway planning commissions; in working in sales or brokerage aspects of wholesale and retail marketing; and in finding employment in food- and feed-processing firms.

### Requirements

Students are required to take the core courses, support courses, and 20 credits of approved elective courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. In addition, courses for the Discovery Program and the University Writing Requirement must be completed.

### Core Courses

Abbreviation	Course Number	Title	Credits
PBIO	412	Introductory Botany	4
PBIO	421	Introductory Horticulture	4
PBIO	501	Basic Biochemistry (or equivalent)	3
NR	501	Studio Soils	4
HT	204	Plant Propagation	4
PBIO	566	Systematic Botany	4
PBIO	600	Field Experience (Horticulture Related)	4
PBIO	701	Plant Physiology	3
PBIO	612	Plant Genetics and Reproduction	4
or GEN	604	Principles of Genetics	4
PBIO	651	Plant Pathology	4
PBIO	760	Insect Pest Management	4

PBIO	795	Investigations	
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### Electives

A minimum of 20 credits (see department for list of electives applicable). Students are offered some flexibility in selection of electives, although these electives should be related to horticulture and selected in consultation with an adviser.

### Support Courses Required from Other Programs

Abbreviation	Course Number	Title	Credits
BIOL	528	Applied Biostatistics I	4
CHEM	403	General Chemistry I	4
CHEM	404	General Chemistry II	4
EREC	411	Environmental and Resource Economics Perspectives	4

### Environmental Horticulture Minor

A minor in Environmental Horticulture is designed to provide a flexible and broad selection of courses to complement any other major area of study. **A MINIMUM OF 20 CREDITS REQUIRED.**

#### Specific Requirements

PBIO 421 Introductory Horticulture  
or PBIO 412 Introductory Botany

#### Electives

PBIO 405 Organic/Sustainable Food Production  
PBIO 565 Turf Management  
PBIO 566 Systematic Botany  
PBIO 612 Plant Genetics and Reproduction  
PBIO 650 Crop Production Technologies  
PBIO 651 Plant Pathology  
PBIO 652 Culture of Vegetable Crops  
PBIO 679 Landscape Management  
PBIO 701 Plant Physiology

- PBIO 760 Insect Pest Management
- PBIO 795 Investigations (Horticulture related topics)
- PBIO 796 Special Topics in Plant Biology

Up to two electives may be selected from this list of Thompson School Horticultural Technology classes:

- HT 404 Plant Propagation
- HT 257 Woody Landscape Plants
- HT 258 Herbaceous Ornamental Plants
- HT 275 Floricultural Crop Production
- HT 276 Bedding Plant Production
- HT 251 Introduction to Design Communication
- HT 272 Landscape Design Studio

Other electives can count toward the minor based on agreement with advisor or chair.

Students are encouraged to discuss their intent to minor with the Chair of the Department as early as possible-typically no later than the end of the junior year. Not all classes are offered every year.

#### **Certification of Minor**

During the student's final semester an application should be made to the COLSA Dean's Office to have the minor shown on the academic transcript. The student should fill out a **Certification of Completion of Minor** form and obtain the signatures of the student's major advisor, the student's minor advisor, and the Dean of COLSA.

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## **Environmental Sciences ▼**

» <http://www.envsci.unh.edu/>

» [Click to view course offerings](#)

*Professor:* John D. Aber, Russell G. Congalton, William H. McDowell

*Associate Professor:* Heidi Asbjornsen, Mimi Larsen Becker, J. Matthew Davis, Serita D. Frey, Kevin H. Gardner, Jennifer M. Jacobs, Thomas D. Lee, Scott V. Ollinger

*Research Associate Professor:* Ruth K. Varner

*Assistant Professor:* A. Stuart Grandy, Anne Lightbody, Mary D. Stampone, Wilfred M. Wollheim

The College of Life Sciences and Agriculture (COLSA) and the College of Engineering and Physical Sciences (CEPS) jointly offer a bachelor of science degree in environmental sciences. Environmental sciences is an interdisciplinary field concerned with the interaction of biological, chemical, and physical processes that shape our natural environment. Students graduating with a degree in environmental sciences will have an understanding of these interacting processes, the ability to effectively communicate with both scientific and lay audiences, competency in field methods appropriate for entry-level environmental science positions, competency in the use and application of geographic information systems (GIS), a basic understanding of environmental policy, and the ability to contribute to multidisciplinary teams. The University of New Hampshire is a recognized leader in environmental sciences research, and the environmental sciences program capitalizes on faculty expertise in this area. The program has 12 full-time faculty members, with major teaching and research emphases in the areas of biogeochemical cycling, environmental chemistry, ecosystem science, global change, hydrology, plant ecology, soil science, and water resource management.

Employment opportunities include: environmental consulting firms; educational facilities (e.g., science centers); environmental monitoring laboratories (e.g., water treatment plants; the Environmental Protection Agency); government agencies (e.g., the U.S. Geological Survey, Bureau of Land Management, Natural Resource Conservation Service), university and government research laboratories, and nongovernment environmental organizations. The environmental sciences program also constitutes an excellent preparation for graduate programs in several areas relating to the environment. Students should consult with their adviser early if their goals include further study.

### **Requirements**

In addition to the Discovery Program and University Writing requirements, all students will take Introduction to Environmental Science (NR 403) and Professional Perspectives in Natural Resources (NR 400), plus one other elective introductory environmental science course. Foundation courses include two semesters of chemistry (CHEM 403, 404) and calculus (MATH 425, 426), one semester of geology (ESCI 401, 402, or 409), one semester of statistics (MATH 644 or BIOL 528), one semester of physics (PHYS 407), and one approved biology course. Core courses include Techniques in Environmental Sciences (ESCI 534); Introduction to GIS (NR 658), Fate and Transport in the Environment (ESCI 654); Natural Resources and Environmental Policy (NR 602); and a capstone experience (NR 791 and an independent study or capstone course approved by their advisor and the program coordinator).

*Students must complete an additional eight courses in one of the following options:*

### **Ecosystems**

NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 730, Terrestrial Ecosystems

NR 765, Community Ecology

NR 751, Aquatic Ecosystems

Four approved electives

### **Hydrology**

PHYS 408, General Physics II

ESCI 561, Landscape Evolution

NR 501, Studio Soils, or ESCI 512, Principles of Mineralogy

ESCI 705, Principles of Hydrology

ESCI 710, Groundwater Hydrology

A course in quantitative analysis

Two approved electives

### **Soil and Watershed Management**

PHYS 408, General Physics II, or NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 501, Studio Soils

NR 703, Watershed Water Quality Management

NR 706, Soil Ecology, or NR 744, Biogeochemistry

Four approved electives

For a list of approved elective courses and for further information about the major, students may consult with the program coordinator, Ruth K. Varner, (603) 862-0853.

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### **Equine Studies (EQST) ▼**

» <http://www.equine.unh.edu>

» [Click to view course offerings](#)

*Professor:* William E. Berndtson

*Associate Professor:* Elizabeth P. Boulton

*Lecturer:* Christina Keim

*Teacher/Trainer:* Sarah Hamilton, Elizabeth L. Oertel

The equine studies degree program at UNH offers a unique and well-rounded program of study to students pursuing a career in the horse industry. All students receive a background in science and business, as well as equine-specific courses that incorporate outstanding opportunities for experiential learning. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. Students then choose a specialization in one of three options:

***Equine Industry and Management*** – This option combines business classes and hands-on equine classes, such as teaching training, stable management, and competition management for students interested in a traditional equine or equine business career.

***Therapeutic Riding*** – This option includes classes in equine studies, therapeutic riding, non-profit organizations, and human development and special needs for students interested in a career in therapeutic riding. Students also test for NARHA instructor certification.

***Equine Science*** – This option combines equine classes with a more intensive science curriculum which includes genetics, reproduction, and nutrition. This program is suited for pre-veterinary students or those interested in graduate education or research.

In addition, courses for the Discovery Program and the University Writing Requirement must be completed.

## OPTION I - EQUINE INDUSTRY AND MANAGEMENT

### Equine Industry and Management Core Courses

Abbreviation	Course Number	Title
AAS	437	Equine Handling and Care Techniques
AAS	546	Animal Business Applications
ANSC	406	Careers in Animal Science
ANSC	411	Freshman Seminar in Equine Science
ANSC	432	Intro to Forage and Grassland Management
ANSC	504	Equine Science

ANSC	511-512	Anatomy & Physiology*
ANSC	565	Principles of Horse Trials Mgmt
ANSC	600	Field Experience*
ANSC	609	Principles of Nutrition
ANSC	612	Genetics of Domestic Animals
ANSC	620	Equine Diseases
ANSC	697	Equine Seminar
ANSC	724	Reproductive Management & AI
ANSC	725	Equine Sports Medicine
ANSC	797	Equine Capstone Experience
BIOL	411-412	Principles of Biology I & II
BIOL	528	Applied Biostatistics I
ENGL	501	Intro to Creative Non-fiction (or ENGL 419, 502 or 503 or ANSC 543)
EREC	411	Env. & Resource Economics Perspectives
EREC	504	Business Management for Natural Resource Firms or
EREC	501	Ag. & Nat Resource Product Marketing

\*waived for TSAS equine management graduates.

### Equine Industry and Management Electives

At least four of the following courses (for classes less than three credits, two must be taken together to count as one requirement):

#### Equine Industry and Management Electives

Abbreviation	Course Number	Title
AAS	426	Equine Conformation & Lameness
AAS	434	Equipment & Facilities Management
AAS	547	Applied Equine Management
ADMN	502	Financial Accounting
ANSC	500	Methods of Therapeutic Riding
ANSC	507	Scientific Approach to Equine Discipline
ANSC	602	Animal Rights and Societal Issues
ANSC	640	Principles of Riding Instruction



ANSC	641	Principles of Dressage Instruction
ANSC	642	Principles of Jumping Instruction
ANSC	643	Principles of Therapeutic Riding Instruction
ANSC	701	Physiology of Reproduction
MGT	580	Introduction to Organizational Behavior
RMP	563	Recreation Management & Policy Practicum
ZOOL	713	Animal Behavior

### Applicable Writing-Intensive Courses

Abbreviation	Course Number	Title
ANSC	543	Technical Writing in Animal Sciences
ANSC	600	Field Experience
ANSC	602	Animal Rights and Societal Issues
ZOOL	713	Animal Behavior

### OPTION II - THERAPEUTIC RIDING

#### Therapeutic Riding Core Courses

Abbreviation	Course Number	Title
AAS	426	Equine Conformation & Lameness
AAS	437	Equine Handling and Care Techniques
AAS	246	Animal Business Applications
AAS	247	Applied Equine Management
ANSC	406	Careers in Animal Science
ANSC	411	Freshman Seminar in Equine Science
ANSC	500	Methods of Therapeutic Riding
ANSC	504	Equine Science
ANSC	600	Field Experience*
ANSC	609	Principles of Nutrition
ANSC	612	Genetics of Domestic Animals
ANSC	620	Equine Diseases
ANSC	640	Principles of Riding Instruction
ANSC	643	Principles of Therapeutic Riding Instruction

ANSC	697	Equine Seminar
ANSC	725	Equine Sports Medicine
ANSC	797	Equine Capstone Experience
BIOL	411-412	Principles of Biology I & II
BIOL	528	Applied Biostatistics I
ENGL	501	Intro to Creative Non-fiction (or ENGL 419, 502 or 503 or ANSC 543)
EREC	411	Env. & Resource Economics Perspectives
KIN	798	Special Topics
BMS	507-508	Human Anatomy & Physiology

\*waived for TSAS equine management graduates.

### Therapeutic Riding Electives

At least four of the following courses (at least three at the 500-level or above):

#### Therapeutic Riding Electives

Abbreviation	Course Number	Title
ANSC	507	Scientific Approach to Equine Discipline
COMM	520	Survey of Communication Disorders, or
COMM	401	American Sign Language I
CSL	402	Introduction to Non-Profit Organizations
CSL	403	Organizing and Supervising Volunteers
CSL	407	Introduction to Non-Profit Budgeting & Accounting
CSL	508	Essentials of Fundraising for Community-Based Organizations
CSL	509	Essentials of Grant Writing for Community-Based Organizations
HHS	740	Collaborative Services for Children with Special Needs
MGT	580	Introduction to Organizational Behavior
OT	510	Exploring Occupational Therapy & Occupation
OT	500	Behavior & Development of Children, or
FS	525	Human Development
RMP	501	Recreation Services for Individuals with Disabilities

RMP	557	Recreation Services Program Design
ZOOL	713	Animal Behavior

### Suggested Electives for Students in Therapeutic Riding

Abbreviation	Course Number	Title
AAS	254	Animal Assisted Activities & Therapy
AAS	251	Human/Animal Bond

### Applicable Writing-Intensive Courses

Abbreviation	Course Number	Title
ANSC	543	Technical Writing in Animal Sciences
ANSC	600	Field Experience

## OPTION III - EQUINE SCIENCE

### Equine Science Core Courses

Abbreviation	Course Number	Title
AAS	437	Equine Handling and Care Techniques
ANSC	406	Careers in Animal Science
ANSC	411	Freshman Seminar in Equine Science
ANSC	504	Equine Science
ANSC	511-512	Anatomy & Physiology
ANSC	600	Field Experience*
ANSC	609	Principles of Nutrition, or
ANSC	612	Genetics of Domestic Animals
ANSC	620	Equine Diseases
ANSC	697	Equine Seminar
ANSC	724	Reproductive Management & AI or
ANSC	701	Physiology of Reproduction
ANSC	725	Equine Sports Medicine
ANSC	797	Equine Capstone Experience
BIOL	411-412	Principles of Biology I & II
BIOL	528	Applied Biostatistics I

CHEM	403-404	General Chemistry I & II
EREC	411	Env. & Resource Economics Perspectives
ENGL	501	Intro to Creative Non-fiction (or ENGL 419, 502 or 503 or ANSC 543)
NUTR	750	Nutritional Biochemistry

\*waived for TSAS equine management graduates.

### Equine Science Electives

At least five of the following courses:

#### Equine Science Electives

Abbreviation	Course Number	Title
AAS	426	Equine Conformation & Lameness
AAS	439	Fundamentals of Animal Health
ANSC	432	Intro to Forage and Grassland Management
ANSC	500	Methods of Therapeutic Riding
ANSC	507	Scientific Approach to Equine Discipline
ANSC	701	Physiology of Reproduction
BMS	623	Comparative Histology
BMS	704	Pathologic Basis of Disease
BMS	725	Veterinary Microbiology & Zoonotic Disease
BMS	718	Mammalian Physiology
ANSC	724	Reproductive Management & AI
BMCB	658-659	General Biochemistry**
CHEM	651-653	Organic Chemistry I**
CHEM	652-654	Organic Chemistry II**
MATH	424B	Calculus for Life Sciences**
BMS	503	General Microbiology**
NUTR	750	Nutritional Biochemistry
PHYS	401-402	Introduction to Physics I & II**
ZOOL	713	Animal Behavior

\*\*Required for students with pre-vet intent

**Applicable Writing-Intensive Courses**

Abbreviation	Course Number	Title
ANSC	543	Technical Writing in Animal Sciences
ANSC	600	Field Experience
ZOOL	713	Animal Behavior
NUTR	750	Nutritional Biochemistry
CMN	600	Public Speaking as a Civic Art
BMS	718	Mammalian Physiology
ANSC	444A	Honors/Animal Ethics

**Diploma Program Providing Preparation for NARHA Certification****Required Courses**

Abbreviation	Course Number	Title
ANSC	504	Equine Science
or AAS	437	Equine Handling and Care Techniques
ANSC	402	Horsemanship
KIN	501	First Aid-Responding to Emergencies
ANSC	500	Methods of Therapeutic Riding
ANSC	795	Investigations
		a seminar on teaching therapeutic riding

**GPA Requirements for All Students in Equine Studies**

All students enrolled in the equine studies major will be required to receive a minimum grade of C- in all classes required for the major. Students failing to do this will need to retake the course in order to receive credit.

**Honors-in-Major Requirements for B.S. in Equine Studies**

The B.S. in equine studies (formerly called the B.S. in animal science: equine sciences) offers three academic options: equine industry and management; therapeutic riding; and equine science. For students enrolled in fall 2010 forward, the Honors-in-Major requirements for the B.S. in equine studies in each of these three options are as follows:

1. Students are required to maintain an overall 3.40 grade point average and a 3.40 in major coursework.
2. Students will complete a **total of 16 credits** including the **Honors Senior Thesis** to meet equine studies B.S. Honors-in Major-requirements.
3. Students must choose two to three courses from the following courses and designate them as Honors (8-12 credits) <http://www.unh.edu/registrar/regforms/honorsform.pdf>:

ANSC 512H, Anatomy and Physiology

ANSC 612H, Genetics of Domestic Animals

ANSC 620H, Equine Diseases

ANSC 640H, Principles of Riding Instruction

ANSC 643H, Principles of Therapeutic Riding Instruction

ANSC 701H, Physiology of Reproduction

BMS 718H, Mammalian Physiology

ANSC 724H, Reproductive Management & AI

ANSC 725H, Equine Sports Medicine

Instructors shall retain flexibility in implementing additional assignments that elevate the course's educational content to justify Honors designation, which will likely involve activities such as extra reading or writing assignments, laboratory or field experiences, or classroom presentations.

4. Students must complete ANSC 799 - Honors Senior Thesis (4-8 credits required; 1-4 credits can be taken per semester; two semesters required and a written thesis).

In order to enroll in ANSC 799, students must obtain a permission slip from the equine honors program co-coordinator (Elizabeth Boulton). Thesis work must encompass two consecutive semesters of 1-4 credits each semester. The student must identify a faculty mentor to supervise thesis work, which will involve investigation of some aspect of equine studies that considers and applies the student's classroom education and potential career opportunities. A written thesis and public presentation of the thesis work are typically expected for successful completion of this requirement.

**Students who enrolled prior to fall 2010 adhere to the following Honors-in-Major requirements in the B.S. animal sciences: equine sciences in each of the three tracks:**

Students are required to maintain an overall grade-point average of 3.2 in courses completed at the University of New Hampshire and a 3.2 in all animal sciences coursework.

Students must successfully complete 16 credits of animal sciences courses with Honors,

including ANSC 799 Honors Senior Thesis (see below). Most courses can be designated as Honors courses, with the consent of the course instructor, and approval of the department's Honors Program coordinator.

At least one of the courses must be:

ANSC 612H, Genetics of Domestic Animals  
BMS 623H, Comparative Histology  
ANSC 701H, Physiology of Reproduction  
BMS 702H, Endocrinology  
BMS 704H, Pathologic Basis of Disease  
ANSC 715H, Physiology of Lactation  
ANSC 718H, Mammalian Physiology  
NUTR 750H, Nutritional Biochemistry  
BMS 714, Research Methods in Endocrinology  
BMCB 753, Cell Culture

Complete a Honors Senior Thesis

ANSC 799, Honors Senior Thesis (5-8 credits required; 1-4 credits can be taken per semester; two semesters required and a written thesis)

Instructors shall retain flexibility in implementing additional assignments that elevate the course's educational content to justify Honors designation, which will likely involve activities such as extra reading or writing assignments, laboratory or field experiences, or classroom presentations.

At least 5 credits, but not more than 8 credits, of the 16 credits in animal Sciences honors courses must be Honors Senior Thesis credits (ANSC 799). In order to enroll in ANSC 799, students must obtain a permission slip from the Honors Program coordinator. Thesis work must encompass two consecutive semesters of 1-4 credits each semester. The student must identify a faculty mentor to supervise thesis work, which will involve investigation of some aspect of animal science that considers and applies the student's classroom education and potential career opportunities. A written thesis and public presentation of the thesis work are typically expected for successful completion of this requirement.

**Minor in Equine Studies**

A minor in equine studies consists of a minimum of 20 credits of equine-related animal science (ANSC) courses. No more than 7 credits may be taken in the Thompson School of Applied

Science (AAS) and at the 400- level. ANSC 504, Equine Science, MUST be taken. Students must receive a minimum grade of C- in any course used for the minor. Students failing to do this will need to retake the course in order to receive credit. No courses taken on a pass (credit)/fail basis may count towards the minor. Students who transfer from other institutions may petition the equine program faculty for course approval. Students who choose both ANSC 500 and ANSC 643 as two of their courses towards the minor in equine studies will be eligible for NARHA therapeutic riding instructor certification

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## Forestry ▼

» <http://www.forestry.unh.edu/>

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*Professor:* Russell G. Congalton, Mark J. Ducey, Robert T. Eckert, Theodore E. Howard, Paul C. Johnson, Barrett N. Rock

*Affiliate Professor:* Christopher Eagar, Jeffrey H. Gove, William B. Leak

*Associate Professor:* Heidi Asbjornsen, Thomas D. Lee, Scott V. Ollinger

*Affiliate Assistant Professor:* Richard A. Hallett, Linda S. Heath

*Extension Professor:* Karen P. Bennett

Climate change, carbon storage, biodiversity, and ecosystem integrity in the context of sustainable human use of forests and associated resources are important scientific and social issues. The forestry program at the University of New Hampshire prepares its graduates with the scientific and managerial knowledge and skills to address these environmental and resource management problems at local, regional, and global levels.

Forestry is the art and science of managing and understanding the natural and human dimensions of forests and forest use. Forestry education at UNH focuses on sustainable management of forests for biodiversity, productivity, and health, based on a multidisciplinary approach. The program's goal is to provide a sound professional preparation, a broad general education, and the flexibility to cultivate special abilities and interests, leading to a bachelor of science in forestry degree (B.S.F.) accredited by the Society of American Foresters (SAF). The SAF is recognized by the Council on Postsecondary Accreditation and the U.S. Department of Education as the accrediting body for forestry in the United States. Students are encouraged to develop an area of concentration or to complete a minor in consultation with their academic adviser.



UNH forestry graduates manage forests to provide wildlife habitat and recreation opportunities, care for soil and water resources, protect and restore forest ecosystems, and assure a sustainable supply of forest products. They are employed by private industry, public agencies, public interest groups, education institutions, research organizations and consulting firms.

Many students enter graduate school for advanced study in forest biology or management while others have found challenging international opportunities.

### **Freshman Year**

BIOL 528, Applied Biostatistics I, or equivalent

ENGL 401, First Year Writing

MATH 424B, Calculus for Life Sciences, or MATH 420, Finite Mathematics

NR 400, Professional Perspectives in Natural Resources

NR 401, Introduction to Natural Resources

NR 425, Field Dendrology

NR 433, Wildlife Ecology

NR 542, Forestland Measurement and Mapping

PBIO 412, Introductory Botany

Discovery elective (FPA, HP, HUM, or WC)

### **Sophomore Year**

CHEM 403, General Chemistry

EREC 411, Environmental and Resource Economics Perspectives, or ECON 402, Principles of Economics (Micro)

NR 501, Studio Soils

NR 504, Freshwater Resources

NR 506, Forest Entomology

NR 527, Forest Ecology

NR 599, Work Experience

Oral Communications Skills Course

Discovery elective (FPA, HP, HUM, or WC)

### **Junior Year**

NR 602, Natural Resources and Environmental Policy

NR 643, Economics of Forestry

NR 658, Introduction to Geographic Information Systems

FORT 279, Forest Fire Control and Use

NR 729, Silviculture

NR 757, Remote Sensing of the Environment

NR 782, Monitoring Forest Health, or P BIO 651, Plant Pathology  
Discovery elective (FPA, HP, HUM, or WC)

### Senior Year

NR 745, Forest Management (Capstone)  
NR 749, Forest Inventory and Modeling  
RMP 711, Recreation Resource Management  
  
Discovery elective (FPA, HP, HUM, or WC)

All forestry majors must satisfy the B.S.F. requirements, and all Discovery Program requirements. Students must satisfy the Inquiry requirement of the Discovery Program by completing an inquiry or inquiry-attribute course. Seniors must also satisfy the capstone experience requirement of the Discovery Program. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course (NR 745, Forest Management), created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors.

Students interested in the Forestry program may consult with the program coordinator, Theodore Howard, (603) 862-2700.

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## Genetics (GEN) ▼

» <http://www.genetics.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Thomas M. Davis, Subhash C. Minocha, Robert L. Taylor Jr., W. Kelley Thomas, Louis S. Tisa

*Associate Professor:* John J. Collins, Vaughn S. Cooper, Estelle M. Hrabak, Anita S. Klein

*Assistant Professor:* Feixia Chu, Cheryl A. Whistler

»Click to view faculty participating in the program [<http://www.genetics.unh.edu/faculty>]

Genetics and genomics are central to all aspects of the life sciences. Genetics is the branch of biology that deals with heredity, variation of genes among individuals in a population, and the

expression and regulation of genes. Genomics focuses on determining the structure and function of genomes and includes the mapping of genes, high-throughput DNA sequencing, and investigating the molecular mechanisms by which genetic and environmental factors contribute to phenotypes. Every day, scientists use the tools of genetics and genomics to make exciting discoveries in fields such as molecular biomedicine, cancer research, biodiversity, and sustainability.

A major in genetics provides a solid foundation in biology, biochemistry, microbiology, chemistry, physics, math, and cell biology. Students take advanced courses in molecular genetics, gene regulation, bioinformatics, molecular evolution, genomics, and laboratory techniques. There are many opportunities for interested students to gain research experience through formal or informal research projects in faculty members' laboratories. A student majoring in genetics with an option in genomics receives additional training in genomics and computer programming for bioinformatics.

Students with degrees in genetics or genomics are well prepared to apply to graduate schools (e.g., for training in genetic counseling or research), professional schools, or to pursue careers in biotechnology companies, forensics labs, hospitals, university research laboratories, and government agencies. Two additional courses are needed for application to professional schools (e.g., medical or dental). Graduates may also be employed in management, sales, marketing, regulatory affairs, technical writing, or science journalism. With supplementary courses in education, graduates with a Bachelor's degree in genetics or genomics can teach at the elementary, junior high, or high school level.

The genetics faculty conduct research on diverse topics such as evolution, gene structure and function, host-microbe interactions, genome sequencing and analysis, heredity, and diversity in populations. Faculty research areas encompass microbial, plant, and animal genetics. Genetics faculty are committed to mentoring undergraduate students in independent research experiences in their laboratories, which provide students with exposure to cutting-edge research technologies.

Bachelor of Science in Genetics. Students majoring in genetics must take: i) four genetics core courses; ii) five major elective courses chosen from an extensive list; iii) six bioscience core courses; and iv) seven foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, a created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C minus must be earned in all courses offered in the College of Life

Sciences and Agriculture. In addition, courses for the **Discovery Program** and the **University Writing Requirement** must be completed. For a detailed list of curriculum requirements, go to <http://genetics.unh.edu/major-requirements-bachelor-science-genetics>.

#### Genetics Core Courses

Introduction to Genetics (1 sem)  
Genetics Lab (1 sem)  
Molecular Genetics (1 sem)  
Genomics and Bioinformatics (1 sem)

#### Major Electives

One course with a significant laboratory component, one course in population genetics or molecular evolution, and three upper-level courses in biochemistry, genetics, microbiology or others, chosen from an approved list.

#### Bioscience Core Courses

Biology w/lab (2 sem)  
Genetics (1 sem)  
Microbiology w/lab (1 sem)  
Cell and Developmental Biology (1 sem)  
Biochemistry w/lab (1 sem)

#### Foundation Courses

General Chemistry w/lab (2 sem)  
Organic Chemistry w/lab (1 sem)  
Calculus (1 sem)  
Statistics (1 sem)  
Physics w/lab (2 sem)

Bachelor of Science in Genetics: Genomics Option. Students majoring in genetics with the genomics option must take: i) four genetics core courses; ii) five major elective courses; iii) six bioscience core courses; and iv) seven foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C minus must be earned in all courses offered in the College of Life Sciences and Agriculture. In addition, courses for the **Discovery Program** (<http://www.unh.edu/academic-affairs/discovery/>) and the **University Writing Requirement** (<http://www.unh.edu/writing/uwr/students/Wlchecklist/>) must be completed. For a detailed list of

curriculum requirements, go to <http://www.genetics.unh.edu/major-requirements-bachelor-science-genetics-option-genomics> .

#### Genetics Core Courses

Introduction to Genetics (1 sem)  
Genetics Lab (1 sem)  
Molecular Genetics (1 sem)  
Genomics and Bioinformatics (1 sem)

#### Major Electives

Introduction to Perl Programming for Bioinformatics (1 sem)  
Comparative Genomics (1 sem)  
Population Genetics and Molecular Evolution (2 sem)  
One upper-level course in biochemistry, genetics, microbiology or others, chosen from an approved list.

#### Bioscience Core Courses

Biology w/lab (2 sem)  
Genetics (1 sem)  
Microbiology w/lab (1 sem)  
Cell and Developmental Biology (1 sem)  
Biochemistry w/lab (1 sem)

#### Foundation Courses

General Chemistry w/lab (2 sem)  
Organic Chemistry w/lab (1 sem)  
Calculus (1 sem)  
Statistics (1 sem)  
Physics w/lab (2 sem)

### **Pre-Professional Health Programs**

Students interested in postgraduate careers in the health care professions should visit the Pre-Professional Health Programs Advising Office online ([www.unh.edu/premed-advising](http://www.unh.edu/premed-advising)) or in person (Hood House, Room 102). Requirements for specific types of professional schools (e.g., medical, dental, physician's assistant, pharmacy, etc.) are provided at <http://www.unh.edu/premed-advising/hlthprof.htm>. Students interested in veterinary medicine should consult the Pre-Veterinary Medicine Program (<http://www.prevet.unh.edu/>) website.

While many of the prerequisite courses required by professional schools are also requirements

of the Genetics major, you should consult with your faculty advisor to create a plan of study that best prepares you for pursuing a career in one of these health professions.

### **Minor in Genetics (GEN)**

Students who wish to develop focus in the area of genetics and genomics can complement their major academic program with a minor in Genetics. The general requirements for completion of a minor and the courses that fulfill the minor requirements in Genetics can be found at <http://www.genetics.unh.edu/minor-genetics>. The intent to complete a minor in Genetics should be communicated by the end of the junior year. During the final semester, students should file the Certificate of Completion of Minor in order to have the minor shown on the academic record. For additional information on the Genetics minor, contact the Undergraduate Program Coordinator, Professor Estelle Hrabak ([estelle.hrabak@unh.edu](mailto:estelle.hrabak@unh.edu)).

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### **International Affairs (dual major) ▼**

For program description, see [Special University Programs](#).

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### **Life Sciences and Agriculture (LSA) ▼**

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*Affiliate Professor:* Stephen K. Crawford, George C. Hurtt, Jeffery S. Kahl, John A. McCracken, Ronald E. Rompalla

*Affiliate Associate Professor:* Herman A. Karl, Jianhua Li, Peter A. Maddison, Gary B. Smejkal, Kathy J. Soder, Arthur F. Stucchi, John C. Wallace

*Research Assistant Professor:* Dennis E. Mathews

*Affiliate Assistant Professor:* Matthew J. Baber, Ria Brejaart, John L. Campbell, Andrew B. Cooper, Jennifer Dijkstra, Dean R. Elder, Christopher Longson, Bo R. Rueda, John A. Ryan, Deena J. Small, Nathan L. Smith, James A Sulikowski, Irina L. Trubetskova, Bruce S. WildBlood-Crawford, Mariko Yamasaki

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## Marine, Estuarine and Freshwater Biology (MEFB) ▼

» <http://www.mefb.unh.edu/>

» [Click to view course offerings](#)

*Professor:* John F. Burger, Donald S. Chandler

*Associate Professor:* Alan L. Baker

UNH is located on a seacoast that provides an extraordinary diversity of marine and estuarine habitats. It is also only a short distance from mountain streams, rivers, marshes, bogs, ponds and lakes. All of the habitats provide outstanding resources for field courses and research. The marine, estuarine and freshwater faculty are spread across all three departments of the College of Life Sciences and Agriculture. UNH is a Sea Grant university and has an international reputation for teaching and research in aquatic sciences. UNH has aquaculture facilities, coastal and estuarine research laboratories. In collaboration with Cornell, UNH jointly administers the summer undergraduate programs at the Shoals Marine Laboratory on Appledore Island, seven miles off the coast of New Hampshire and Maine.

The Marine, Estuarine and Freshwater Biology (MEFB) B.S. program is designed to provide a broad background for undergraduates interested in marine, estuarine and freshwater biology, aquaculture, and fisheries. The program integrates theoretical and practical (hands-on laboratory and field) courses. Students are encouraged to become involved in one or more of the numerous undergraduate research opportunities available in the marine, estuarine and freshwater sciences.

### ***Academic Requirements***

To receive the B.S. degree in marine, estuarine and freshwater biology, students must complete 128 credit hours with a 2.0 cumulative grade-point average. Courses must include all UNH Discovery Program requirements, the MEFB core curriculum requirements, seven flexible MEFB major requirement courses and three MEFB electives. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C- is required in all biological science courses that are counted towards the requirements for a degree in MEFB. The only exception is that a passing grade below a C- will be accepted in a student's first biology course (BIOL 411 or 412). Students who expect to compete successfully for post-baccalaureate programs should attain a cumulative GPA of 3.0 or higher by the end of the sophomore year and maintain it at that level.

### ***MEFB Core Curriculum***

The MEFB major uses core curriculum similar to the Biology B.S. core. It constitutes an integrated sequence of courses imparting basic knowledge of biology to expose students to the breadth of knowledge inherent in the biological sciences. The core allows a student to obtain a broad background in biology and related physical sciences and math and prepares them for upper level courses in marine, estuarine and freshwater biology.

### **MEFB Core Curriculum Courses**

BIOL 412, Introductory Biology: Evolution, Biodiversity and Ecology

BIOL 411, Introductory Biology: Molecular and Cellular

BIOL 541, General Ecology

BMS 503, General Microbiology

GEN 604, Principles of Genetics

CHEM 403 & 404, General Chemistry

CHEM 545/546, Organic Chemistry

BMCB 658/659, General Biochemistry

MATH 424B, Calculus for Life Sciences or 425, Calculus I

BIOL 528, Applied Biostatistics I, or BIOL 555 Experimental Design & Analysis Lab

PHYS 401 and 402, Introduction to Physics

Typically, students take MEFB 401; BIOL 411 & 412; CHEM 403-404; and Calculus 424B in the first year, and then complete the remainder of their core requirements during the sophomore and junior years.

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### ***MEFB Flexible Requirement Courses***

In addition to the MEFB core curriculum, students must complete MEFB 401, Marine, Estuarine and Freshwater Seminar, MEFB 525, Introduction to Aquatic Botany, plus one course selected from each of the six MEFB major requirement categories and three MEFB electives. A complete list of approved courses in each category is available from the student's adviser, the Department of Biological Sciences office, and the MEFB website at <https://mefb.unh.edu/sites/mefb.unh.edu/files/checklist.pdf>. Co-requisite lecture and lab courses count as one course. Courses listed in more than one category will satisfy requirements in only one category.

*Note:* It is strongly recommended that students participate in an exchange semester at another



university or in a field-oriented program or internship. There are many exchange opportunities available in which a full semester of credits toward the major may be earned. In addition, students should explore the courses at the Shoals Marine Laboratory (SML), which provides an excellent setting for several “field-oriented” courses during the summer. Often there is financial support available for the SML programs (see the SML website for details ([www.shoals.unh.edu](http://www.shoals.unh.edu))) or the Cornell web site at [www.sml.cornell.edu](http://www.sml.cornell.edu). It is further recommended that students explore possibilities of one or more semesters of independent investigation (research projects). For details, students should contact their adviser. Financial support is available for most of these programs.

One 600 or 795 experience totaling three or more credits or any two 795 experiences of two credits each can fulfill one course requirement in any category with adviser approval. A Petition for Academic Variance approved by the chair of the Department of Biological Sciences is required to count 795 experiences for more than one major required course. Students should check the MEFB web site (<http://www.mefb.unh.edu/>), and the UNH online catalog for updates and current course offerings.

### ***Prehealth Professional Program***

MEFB majors who wish to pursue postgraduate degrees in the health care professions should visit the premedical advising office in Room 102, Hood House for additional information on requirements for specific professional schools. Call (603) 862-2064 or visit the program’s web page at [www.unh.edu/premed-advising](http://www.unh.edu/premed-advising). The following elective courses will be helpful in preparing for admission to post-baccalaureate programs in the health professions and for their required aptitude examinations: BMS 702, ZOO 518, ZOO 625/626, BMCB 605, BMCB 751/752, ANSC 511/512.

Students interested in the marine, estuarine and freshwater biology (MEFB) B.S. major can contact the Department of Biological Sciences, (603) 862-3205.

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## **Natural Resources (NR) ▾**

» <http://www.nre.unh.edu/>

» [Click to view course offerings](#)

*Affiliate Professor:* Changsheng Li, Rakesh Minocha, Lawrence J. Prelli

*Associate Professor:* Jonathan R. Pennock

*Assistant Professor:* Rebecca J Rowe, Richard G. Smith

*Affiliate Assistant Professor:* Ria Brejaart, Joel N. Hartter, Mary E. Martin

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## **Neuroscience and Behavior (NSB) ▼**

» <http://neuroscience.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Robert C. Drugan, Robert G. Mair, Michelle P. Scott, Winsor H. Watson III

*Associate Professor:* Brett M. Gibson, Jill A. McGaughy, William Wren Stine

*Assistant Professor:* Andrew B. Leber

[www.neuroscience.unh.edu/](http://www.neuroscience.unh.edu/)

The major in neuroscience and behavior (NSB) offers an interdisciplinary approach to human and non-human behavior with foci in the evolution and adaptiveness of behavior patterns and in the neurological mechanisms. We offer courses in neurobiology, neuroendocrinology, cognition, sensation and perception, behavioral ecology, and many others. Students who have always been fascinated by how the brain functions will be well served by this major, as will those who love wild animals and wish to better understand their behavior. The B.S. in neuroscience and behavior is based on a solid foundation in biology and chemistry with some physics and statistics. Additional basic courses may include genetics, evolution, and ecology. Beyond this foundation, students may elect courses more in the general area of integrative neuroscience and take advanced courses such as psychobiology, attention disorders, and brain and behavior or they may choose the general area of animal behavior and take courses that are more field oriented.

NSB students are highly motivated and many take advantage of research experience in the laboratories of the psychology and biology faculty in the program. This provides valuable experience with cutting-edge equipment and techniques. Some students may share aspects of a larger project whereas others may be relatively independent and design their own project under supervision. In either case important skills are gained by the discipline of gathering data, analyzing and interpreting it, and finally presenting it to a broader audience.

Our curriculum provides most of the requirements and recommended courses for students seeking admission to graduate school and to professional schools in medicine and veterinary medicine. Students who might choose not to go on for advanced degrees are well prepared for employment as skilled technicians in research laboratories or, if their interests are in animal behavior, as field research assistants or animal trainers. With additional courses in education, the B.S. in NSB also qualifies graduates to teach at the elementary, junior high and high school levels.

Faculty participating in the NSB major combine a love of teaching and student mentoring with a passion for research. All NSB faculty have active research programs and encourage student participation. Research facilities that students can use include the aviary, the confocal imaging center, the Hubbard Center for Genomic Studies and the many marine, freshwater, and estuarine laboratories associated with UNH programs. Students can also take summer courses at the Shoals Marine Laboratory.

### *Bachelor of Science in Neuroscience and Behavior*

Students majoring in NSB are required to take foundation courses in basic science, core courses (choice of three from a list of five) that allows them to express an interest in either integrative neuroscience or animal behavior; and four electives from an extensive list of courses including some offered by other departments including biochemistry, molecular and cellular biology and natural resources. Finally, a capstone experience is required. This may be independent research, an advanced seminar, or other special student activity. It is meant to integrate prior experience and take the student to a new level in an area of special interest.

#### **NSB Foundation courses**

First-year introductory seminar (1 credit)

Introductory Biology (2 semesters)

Introductory Chemistry

Organic Chemistry

Biochemistry

Physics

Statistics

#### **Core courses**

Choice of three of five, which include Animal Behavior, Psychobiology, Neurobiology and Behavior, Genetics, and Drugs and Behavior.

#### **Electives**

Four NSB major electives

#### **Capstone**

4-8 credits

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## Nutrition (NUTR) ▼

» <http://www.nutrition.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Gale B. Carey, Joanne Curran-Celentano, Anthony R. Tagliaferro

*Associate Professor:* Dennis J. Bobilya, Colette H. Janson-Sand

*Clinical Associate Professor:* Mary Katherine Lockwood, Ruth A. Reilly

*Clinical Assistant Professor:* Joanne D. Burke

*Lecturer:* Jesse Stabile Morrell

*Extension Professor:* Deborah Luppold, Catherine A. Violette

» <http://www.nutrition.unh.edu/>

» Click to view faculty participating in the program [<http://www.nutrition.unh.edu/faculty>]

Nutrition is the study of how nutrients and food components function at molecular, cellular, and whole-body levels to impact human health and disease. Our students are grounded in fundamental sciences as they develop nutrition-specific competencies in nutrition and health, foods, nutritional assessment, wellness, life cycle nutrition and/or metabolic biochemistry.

Students pursuing the B.S. degree in nutrition can choose from three areas of specialization: dietetics option, nutrition & wellness option, and nutritional sciences option. For descriptions of each option and their curricular details, visit [www.nutrition.unh.edu](http://www.nutrition.unh.edu).

The nutrition program prepares students for entry-level positions in health care, education, or the biotechnology industry, or entry into post-baccalaureate professional programs such as dietetic internship, medical school, dental school, or graduate school. Upon completion of the B.S. in nutrition, dietetics option, students apply for a dietetic internship, a pre-requisite for becoming a registered dietitian. The dietetics curriculum is accredited by the American Dietetic Association (ADA). Nutrition & wellness option students are prepared for jobs in agencies and businesses that have an emphasis on health and wellness, including schools, fitness centers, and non-profit and community organizations. Nutritional sciences option students most often enter the biomedical/biotechnology workplace or enroll in a post-graduate educational degree program (e.g., medical school, graduate school, dental school, etc.).

Our nutrition faculty have expertise in obesity, diabetes, sports nutrition, food safety, food

science, cardiovascular disease risk, and young adult health. Undergraduate students actively participate in ongoing research projects in these areas. The Center for Health Enhancement ([www.che.unh.edu](http://www.che.unh.edu)) and the Young Adult Health Risk Screening Initiative ([www.nutrition.unh.edu/research/YAHRSI](http://www.nutrition.unh.edu/research/YAHRSI)) are two resources that support nutrition research at the University of New Hampshire.

### **B.S. in Nutrition: Dietetics Option**

Students majoring in the dietetics option must take: (i) four nutrition core courses, (ii) 13 courses in nutrition and other subject areas required by the option, (iii) three bioscience core courses and (iv) foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C- must be earned in all NUTR courses required by the major. For a detailed list of curricular requirements, visit the dietetics homepage at <http://nutrition.unh.edu/4year/dietetics>. In addition, all other university academic requirements for the **Discovery Program** and the **University Writing Requirement** must be completed.

#### **Nutrition Core Courses**

Nutrition in Health and Well-Being (1 sem)

Nutritional Assessment (1 sem)

Life Cycle Nutrition (1 sem)

Professional Perspectives on Nutrition (1 sem)

**Nutrition/Other Courses:** A total of 13 courses are required for this option, in topics such as community nutrition, nutritional biochemistry, nutrition education and counseling, food science, the US health care system, microbiology, and capstone experience reading and writing about nutrition research.

#### **Bioscience Core Courses**

Microbiology w/lab (1 sem)

Anatomy & Physiology w/lab (2 sem)

#### **Foundation Courses**

Courses (with labs) are required in the areas of general chemistry, organic chemistry, and biochemistry, along with one semester of statistics.

**B.S. in Nutrition: Nutrition & Wellness Option**

Students choosing the nutrition & wellness option must take (i) four nutrition core courses, (ii) 12 courses in nutrition and other subject areas required by the option, (iii) three bioscience core courses and (iv) foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C- must be earned in all NUTR courses required by the major. For a detailed list of curricular requirements, visit the nutrition and wellness homepage at <http://nutrition.unh.edu/4year/NutritionandWellness>. In addition, all other university academic requirements for the **Discovery Program** and the **University Writing Requirement** must be completed.

**Nutrition Core Courses**

Nutrition in Health and Well-Being (1 sem)

Nutritional Assessment (1 sem)

Life Cycle Nutrition (1 sem)

Professional Perspectives on Nutrition (1 sem)

**Nutrition/Other Courses:** A total of 12 courses are required for this option in topics such as nutrition and wellness, sports nutrition, stress management, kinesiology, and weight management.

**Bioscience Core Courses**

Microbiology w/lab (1 sem)

Anatomy & Physiology w/lab (2 sem)

**Foundation Courses**

Courses (with labs) are required in the areas of general chemistry, organic chemistry, and biochemistry, along with one semester of statistics.

**B.S. in Nutrition: Nutritional Sciences Option**

Students choosing the nutritional sciences option must take (i) four nutrition core courses, (ii) three nutrition courses and three other major electives from a list of 11 courses specific to the option, (iii) seven bioscience core courses and (iv) seven foundation courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone

explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, or other special student activity). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors. A minimum grade of C- must be earned in all NUTR courses required by the major. For a detailed list of curricular requirements, visit the nutritional sciences homepage at <http://nutrition.unh.edu/4year/nutritionalsciences>. In addition, all other university academic requirements for the **Discovery Program** and the **University Writing Requirement** must be completed.

### **Nutrition Core Courses**

Nutrition in Health and Well-Being (1 sem)

Nutritional Assessment (1 sem)

Life Cycle Nutrition (1 sem)

Professional Perspectives on Nutrition (1 sem)

**Nutrition/Other Major Electives**: A total of six courses are required for this option, three of which are required nutrition courses in nutritional biochemistry, nutritional biochemistry of micronutrients, and a research-intensive experience. The remaining three courses are chosen from a list of nutrition and other major electives, and include subjects such as pathologic basis of disease, mammalian physiology, treatment of adult obesity, and cell culture.

### **Bioscience Core Courses**

General Biology w/lab (2 sem)

Genetics (1 sem)

Microbiology w/lab (1 sem)

Biochemistry w/lab (1 sem)

Anatomy & Physiology w/lab (2 sem)

### **Foundation Courses**

General Chemistry w/lab (2 sem)

Organic Chemistry w/lab (1 sem)

Physics w/lab (2 sem)

Statistics (1 sem)

Calculus (1 sem)

### **Pre-Professional Health Programs**

Students interested in postgraduate careers in the health care professions should visit the Pre-

Professional Health Programs Advising Office online ([www.unh.edu/premed-advising](http://www.unh.edu/premed-advising)) or in person (Hood House, Room 102). Requirements for specific types of professional schools (e.g., medical, dental, physician's assistant, pharmacy, etc.) are provided at <http://www.unh.edu/premed-advising/hlthprof.htm>. Students interested in veterinary medicine should consult the Pre-Veterinary Medicine Program website. While many of the prerequisite courses required by professional schools are also requirements of the Nutrition major, you should consult with your faculty advisor to create a plan of study that best prepares you for pursuing a career in one of these health professions.

### **Minor in Nutrition (NUTR)**

The Nutrition minor is particularly suited to students interested in pursuing professional careers related to human health and wellness. The general requirements for completion of a minor can be found in the [Minors section](#) of the Undergraduate Catalog. Courses that fulfill the requirements of the Nutrition minor can be found at <http://nutrition.unh.edu/4year/MinorinNutrition>. Students "declare" the Nutrition Minor by submitting the Intent to Minor in Nutrition form. Submission of the Intent to Minor form is required to gain registration preference in certain courses if space is available and by discretion of the instructor. This form should be completed and submitted to the Minor Supervisor as soon as students become interested in the minor, preferably prior to the start of their junior year. During the final semester, students should file the Certification of Completion of Minor in order to have the minor shown on the academic record. For additional information on the Nutrition minor, contact the Minor Supervisor in Nutrition, Jesse Stabile Morrell ([jesse.morrell@unh.edu](mailto:jesse.morrell@unh.edu)).

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### **Plant Biology (PBIO) ▼**

» <http://www.plant.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Thomas M. Davis, Wayne R. Fagerberg, Curtis V. Givan, Leland S. Jahnke, J. Brent Loy, Arthur C. Mathieson, Subhash C. Minocha, Christopher D. Neefus

*Affiliate Professor:* Clinton J. Dawes, Walter C. Shortle, Kevin T. Smith

*Associate Professor:* Alan L. Baker, Estelle M. Hrabak, Anita S. Klein, John M. Roberts



*Affiliate Associate Professor:* Janet R. Sullivan

*Extension Professor:* Alan T. Eaton, Catherine A. Neal, Cheryl A. Smith, Stanley R. Swier

*Extension Associate Faculty:* Rebecca Grube Sideman

*Extension Assistant Professor:* Brian A. Krug

Plant biology is the study of plants at the population, organismal, cellular, and molecular level; and the investigation of the uses of plants for food, fiber, recreational, and ornamental purposes. Offerings in marine and freshwater plant biology also are provided and facilitated by the Jackson Estuarine Laboratory and two marine laboratories where the plant biology faculty maintains an active involvement in teaching and research.

### **General Science Certification**

See [Department of Education](#) and [COLSA](#).

### **B.S. in Plant Biology**

This degree is for students intending to seek employment in agricultural, pharmaceutical, and biotechnology industries; to work in governmental agencies, environmental groups, and consulting firms; to teach secondary education; or to undertake graduate studies in preparation for advanced research and teaching positions. Students interested in university teaching and/or research, and governmental and industrial research, should plan to complete an advanced degree in the field.

Students are required to take the core courses, which include the biology core curriculum and five plant biology elective courses. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors.

In addition, courses for the Discovery Program and the University Writing Requirement must be completed.

### **Core Courses**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
BIOL	411	Introductory Biology: Molecular and Cellular	4
BIOL	412	Introductory Biology: Evolution, Biodiversity and Ecology	4

CHEM	403	General Chemistry I	4
CHEM	404	General Chemistry II	4
MATH	424B	Calculus for Life Sciences	4
BMS	503	General Microbiology	5
BIOL	541	General Ecology	4
BIOL	528	Applied Biostatistics I	4
CHEM	545/546	Organic Chemistry and Laboratory	5
BMCB	658/659	General Biochemistry and Laboratory	5
PHYS	401	Introduction to Physics I	4
PHYS	402	Introduction to Physics II	4
GEN	604	Principles of Genetics	4
PBIO	701/702	Plant Physiology and Laboratory	5
PBIO	758	Plant Anatomy	5
GEN	774	Plant Biotechnology and Genetic Engineering	3
PBIO	566	Systematic Botany	4
PBIO	795	Investigations	

### **Plant Biology Electives**

Five additional courses must be selected from those listed under categories 1-5. No more than three courses from any one category can be used to fulfill the requirement. It is strongly recommended that students choose courses from as many of the categories as possible to obtain a broad background in plant biology. Core courses cannot be used to fulfill elective requirements. PBIO 795, Investigations in Plant Biology can be used once to fulfill one of the five electives, if taken for three or more credits. PBIO 796, Special Topics in Plant Biology can be used to fulfill elective requirements, if taken for three or more credits and pre-approved by adviser.

#### *Category 1: Systematics, Ecology, and Evolution*

PBIO 566, 625, 717, 719, 722, 723, 747; NR 713, 730, 765, 783

#### *Category 2: Marine and Freshwater Plant Biology*

PBIO 503, 625, 717, 719, 722, 723, 727, 732, 747; ZOOL 725

#### *Category 3: Plant Structure and Physiology*

PBIO 709, 713, 727; BMCB 714/715; GEN 774/775

#### *Category 4: Environmental Horticulture*

NR 506; PBIO 547, 565, 650, 651, 652, 679; ZOOL 745

*Category 5: Plant Genetics, Cell Biology, and Biotechnology*

GEN 705, 771, 772, 775; BMCB 751, 753, 754

### **B.A. in Plant Biology**

The curriculum provides a broad background in the liberal arts and plant biology. Students may enter this program as first-year students or transfer into it from other liberal arts or science programs. This program is of particular interest to students who intend to utilize their plant biology training in public relations, teaching, or other related careers in combination with a liberal arts background. The program allows students to obtain minors in other fields such as English, history and philosophy of science, international affairs, education, art, etc., to create an interdisciplinary program, or to pursue a double major. Students must complete a minimum of 40 semester credits in the major, including B.A. degree core courses, upper level biology category electives, Discovery Program requirements, and other B.A. requirements. One capstone experience, supervised and approved within the major, is required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors.

### **Upper Level Plant Biology Category Electives**

*12 credits minimum*

Select courses from several of the five plant biology categories (see B.S. program). PBIO 758 and GEN 774 are also recommended.

### **Required Discovery Courses**

*Required:* Biological Science, BIOL 412, Introductory Biology: Evolution, Biodiversity and Ecology; Physical Science CHEM 403, General Chemistry

*Recommended:* Quantitative Reasoning, BIOL 528, Applied Biostatistics I; Humanities, PHIL 424, Science, Technology, & Society; or HUMA 651, Humanities and Science: The Nature of Scientific Creativity

### **Other B.A. Requirements**

Foreign language (equivalent to one year of college language)

### **Requirements**

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Abbreviation	Course Number	Title	Credits
PBIO	412	Introductory Botany*	4
ZOOL	412	Biology of Animals	4
PBIO	501	Basic Biochemistry	3
or CHEM	545/546	Organic Chemistry and Laboratory	5
BIOL	541	General Ecology	4
PBIO	566	Systematic Botany	4
or PBIO	722	Marine Phycology	4
GEN	604	Principles of Genetics	4
or PBIO	612	Plant Genetics and Reproduction	4
PBIO	701/702	Plant Physiology and Laboratory	5

\*waived if previous credit received for BIOL 411-412 or equivalent

### Minors

The Department of Plant Biology offers two departmental minors: a minor in plant biology and a minor in environmental horticulture. These minors are available to all students and are designed to provide a flexible and broad selection of courses to complement any other major area of study.

#### The requirements for the plant biology minor are:

PBIO 412 or equivalent or BIOL 601, and a minimum of 16 credits from the following list of courses: PBIO 566, 625, 651, 701/702, 709, 713, 717, 719, 722, 727, 758, 795 (maximum of four credits), 796, 799; BIOL 601; BMBB 754; GEN 772, 774/775.

#### The requirements for the environmental horticulture minor are:

PBIO 421 or PBIO 412 and a minimum of 16 credits from the following list of courses: PBIO 405, 565, 566, 612, 650, 651, 652, 679, 701, 760, 795 (horticulture-related topics) and 796. Up to two electives may be selected from the following list of Thompson School Horticultural Technology classes: HT 404, 257, 258, 275, 276, 251 and 272.

For advice on course selection, students should see the department chairperson.

### Departmental Honors

Honors in plant biology or environmental horticulture will be awarded to students who complete 16 credits of honors courses in plant biology courses (including a minimum of four credits in a senior honors thesis project), and maintain a minimum grade-point average of 3.4 (overall

average and in major coursework). Students wishing to apply to the departmental honors program should consult with the department chairperson.

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## **Sustainable Agriculture and Food Systems (SAFS) ▼**

» <http://sustainableag.unh.edu/>

» [Click to view course offerings](#)

*Professor:* William E. Berndtson, John E. Carroll, Andrew B. Conroy, Thomas M. Davis, Jon M. Wraith

*Associate Professor:* David L. Berlinsky, Alberto B. Manalo

*Assistant Professor:* Andre F. Brito, Kirk D. Broders, David H. Townson

*Extension Associate Faculty:* Rebecca Grube Sideman

The sustainable agriculture and food systems (SAFS) program offers a flexible curriculum to students seeking to acquire integrated knowledge and experiences related to modern agricultural and food systems and/or preparing for varied careers in these fields. It draws upon the diverse course offerings by the three academic departments in the College of Life Sciences and Agriculture and the Thompson School of Applied Science as well as those from other colleges at UNH.

Students in this program will obtain knowledge in a variety of topics including sustainable agricultural practices, the promotion of healthy eating through sustainable food production and food policies, the science and management of working landscapes, locally produced foods and value-added agricultural products. SAFS graduates will be prepared to pursue careers in a wide range of fields including, but not limited to, integrated agriculture; the production of food, fiber and agricultural services; management and marketing of agricultural operations; management of working lands and landscapes; agriculture/food/nutrition/natural resources-related research; policy-making, and other current and emerging professions.

The program offers both a Bachelor of Science (B.S.) degree and a Bachelor of Arts (B.A.) degree. The B.A. degree will be particularly useful to those interested in having more flexibility to take courses from a variety of disciplines or pursuing a dual degree, second major, or minor. The B.S. degree will best serve those seeking a strong foundation in scientific and technical knowledge and/or who envision pursuing an advanced degree.

## Foundation Requirements

All students pursuing either a B.A. or B.S. in SAFS are required to earn 38 credits of foundation courses which will provide them with fundamental knowledge in disciplines relevant to agricultural production and management. Most of these courses are offered by departments in the College of Life Sciences and Agriculture. The specific courses that meet foundation requirements are as follows:

PBIO 405, Organic and Sustainable Food Production

CHEM 403, General Chemistry I

NR 435, Contemporary Conservation Issues and Environmental Awareness

NUTR 405, Food and Society

ANSC 401, Animals and Society

EREC 411, Environmental and Resource Economics Perspectives

PBIO 421, Introductory Horticulture

NR 501, Studio Soils

BIOL 528, Applied Biostatistics I

## Other Requirements for B.A. Students

a. **Student-Designed Emphasis Area:** Earn 20 credits to complete the emphasis area requirement. Students may select a cohesive group of courses from the *List of Approved Program Electives*, or may use a group of courses transferred from a completed 2-year degree program such as the Thompson School of Applied Sciences. Students will define their emphasis area and submit it to the SAFS program advisory committee for approval prior to the start of their fifth semester or third year.

b. **Program Electives:** Complete 20 credits of courses found in the *List of Approved Program Elective Courses*.

c. **Senior Capstone Experience:** Earn at least 4 credits in a course approved and supervised by the SAFS Program. Capstone experiences may include formal coursework, pre-approved Honors theses or mentored research projects, or other special student activities accepted by the SAFS program.

Of the emphasis and program elective courses, at least 16 credits (not counting the capstone) must be earned at the 600 or 700 level. Furthermore, at least 4 credits must qualify as experiential.

## Other Requirements for B.S. Students

B.S. students must meet the ***Student-Designed Emphasis Area, Program Electives***, and ***Senior Capstone Experience*** requirements described above for B.A. students. In addition, they must satisfy the ***Core Science Courses*** requirement by completing 12 credits of science courses chosen from the *List of Approved Core Science Courses*.

Of the core science, emphasis, and program elective courses, at least 20 credits (not counting the Capstone) must be earned at the 600 or 700 level. Moreover, at least 4 credits must qualify as experiential.

The *List of Approved Program Elective Courses*, which includes those classified as *Experiential*, and *List of Approved Core Science Courses* may be obtained from the program director.

### **University Requirements**

In addition to meeting the SAFS major requirements, students must satisfy all University requirements including those that pertain to the minimum number of credits, grade-point average, writing intensive courses, the Discovery Program, and foreign language (only for B.A. students).

Students interested in the sustainable agriculture and food systems program should contact Rebecca G. Sideman at (603) 862-3203 or [becky.sideman@unh.edu](mailto:becky.sideman@unh.edu).

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## **Tourism Planning and Development (TOUR) ▼**

» <http://www.tourism.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Lyndon E. Goodridge, John M. Halstead, Bruce E. Lindsay

*Associate Professor:* Kelly L. Cullen, Alberto B. Manalo, Douglas E. Morris, Robert A. Robertson

*Lecturer:* Mary Adamo Friedman

*Extension Professor:* Michael R. Sciabarrasi

*Extension Associate Professor:* Charles A. French

Tourism creates immense economic activity, totaling more than \$4 trillion dollars of world spending. Tourism is also an integral part of New England's economy. Experience has shown that the public and private sectors of the tourism industry benefit substantially from proper

planning. Those locations with the best planned and managed tourism developments are likely to be the most successful tourist destinations from the standpoint of providing both high-quality tourist experiences and bringing substantial economic benefits with minimal disruptions to the social and natural environment. In response to these needs, the Department of Natural Resources and the Environment offers a bachelor of science degree in tourism planning and development from both regional and international perspectives.

The tourism planning and development curriculum provides students with the skills and knowledge necessary to plan, develop, and manage natural, cultural, and financial resources in an environmentally and socially responsible manner. The program utilizes an interdisciplinary approach to provide students with a strong liberal education supplemented by a broad professional understanding of tourism planning and its role in local, state, national, and global economic and social development. Students study both the social and environmental sciences in order to better understand the complexity of natural and social systems. The program emphasizes the application of planning and marketing tools, environmental, social and economic science theories and methods to the planning and development tourism resources and the management of natural resources.

### **Curriculum Structure**

All majors must complete a core curriculum and choose one of two focus areas: international tourism development or regional tourism planning. Capstone experiences are supervised and approved within the major, and are required of all seniors. The capstone explores areas of interest based on the integration of prior learning. The capstone requirement may be satisfied through a course, created work or product, a professional internship or some form of experiential learning (e.g., honors theses, mentored research projects, and other special student activities). Departments are responsible for certifying that graduating seniors have met the capstone requirement for their majors.

In addition, courses for the Discovery Program and the University Writing Requirement must be completed.

### **Core Courses**

*The core curriculum is composed of the following courses:*

TOUR 400, Introduction to Tourism

EREC 411, Environmental and Resource Economics Perspectives or Equivalent

MKTG 550, Survey of Marketing

EREC 504, Business Management for Natural Resource Firms

EREC 525, Statistical Methods and Applications



CEP 614, Fundamentals of Planning

TOUR 615, Tourism Planning and Development

TOUR 633, Economics of Travel and Tourism

TOUR 560, Special Topics (8 credits)

TOUR 700, Marketing Communications Research: Methodological Foundations

TOUR 705, Ecotourism: Managing for the Environment, or TOUR 767, Social Impact

Assessment, or CEP 777, Topics in Community Planning

TOUR 794, Tourism Internship involves a 14–16 week, 40 hours per week full-time, supervised internship, and enables students to meet and work in association with representatives from the public and private sectors of the tourism industry.

### ***International Tourism Development Concentration***

This concentration area prepares students to work in the dynamic and challenging environment of international tourism development. Depending on interests, language skills, and international experiences, students may expect to find employment in settings such as national tourism offices, international tourism organizations, national and foreign consulates, and multinational tourism destination resorts. In addition to the required core courses, students who pursue the international tourism development concentration must complete the following requirements: TOUR 792, International Experience; two TOUR electives; competency in a foreign language (i.e., functional reading, writing, and speaking ability equivalent to the third-year second-semester level); and two additional electives that will enhance students' career opportunities in the international area.

### ***Regional Tourism Planning Concentration***

This concentration area prepares students to obtain professional roles in planning in the public or private sectors of the tourism industry. Depending on interests and technical skills, students may expect to find employment in settings such as local and regional economic development organizations, chamber of commerce offices, convention and visitor bureaus, state and federal offices of tourism development, local and regional planning commissions, and resort communities. In addition to the required core courses, students who pursue the regional tourism planning concentration must complete the following requirements: TOUR 798, Independent Study in Tourism; two TOUR electives; and all the requirements for at least one minor in a relevant area of study.

Students interested in the tourism planning and development program should contact the program coordinator, Robert A. Robertson, (603) 862-2711, [rob.robertson@unh.edu](mailto:rob.robertson@unh.edu)

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## Wildlife and Conservation Biology ▼

» <http://www.wildlife.unh.edu/>

» [Click to view course offerings](#)

*Professor:* Kimberly J. Babbitt, Marianne Klauser Litvaitis, John A. Litvaitis, Peter J. Pekins

*Research Assistant Professor:* Adrienne I. Kovach

*Extension Associate Professor:* Matthew D. Tarr

The wildlife and conservation biology curriculum is for students interested in the ecology, conservation, and management of wildlife resource. It is designed to provide a knowledge of wildlife species and their various forest, field, and wetland habitats, related policy and law, and ultimately their management and conservation. Students are prepared for employment with public and private agencies in wildlife conservation and management, or for continued study at the graduate level.

Fieldwork is carried out during the academic year on local and regional wildlife populations. Majors are assisted and encouraged to obtain summer employment related to wildlife and natural resources.

### Freshman Year

BIOL 411, Principles of Biology I

BIOL 412, Principles of Biology II

ENGL 401, First Year Writing

MATH 424B, Calculus for Life Sciences, or MATH 420, Finite Mathematics

NR 400, Professional Perspectives in Natural Resources

NR 401, Introduction to Natural Resources

NR 425, Field Dendrology

NR 433, Wildlife Ecology

Elective

### Sophomore Year

BIOL 528, Applied Biostatistics I

CHEM 403, General Chemistry

CHEM 404, General Chemistry

ENGL 501, Introduction to Creative Nonfiction, or ENGL 502, Technical Writing, or ENGL 503, Persuasive Writing

EREC 411, Environmental and Resource Economics Perspectives

NR 527, Forest Ecology, or BIOL 541, General Ecology

NR 658, Introduction to Geographic Information Systems  
Elective or Advanced Zoology Course

### **Junior Year**

NR 602, Natural Resources and Environmental Policy  
NR 615, Wildlife Habitats  
NR 640, Wildlife Population Ecology  
NR 655, Vertebrate Biology  
NR 741, Demographic Methods in Conservation Biology and Wildlife Ecology  
NR 625, Physiological Ecology or ZOOL 625, Principles of Animal Physiology  
ZOOL 690, Evolution, or NR 664, Conservation Genetics  
Elective or Advanced Zoology Course  
Elective

### **Senior Year**

NR 729, Silviculture or NR 711, Wetland Ecology and Management, or ZOOL 717, Lake Ecology  
NR 738, Wildlife Policy and Management (Capstone)  
NR 740, Inventory and Monitoring of Ecological Communities  
Elective  
Elective  
Elective

One capstone experience, supervised and approved within the major, is required of all seniors. The capstone requirement is satisfied through the course NR 738 during the senior spring semester.

Electives should be used to satisfy Discovery Program requirements and two major requirements in the areas of communication skills and physical sciences, one course in each area. Pertinent courses are listed in the detailed curricular guidelines from the department.

Students interested in the wildlife and conservation biology major may consult with the program coordinator, Peter Pekins, (603) 862-1017.

### **General Science Certification**

See [Department of Education](#) and [COLSA/Degrees](#).

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## Zoology (ZOOL) ▼

» <http://www.zoology.unh.edu/>

» [Click to view course offerings](#)

*Professor:* John F. Burger, Donald S. Chandler, James F. Haney, Larry G. Harris, W. Huntting Howell, Marianne Klauser Litvaitis, Michelle P. Scott, James T. Taylor, Charles W. Walker, Winsor H. Watson III

*Research Professor:* Raymond E. Grizzle

*Affiliate Professor:* Ann C. Bucklin, Maryellen M. Lutcavage

*Associate Professor:* David L. Berlinsky, Jessica A. Bolker

*Affiliate Associate Professor:* James E. Byers, Richard Langan

*Research Assistant Professor:* Elizabeth A. Fairchild

*Affiliate Assistant Professor:* Michele Dionne, Dwight D. Trueblood, Barry J. Wicklow

*Clinical Associate Professor:* Mary Katherine Lockwood

*Extension Assistant Professor:* Kenneth J. LaValley

The University's location and facilities provide unique opportunities for the study of aquatic and terrestrial animals due to its access to the seacoast and the lakes region of New Hampshire, the White Mountains National Forest, and the presence of two coastal marine laboratories, as well as estuarine and freshwater facilities. There is a strong teaching and research emphasis on ecological and physiological processes in aquatic animals and ecosystems. Major strengths of our program are our hands-on approach to teaching and emphasis on involving undergraduates in research.

The zoology majors (B.S. and B.A.) build on the common background of the biology core curriculum (two semesters of introductory biology, ecology and genetics), with an additional six (B.A.) or seven (B.S.) courses that include morphology, physiology, three choices between courses in development, evolution, and animal survey and one (B.A.) or two (B.S.) electives in a biological science. The B.A. also has a foreign language requirement. Zoology majors are required to achieve a 2.0 average and a minimum of C- in each biological science course. The zoology majors also require passing grades in chemistry (three semesters for the B.A. and four for the B.S.), physics (one semester for the B.A. and two for the B.S.) and mathematics (calculus or biostatistics for the B.A. and both courses for the B.S.). Students will have opportunities in these majors to specialize in areas of their own interest, such as completing a minor in Animal Behavior.

For a detailed list of curriculum requirements, go to the zoology homepage at [www.zoology.unh.edu](http://www.zoology.unh.edu).

In addition, courses for the Discovery Program and the University Writing Requirement must be completed.

### ***New England Regional Student Program***

The bachelor's degree in zoology is one of the specialized curricula recognized by the New England Board of Higher Education and participates in the New England Regional Student Program. Under this program, students from the state of Massachusetts pay the UNH in-state tuition rate plus 75 percent.

Students who are interested in a zoology major should contact James Haney, Department of Biological Sciences, (603) 862-2105.

### ***General Science Certification***

See [Department of Education](#) and [COLSA/Degrees](#).

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» <http://www.thompsonschoo.unh.edu/>

*Director:* Regina A. Smick-Attisano

*Assistant Director:* Deborah Pack (TSAS Admissions) , Cynthia Giguère

### Introduction ▼

The Thompson School of Applied Science (TSAS), established in 1895, is a division of the College of Life Sciences and Agriculture (COLSA) offering the associate in applied science degree and 14 program concentrations. Curricula comprise a balance of professional, science-related, and general education courses that prepare students to meet the specific demands of a technical or applied profession, continuing education, and the general demands of life.

### Thompson School of Applied Science Overview ▼

Faculty members at the Thompson School have significant work experience in industry and business; extensive and up-to-date knowledge of their specialties; ongoing contacts with practicing professionals; dedication to students and to excellence in teaching; and a commitment to practical, science-based education. They work closely with students, providing academic advising, career counseling, and special assistance, even outside the classroom, when needed.

Located at the western entrance to campus, the Thompson School's classrooms, laboratories, and working enterprises are designed for career-related experience under realistic conditions.

Barton Hall contains an animal science lab, a food preparation lab, a state-of-the-art grooming facility, several classrooms, faculty offices, and a student lounge.

Cole Hall includes a 150-seat lecture auditorium, a commercial kitchen and dining area, a student study and lounge area, a computer laboratory (which serves as a GIS lab), a small classroom, and administrative offices.

Putnam Hall houses an architecture laboratory, a surveying and mapping laboratory, a

geographic information system (GIS) laboratory, a computer-aided design (CAD) laboratory, an agricultural mechanization shop (welding, engines), forestry and multi-use classrooms, and staff and faculty offices.

More detailed information on our various program areas and specializations follow.

- Whether the specialty is dairy, equine, or small animals, students in **Applied Animal Science** utilize professional facilities both on and off campus. On-campus facilities include the Thomas P. Fairchild Dairy Teaching and Research Center, UNH's equine facilities, and the Thompson School Grooming Shop. Our small animal care program partners with the New Hampshire SPCA
- **Applied Business Management** students enjoy the combination of academic and industry-based education and training in all aspects of managing and/or owning small- to medium-sized businesses and organizations. The N.H. Seacoast area business community serves as our working laboratory for students, who observe operations, conduct interviews, and perform a wide variety of business analyses with local merchants, entrepreneurs, and other community leaders.
- **Civil Technology** students have a variety of classroom experiences, ranging from an in-lab materials testing facility to two civil technology computer facilities with 24-hour, 7-day access that features the latest software for surveying and mapping, and architectural and computer-aided design. GPS (global positioning system) software also is available. The civil technology suite of spaces provides a ready access to learning and development.
- Students majoring in **Community Leadership** gain enriching experiences working with organizations such as Families First, the N.H. Housing Partnership, the Red Cross, New Hampshire Public Television, and on-campus groups. Students are involved with creating, operating, and evaluating these service-learning activities.
- **Culinary Arts** students are engaged in a carefully designed curriculum combining theory with more than 700 hours of practical application of culinary techniques in modern production kitchens located on UNH's campus. Students also are required to complete a summer work experience of a minimum of 400 hours at a pre-approved establishment between their first and second years of study.
- **Dietetic Technology** students utilize skills gained in the classroom by applying them in local hospitals and long-term care facilities and in community programs such as UNH Cooperative Extension Nutrition Connections and NH Food Bank Cooking Matters. Students complete a minimum of 450 practice hours under the supervision of preceptors who have expertise in their fields; they mentor students as they provide patient care as part of a hospital's nutrition care team, teach nutrition and healthy cooking classes in community programs, and design and prepare healthy recipes for our on-site restaurant.
- **Forest Technology** students integrate all aspects of forest management as they complete projects on more than 3,000 acres of University land. Using the school's

sawmill and harvesting equipment, they contribute to the sustainable management of UNH lands. In the classroom and the forest they develop skills (including GIS and GPS) and techniques in boundary surveying, mapping, forest inventory, forest planning, reforestation, and forest land protection.

- **Horticultural Technology** students have the use of the Thompson School horticultural facilities (glass and poly covered greenhouses used for propagation and cultivation of a wide selection of ornamental plant material), refrigerated compartments, display gardens (public and private), and the campus arboretum as well as a wide variety of landscaping tools and equipment. Students design, install and maintain landscaping components on the grounds of the University and with local organizations and homeowners in surrounding communities.
- **Restaurant Management** students receive a balance of management theory and practical experience. Participation in on-campus restaurants, special events, and functions offer students hands-on opportunities to gain confidence and experience. Students are also required to complete a summer work experience of a minimum of 400 hours at a pre-approved establishment between their first and second years of study.

## Associate in Applied Science ▼

To graduate with an associate in applied science degree, a student must complete specified coursework in general education, technical specialization, and general electives (see the following section), with an overall grade-point average of no less than 2.0. In addition, students must earn the minimum number of total credits required for each specialization, no fewer than 64.

### *General Education*

These are courses designed for personal and professional development with special emphasis on the ability to think critically, to communicate effectively, to understand computer technology, and to process quantitative data. In addition, they serve to acquaint students with some of the major modes of thought necessary to understand oneself, others, society, and the environment.

In this area a student must complete:

- one course in computer literacy (minimum of one credit hour);
- one course in mathematics (minimum of three credit hours);
- two to three courses in communications, to include COM 209, Expository Writing and Reading, plus elective(s) for a minimum of six credit hours;
- two to three courses in social sciences, the arts, or the humanities, to include either SSCI 201, Human Relations, or SSCI 202, Social Issues, plus an elective (minimum of



six credit hours).

### *Technical Specialization*

These are courses designed to develop the necessary scientific knowledge, technical skills, and practical experience required for employment in a professional discipline. Each student must complete all technical courses specified in the selected program of study.

See the following [Programs of Study](#) sections for course requirements and descriptions.

### *General Electives*

This component of the degree program allows the individual to pursue courses of personal or professional interest. In this area, a student may choose a number of courses in each program of study specified as electives. These may be chosen from courses offered by the Thompson School or from other selected University undergraduate courses with adviser and administrative approval.

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Equine Management

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Business Management

#### Civil Technology

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Construction Management

Surveying and Mapping

#### Community Leadership

#### Culinary Arts and Nutrition

Culinary Arts

Dietetic Technology

#### Forest Technology

Forest Technician

#### Horticultural Technology

Landscape Operations

Ornamental Horticulture

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### Full-Time and Part-Time Programs ▼

The associate in applied science degree at the Thompson School can be completed by pursuing either a full-time or part-time program. Most students enroll in the full-time program. This allows completion of a program of study in four semesters (the traditional two-year period). The sequence of required courses and semester schedules for each program are defined throughout this catalog.

Some students who cannot attend on a full-time, two-year schedule or who wish to spread the financial investment of a college education over a longer period elect the option of part-time study. This allows students to work toward completion of the degree over an extended period, typically two calendar years to five academic years. The schedule can be shortened or lengthened to meet the needs of the individual student. For further information, please contact the Thompson School at (603) 862-1025.

### Admissions ▼

The Thompson School welcomes applications from both recent high school graduates and adult students.

Admission to an associate in applied science degree program is based upon successful completion of a secondary school program of college preparatory coursework or its equivalent. Primary consideration is given to the academic record, as demonstrated by the candidates' secondary school course selections and achievement, recommendation, and the results of the SAT and/or ACT exam. Consideration is given to the applicant's academic achievement, personal motivation, demonstrated interest in a career field, and leadership roles.

Candidates must, at a minimum, present at least four years of English, two years of

mathematics (Algebra I, Geometry and/or Algebra II), two years of science (Biology with a lab, being one of them), and three years of social science. The majority of our students are admitted with three years of both college prep mathematics and science.

For an adult student who graduated from high school several years ago, the Office of Admissions will consider not only his or her academic record but also accomplishments since high school. Important factors include professional work and advancement and motivation to succeed in Thompson School courses. In addition, applicants will be considered on the basis of any available test scores such as General Education Development (GED), SAT or ACT, and College Level Examination Program (CLEP); letters of reference; previous college study; and military record (if applicable). Adult students who have been out of high school for a number of years may request that the Office of Admissions waive the SAT requirement.

## How to Apply ▼

All first-year and transfer applicants to UNH's Thompson School of Applied Science must submit both the *Common Application* and *UNH Supplement* to be considered for admission. To access both forms, visit <http://admissions.unh.edu/apply/>.

Although UNH will accept the paper-version of the application, students are strongly encouraged to submit the application electronically through the Common Application website [www.commonapp.org](http://www.commonapp.org), as this expedites the process (99% of students do submit their applications electronically). These same options are available to students applying from countries other than the United States.

The electronic version of the *Common Application* and *UNH Supplement* may be submitted from September through February 1. The Early Action due date is November 15. Notice of admission to the Thompson School will normally be sent within 30 days following receipt of all required information. When applying from February 2 through July 15, the PDF (paper) application must be submitted <http://admissions.unh.edu/files/2009/04/Common-App-First-Year-and-First-Year-Supplement-2011-1.pdf>

Please note that priority due dates for students requesting UNH residential housing are February 1 for the fall semester and November 1 for the spring semester. Housing assignments are handled on a space-available basis. The UNH financial aid due date is March 1 for the following academic year.

## Campus Visits ▼

Prospective students are encouraged to participate in an interview at the Thompson School, attend an open house, and/or take a tour of the Thompson School and the rest of the UNH campus. Interviews are recommended but not required. An open house is held in the fall. To attend the open house or to arrange your visit, please contact the Thompson School at (603) 862-1025 or visit our website at [www.thompsonschoo.unh.edu](http://www.thompsonschoo.unh.edu).

## Expenses, Financial Aid, and Scholarships ▼

Costs for students include tuition, fees, room and board, books and supplies, and personal and travel expenses. These costs are the same for any student enrolled at the University of New Hampshire (see [Fees and Expenses](#)) and students majoring at the Thompson School have access to the same student services. (See also [Campus Life, Programs and Services for Students](#), and [Health Services](#).) Required curriculum and lab fees for Thompson School programs are listed with each specialization.

Information about scholarships, loans, and work-study is located at <http://financialaid.unh.edu/> or by calling (603) 862-3600. A Free Application for Federal Student Aid (FAFSA) MUST be processed by the Financial Aid Office for a student to be considered for many scholarships. (See also [Financial Aid](#).)

The Thompson School, one of four divisions of the College of Life Sciences and Agriculture (COLSA), informs our students of scholarship opportunities, which are primarily for second-year students.

## New England Regional Student Program ▼

The Thompson School participates in the New England Regional Student Program of the New England Board of Higher Education, through which each state university system in New England offers a number of regional curricula to students from other New England states. Under this program, students pay in-state tuition plus 75 percent. See the following table for Thompson School programs that are eligible in 2011-2012. Eligibility under this program may vary from year to year, so it is suggested that you obtain further information by contacting the

New England Board of Higher Education, 45 Temple Place, Boston, MA 02111; (617) 357-9620. You may also contact the UNH Office of Admissions or the Thompson School for more information.

<b>Associate Degree Program</b>	<b>Available to Residents of</b>
<i>Applied Animal Science</i>	
Dairy Management	MA, ME, RI, VT
Equine Management	MA, ME, RI, VT
Small Animal Care	MA, ME, RI, VT
<i>Civil Technology</i>	
Architectural Technology	CT, RI
Construction Management	CT, RI
Surveying and Mapping	CT, RI
<i>Community Leadership</i>	
Community Leadership	CT, MA, ME, RI, VT
<i>Food Service Management</i>	
Culinary Arts	MA, RI, VT
Dietetic Technician	MA, RI, VT
Restaurant Management	MA, RI, VT
<i>Forest Technology</i>	
Forest Technician	CT, MA, RI, VT
<i>Horticultural Technology</i>	
Landscape Operations	RI
Ornamental Horticulture	RI

## **Transfer Opportunities ▼**

UNH invites Thompson School graduates to continue their education at the University. Many of the associate degree programs offered by the School have baccalaureate degree counterparts. Specifically, these counterparts include civil engineering, forestry, environmental horticulture,

equine management, nutritional sciences, business administration, and hospitality management. Many other baccalaureate majors also are available. A final cumulative grade-point average of at least 2.5 is required for transfer to most programs; some UNH baccalaureate programs require a higher cumulative grade-point average. Successful completion of a baccalaureate degree usually requires a minimum of two years of additional study at the University. Other colleges and universities, especially those within the University System of New Hampshire, also welcome graduates from the Thompson School.

## Program Abbreviations ▼

The following abbreviations are used to identify courses that are part of Thompson School of Applied Science programs.

AM	Agricultural Mechanization
AAS	Applied Animal Science
ABM	Applied Business Management
ANSC	Animal and Nutritional Science
CEP	Community & Environmental Planning
CT	Civil Technology
COM	TSAS Communication
CSL	Community Leadership
CD	Community Development
FSM	Food Service Management
FORT	Forest Technology
HT	Horticultural Technology
MTH	TSAS Mathematics
NR	Natural Resources
NUTR	Nutrition
PBIO	Plant Biology
SSCI	TSAS Social Science
THDA	Theatre and Dance
TSAS	Thompson School Applied Science
ZOOL	Zoology



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UNH Search:





### Thompson School of Applied Science

#### Introduction

#### Degrees

#### Other Programs

#### Programs of Study

- Applied Animal Science
- Applied Business Management
- Civil Technology
- Community Leadership
- Culinary Arts and Nutrition
- Forest Technology
- Horticultural Technology

## Undergraduate Course Catalog 2011-2012

### Thompson School of Applied Science ▼

» <http://www.thompsonschoo.unh.edu/>

### Agricultural Mechanization (AM) ▼

» [Click to view course offerings](#)

*Professor:* Thomas A. March

#### Description

Courses offered under the agricultural mechanization (AM) heading include welding and fabrication, internal combustion engines, computer literacy and construction-related courses. These courses appeal to a wide variety of UNH students (both two and four-year); several are required courses in civil technology specializations.

### Applied Animal Science (AAS) ▼

» <http://www.thompsonschoo.unh.edu/aas>

» [Click to view course offerings](#)

*Professor:* Andrew B. Conroy

*Associate Professor:* Laurie Chapman-Bosco

*Lecturer:* Sarah Proctor

Applied animal science (AAS) provides students with hands-on practical skills combined with knowledge and understanding of the latest technology. The core program provides a solid background in anatomy, physiology, nutrition, health, and animal breeding. In addition, students choose a concentration in equine management, dairy management, or small animal care. Each concentration also allows for choices of elective courses in other areas.

Practical learning experience is provided at the UNH equine facilities and the Thomas P.

Fairchild Dairy Teaching and Research Center and the UNH Organic Dairy Farm. The Thompson School also operates its own grooming shop and biology laboratories. The curriculum has a number of animal-related educational partnerships, including one with the New Hampshire SPCA in Stratham, NH, the Cocheco Valley Humane Society, and field trips to many animal-related businesses.

### **Admissions Requirements**

Applicants to the applied animal science program area must present college preparatory English and at least two years of satisfactory work in both college preparatory mathematics and science (one of the sciences being biology, with a lab). One year of high school chemistry is also highly recommended.

### **Curriculum Fee**

Applied animal science, all specializations: \$605\*

\*This one-time, nonrefundable curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that is unique to the applied nature of the concentration. The curriculum fee covers the entire two-year course of study for one concentration. There may be additional course fees for specific, high-cost courses. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's *Time and Room Schedule*. All fees are subject to change.

### **Applied Animal Science Curriculum Standards**

Applied animal science students must maintain a minimum 2.0 cumulative grade-point average in AAS classes after two semesters (minimum 26 credits) to take additional AAS classes. Students with AAS averages lower than 2.0 must repeat classes with lower grades and raise their average to the required 2.0 before taking additional AAS classes. Students must have a minimum cumulative 2.0 grade-point average in AAS classes to qualify for graduation from the program.

### **Dairy Management**

To work in the highly technical, rapidly changing field of dairy management, students must become well versed in the many aspects of dairy farm operation and management. In the dairy management specialization, students put into practice immediately many of the skills learned in the classroom. Students learn to balance rations, identify and treat diseases, read a bull proof, and gain many other skills. They work at the University's dairy farm, a modern and well-equipped teaching and research center, where they collaborate to manage the CREAM (Cooperative for Real Education in Agriculture) herd. Students are also involved with the new organic dairy facility.

Students learn the business of farming through field exercises in land management, forage production, financial management, and computer use on a dairy farm as well as through continued practical experience with cattle. The program prepares students to work both on the farm and in related businesses.

Thompson School Dairy Management has a unique arrangement with the baccalaureate dairy management major. Students may start with the Thompson School program, obtain their associate in applied science (A.A.S.) degree then transfer to the four-year dairy management major and obtain a B.S. in two additional years with a full-time course of study. This allows students to receive two degrees in as little as four years or obtain their A.A.S. degree and work in the field to later return for a B.S. Students wishing to follow this course of action need to work closely with their advisers and maintain a grade of C or better in key applied animal science courses.

### **Career Opportunities:**

Herd manager, agricultural sales and/or service employee, farm manager, artificial insemination (AI) technician, crop manager, farm or farm-business owner.

### **Dairy Management Program of Study**

#### **First Year, Fall Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
AAS	228	Anatomy and Physiology of Domestic Animals	4
AAS	231	Introduction to Animal Science	4

AAS	244	Introduction to Dairy Herd Management	4
COM	209	Expository Writing and Reading	4
TSAS	205	Computers in the Workplace	2

### First year, Spring Semester

Abbreviation	Course Number	Title	Credits
AAS	242	Introduction to Business in Applied Animal Science	2
AAS	423	Dairy Selection	2
AAS	434	Equipment and Facilities Management	3
AAS	439	Fundamentals of Animal Health	3
COM	212	Technical Writing	2
MTH	202	Math II	3

### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits
AAS	235	Animal Nutrition	3
AAS	275	CREAM (Cooperative for Real Education in Agricultural Management)	4
AAS	297	Work Experience (summer)	0
AAS	432	Introduction to Forage and Grassland Management	3
AAS	546	Animal Business Applications	4
SSCI	20__	Social Science Course	4

### Second Year, Spring Semester

Abbreviation	Course Number	Title	Credits
AAS	240	Animal Breeding	3
AAS	275	CREAM (see above)	4
AAS	574	Dairy Cattle Disease Seminar	2
SSCI	2__	Social Science Course	2 - 4
		Elective(s)	4

### Recommended electives include

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Abbreviation	Course Number	Title	Credits
AAS	221	Large Animal Behavior and Handling	2
AM		Agricultural Mechanization courses	4

Total: 67 - 70 credits

### **Equine Management**

The equine industry in New England encompasses many different facilities and disciplines. Students in the equine management concentration combine courses in the most recent technical information with related practical experience. They gain hands-on experience in bandaging, selection, ration-balancing by computer, fitting and care of equipment, and farm and barn analysis. They also acquire decision making and managerial skills. Graduates have a solid foundation to pursue either employment or additional educational opportunities upon completion of the program.

The riding focus at UNH is balance seat with schooling in dressage, cross country, and stadium jumping. Thompson School students in horsemanship classes ride in the UNH program and have the opportunity to compete in intercollegiate shows.

Thompson School equine management has an articulation agreement for students wishing to pursue a B.S. in the four-year equine studies major following graduation from the Thompson School. This B.S. could be obtained either in equine industry and management (Track I) with four additional semesters, or in therapeutic horseback riding (Track II) in five additional semesters. With this articulation, students may obtain both an associate degree in applied science (A.A.S.) and a B.S. in as little as four years with full-time coursework, or obtain their A.A.S., work in the field, and return for their B.S. at a later date. Students wishing to take advantage of these articulation agreements need to work closely with their advisers. An additional financial benefit may be realized by students following this articulation as the equine management concentration is part of the New England Regional Student Program. [\[please put in link to catalog for this\]](#)

### **Career Opportunities:**

Barn manager, breeding farm manager, sales (tack shops, grain stores), horse show manager, veterinary assistant/equine practice, riding instructor (with additional studies).

## Equine Management Program of Study

### First Year, Fall Semester

Abbreviation	Course Number	Title	Credits
AAS	228	Anatomy and Physiology of Domestic Animals	4
AAS	231	Introduction to Animal Science	4
AAS	437	Equine Handling and Care Techniques	4
ANSC	411	ANSC Introduction to Equine Science	1
COM	209	Expository Writing and Reading	4
TSAS	205	Computers in the Workplace	2

### First Year, Spring Semester

Abbreviation	Course Number	Title	Credits
AAS	236	Equine Show Preparation and Competition	1
AAS	242	Introduction to Business in Applied Animal Science	2
AAS	426	Equine Conformation and Lameness	4
AAS	434	Equipment and Facilities Management	3
AAS	439	Fundamentals of Animal Health	3
COM	212	Technical Writing	2
MTH	202	Math II	3

### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits
AAS	235	Animal Nutrition	3
AAS	292	Light Horse handline (Half Semester II)	1
AAS	297	Work Experience (summer)	0
AAS	432	Introduction to Forage and Grassland Management	3
AAS	546	Animal Business Applications	4
AAS	547	Applied Equine Management	3
SSCI	201	Human Relations	4

**Second Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
AAS	240	Animal Breeding	3
AAS	252	Equine Health Management	4
AAS	253	Equine Competition Management	2
ANSC	402	ANSC: Horsemanship	3
SSCI	20__	Elective(s)	2 - 4
		Elective(s)	2 - 5

**Recommended electives (when offered)**

Abbreviation	Course Number	Title	Credits
AAS	272	Comparative Equine Operations	1
AAS	293	Equine Field Operations	1 - 3
ANSC	411	Introduction to Equine Science	1

Total: 65 - 75 credits

**Small Animal Care**

Animal companionship provides millions of people with an oasis in a hectic, impersonal world, and pet owners consistently seek additional advice on the care of their animals. The small animal care concentration prepares students to work in companion animal care positions of all types.

In their first year, students gain experience in breed types, behavior, genetics, restraint, and training of dogs and cats. Students also master laboratory procedures such as fecal examination and heartworm testing. In addition, the students learn the basics of grooming, nutrition, first aid, disease prevention, medication administration, and toxicology. During their second year, students spend four hours a week at the New Hampshire SPCA or Cocheco Valley Humane Society performing all aspects of animal care while they continue with their academic coursework.

Small animal care is very flexible with recommended elective courses. Second-year students choose classes based on their career goals. Career tracks include veterinary hospital employment, employment in the humane/animal control fields, employment or ownership within the boarding/grooming/daycare industry, or positions in laboratory animal care.



**Career Opportunities:**

Veterinary assistant, laboratory animal caregiver, pet store manager, pet groomer, kennel manager, animal care and control technician, animal-assisted activities/therapy volunteer and/or coordinator.

**Small Animal Care Program of Study****First Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
AAS	228	Anatomy and Physiology of Domestic Animals	4
AAS	230	Small Animal Breeds and Behavior	4
AAS	231	Introduction to Animal Science	4
COM	209	Expository Writing and Reading	4
TSAS	205	Computers in the Workplace	2

**First Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
AAS	218	Careers in Small Animal Care	1
AAS	222	Small Animal Grooming	2
AAS	242	Introduction to Business in Applied Animal Science	2
AAS	249	Small Animal Care Techniques	3
AAS	439	Fundamentals of Animal Health	3
COM	212	Technical Writing	2
MTH	202	Math II	3

**Second Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
AAS	235	Animal Nutrition	3
AAS	279	Small Animal Care Practicum	2
AAS	297	Summer Work Experience	0
AAS	546	Animal Business Applications	4
SSCI	201	Human Relations	4

AAS	2__	AAS Elective	2-4
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### Second Year, Spring Semester

Abbreviation	Course Number	Title	Credits
AAS	224	Small Animal Management	4
AAS	240	Animal Breeding	3
AAS	2__	Applied Animal Science Elective	2 - 4
AAS	2__	Applied Animal Science Elective	2 - 4
SSCI	2__	Social Science Course	2 - 4
		Elective	2 - 4

### Recommended AAS Electives (when offered)

Abbreviation	Course Number	Title	Credits
AAS	219	Animal Cruelty: NH Laws, Investigations and Prosecution	1
AAS	221	Large Animal Behavior and Handling	2
AAS	227	Small Animal Diseases	2
AAS	236	Equine Show Preparation and Competition	1
AAS	237	Equine Management Techniques	4
AAS	251	Human/Animal Bond	2
AAS	254	Animal Assisted Activities and Therapy	2
		ABM Courses (permission required)	Var
		CSL Courses (for students interested in working with non-profit organizations)	Var

Total: 64 - 70 credits

» [Click to view course offerings](#)

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## Applied Business Management (ABM) ▼

» <http://www.thompsonschoo1.unh.edu/abm>

» [Click to view course offerings](#)

*Professor:* William H. Scott, David E. Tooch

*Associate Professor:* Benjamin P. Fowler, Steven D. Tuttle

*Lecturer:* John MacMillan

The applied business management (ABM) program combines class work and practical experience to give students a thorough understanding of the business field. The core curriculum includes financial and managerial accounting, marketing and sales, human resource management, computer applications, business communications, business law, and strategic management for small business. Students may select from a variety of UNH electives.

Practical experience is gained through projects with local industries, municipalities, and state agencies, as well as student-run businesses. Students also may elect to develop internships with area businesses.

### **Admissions Requirements**

Students entering the business management program must present college preparatory English and have a minimum of two years of college preparatory mathematics. Several ABM courses require a strong background in basic mathematics and algebra.

### **Curriculum Fee**

Applied Business Management \$133\*

\*This one-time, nonrefundable curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that is unique to the applied nature of the specialization. The curriculum fee covers the entire two-year course of study for one specialization. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's *Time and Room Schedule*. All fees are subject to change.

### **Business Management**

Privately owned small-to-medium-sized businesses represent the largest and fastest-growing segment of the state and regional economy. The applied business management program offers students courses in many aspects of business management and prepares students for management of a family-owned business, or to start a new business or entry-level positions in existing firms. Business management students gain practical exposure to essential topics in

business management that prepares them to seek further specialization in a business area or to prepare for transfer to a baccalaureate program.

### Career Opportunities:

Office manager, entrepreneur, management trainee, assistant manager, purchasing and inventory controller, bookkeeper, domestic and international sales professional, business owner.

### Business Management Program of Study

#### First Year, Fall Semester

Abbreviation	Course Number	Title	Credits
ABM	204	Principles of Management	4
ABM	205	Applied Financial Accounting	4
COM	209	Expository Writing and Reading	4
SSCI	201	Human Relations	4

#### First Year, Spring Semester

Abbreviation	Course Number	Title	Credits
ABM	207	Applied Marketing	4
ABM	208	Managerial Accounting	4
ABM	226	Business Computer Applications	4
COM	210	Public Speaking	2
		Elective	4

#### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits
ABM	202	Professional Writing	3
ABM	206	Human Resource Management	4
ABM	214	Applied Sales	4
MTH	2__	Math I or II (determined by assessment)	3
		Elective(s)	2 - 4

#### Second Year, Spring Semester

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Abbreviation	Course Number	Title	Credits
ABM	211	Business Policy	4
ABM	232	Business Law	4
		Social Science Elective	2 - 4
		Elective(s)	2 - 4

#### Elective Course Options (when offered)

Abbreviation	Course Number	Title	Credits
ABM	210	Operations Management	4
ABM	215	Business and the Community	4
ABM	217	Web Page Programming and Design	4
ABM	240	Ethics in Business and Society	4
ABM	242	International Trade Applications	4

Total: 64 - 66 credits

### Restaurant Management

[www.thompsonschoo.unh.edu/abm/restaurant.html](http://www.thompsonschoo.unh.edu/abm/restaurant.html)

In the restaurant management concentration, students experience a carefully developed combination of classroom and laboratory work. They engage in practical, hands-on experiences, using modern commercial equipment to help them refine the necessary skills to be successful in the field. Students participate in the operation of 180 Blue, an on-campus restaurant located at the Thompson School. A required summer work experience rounds out the program's hands-on experiential learning. Students can also work at venues operated by University Hospitality Services, all located on the UNH campus. Extracurricular learning and earning opportunities are available in the many restaurants located in the Seacoast area. Students who want to continue their education in a baccalaureate degree program are strongly encouraged to take electives from the University's other schools and colleges to earn credits that may be applied to both degree programs.

» [Click to view course offerings](#)

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### Civil Technology (CT) ▼

» <http://www.thompsonschoool.unh.edu/ct>

» [Click to view course offerings](#)

*Professor:* Robert G. Moynihan, Guy E. Petty

*Associate Professor:* Kenneth L. Flesher

*Assistant Professor:* Anthony Richard Vannozzi

Civil technology is a dynamic educational opportunity offering skill-based learning through class instruction, extensive laboratory experience, and fieldwork, as well as portfolio opportunities. Students choose from one of the following concentrations: architectural technology, construction management, or surveying and mapping.

The cornerstone of the educational experience is instruction in computer-aided design (CAD) and parametric modeling using the Thompson School's state-of-the-art CAD/BIM (building information management) labs. Students in surveying use the latest GPS and surveying equipment and students studying geographical information systems (GIS) use the new GIS Instructional Lab. Additional coursework covers building science, construction contracting, materials, soils, and methodologies of professional practice in the concentration specialties.

### **Admissions Requirement**

Applicants to the architectural technology, construction management, and surveying and mapping specializations must present college preparatory English and at least two years of satisfactory work in college preparatory mathematics.

### **Curriculum Fee**

Civil technology: all specializations: \$87\*

\*This one-time, nonrefundable curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that is unique to the applied nature of the specialization. The curriculum fee covers the entire two-year course of study for one specialization. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's *Time and Room Schedule*. All fees are subject to change.

### **Architectural Technology**

In the architectural technology concentration, students expand on the broad construction-related base of the civil technology curriculum. Faculty who are experienced, registered architects and engineers introduce students to the technical skills used in the architectural profession, including computer-aided design (CAD), parametric modeling, and building science-related technologies. Course content includes engineering-based as well as design-based disciplines. The courses, when coupled with recommended electives, provide students with a substantial knowledge base for architecture-related careers. While some graduates continue their studies in accredited baccalaureate programs and become registered architects, most find work in technical support positions within the design and construction industries in either private companies or public/government entities.

### **Career Opportunities:**

Architectural technician, CAD designer, public works operations, land development planner, facilities management, engineering aide, or construction supervisor.

### **Architectural Technology Program of Study**

#### **First Year, Fall Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CT	220	Professional Practice	1
CT	222	Computer Aided Design Level I	4
CT	223	introduction to Surveying and Mapping	3
CT	224	Surveying and Mapping Lab	2
AM	280	Technical Computer Literacy/Internet Applications	4
MTH	203	Algebra and Trigonometry	3

#### **First Year, Spring Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CT	231	Design I	4
AM	275	Building Science/Residential Construction	4
COM	212	Technical Writing	2
SSCI	204	Leadership Effectiveness and Group Performance	2

		Elective	4
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### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits
CT	227	Mechanical & Electrical Systems	4
CT	230	Statics and Materials	4
CT	247	Construction Contracting	4
CT	281	Architecture I History and Design	4
CT	297	Work Experience	0

### Second Year, Spring Semester

Abbreviation	Course Number	Title	Credits
CT	282	Architecture II	4
COM	209	Expository Writing and Reading	4
SSCI	202	Social Issues	4
		Technical Elective	4

### Technical Elective Course Options (when offered)

Abbreviation	Course Number	Title	Credits
AM	251	Welding and Fabrication Technology	4
AM	252	Internal Combustion Engines II (Prereq. AM 261 - Engines I)	4
CEP	672	Fundamentals of Real Estate	4
NR	435	Contemporary Conservation Issues and Environmental Awareness	4
NR	621	Field Descriptions of Soils	3
THDA	459	Stagecraft	4
		Other courses by approval	VAR

Total: Min 65 credits

### Construction Management

In the construction management concentration, students prepare for careers in land development, construction contracting and management, and land-use planning. Students



learn not only how to build well but how to build wisely. They study construction and its related technologies, dealing with material selection and design, and design of foundation and drainage systems. They also examine environmental and land development issues by studying residential and commercial septic and waste disposal systems, recycling, and effective energy management. Some graduates elect to continue their education in bachelor of science programs in civil engineering or community development.

Graduates of the construction management concentration find employment in a variety of building industry-related positions.

### **Career Opportunities:**

Construction supervisor, project manager, cost estimator, public works employee, contractor, code enforcement officer, construction material tester, land-development planning employee, site evaluator for building components, construction product manufacturer, product representative, DOT engineering technician.

### **Construction Management Program of Study**

#### **First Year, Fall Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CT	220	Professional Practice	1
CT	222	Computer Aided Design Level I	4
CT	223	Introduction to Surveying and Mapping	3
CT	224	Surveying and Mapping Lab	2
AM	280	Technical Computer Literacy/Internet Applications	4
MTH	203	Algebra and Trigonometry	3

#### **First Year, Spring Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CT	231	Design I	4
CT	233	Construction Surveying	4
CT	237	Land Design and Regulations	4
COM	212	Technical Writing	2

SSCI	204	Leadership Effectiveness and Group Performance	2
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**Second Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
CT	227	Mechanical and Electrical Systems	4
CT	230	Statics and Materials	4
CT	247	Construction Contracting	4
CT	297	Work Experience	0
COM	209	Expository Writing and Reading	4

**Second Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
CT	234	Soils and Foundations	4
AM	275	Building Science/Residential Construction	4
SSCI	202	Social Issues	4
		Technical Elective	4

**Technical Elective Course Options (when offered)**

Abbreviation	Course Number	Title	Credits
AM	251	Welding and Fabrication Technology	4
AM	262	Internal Combustion Engines II (Prereq. AM 261 - Engines I)	4
CEP	672	Fundamentals of Real Estate	3
NR	435	Contemporary Conservation Issues and Environmental Awareness	4
NR	621	Field Descriptions of Soils	3
THDA	459	Stagecraft	4
		Other courses by approval	VAR

Total: Min. 65 credits

**Surveying and Mapping**

As land values increase and the need to use our natural resources efficiently while protecting

our environment becomes more critical, the role of surveyors is expanding. The surveying and mapping concentration contains a core sequence of six courses (from Introductory Surveying to the Legal Aspects of Surveying) that continuously challenge students to improve their technical knowledge, computer skills, and field competency. Using electronic field measuring equipment, computers to create and plot maps, and satellite positioning technology, the surveyors and mappers of today are at the forefront of acquiring, analyzing, and managing land information.

### Career Opportunities:

Licensed land surveyor, DOT engineering technician, GIS technician, land development planner, construction surveyor, GPS technician.

### Surveying and Mapping Program of Study

#### First Year, Fall Semester

Abbreviation	Course Number	Title	Credits
CT	220	Professional Practice	1
CT	222	Computer Aided Design Level I	4
CT	223	Introduction to Surveying and Mapping	3
CT	224	Surveying and Mapping Lab	2
AM	280	Technical Computer Literacy/Internet Applications	4
MTH	203	Algebra and Trigonometry	3

#### First Year, Spring Semester

Abbreviation	Course Number	Title	Credits
CT	231	Design I	4
CT	233	Construction Surveying	4
CT	237	Land Design and Regulations	4
COM	212	Technical Writing	2
SSCI	204	Leadership Effectiveness and Group Performance	2

#### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits

CT	240	Legal Aspects of Surveying	4
CT	243	Advanced Surveying and Mapping	4
CT	247	Construction Contracting	4
CT	297	Work Experience	0
COM	209	Expository Writing and Reading	4

### Second Year, Spring Semester

Abbreviation	Course Number	Title	Credits
CT	244	Advanced Surveying Computations	4
ssci	202	Social Issues	4
		Technical Elective	4
		Elective	4

### Technical Elective Course Options (when offered)

Abbreviation	Course Number	Title	Credits
AM	251	Welding and Fabrication Technology	4
AM	262	Internal Combustion Engines II (Prereq. AM 261 - Engines I)	4
CEP	672	Fundamentals of Real Estate	4
NR	435	Contemporary Conservation Issues and Environmental Awareness	4
NR	621	Field Descriptions of Soils	3
THDA	459	Stagecraft	4
		Other courses by approval	VAR

Total: 67 credits

### Civil Technology Elective Course Options (when offered)

Abbreviation	Course Number	Title	Credits
AM	261	Internal Combustion Engines I	4
AM	275	Building Science/Residential Construction	4
CT	227	Mechanical and Electrical Systems	4
CT	230	Statics and Materials	4
CT	233	Construction Surveying	4

CT	234	Soils and Foundations	4
CT	237	Land Design and Regulations	4
CT	240	Legal Aspects of Surveying	4
CT	243	Advanced Surveying and Mapping	4
CT	244	Advanced Surveying Computations	4
CT	281	Architecture I History & Design	4
CT	282	Architecture II (Prereq. Architecture I)	4
NR	621	Field Description of Soils	3

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## Community Leadership (CSL) ▼

» <http://www.thompsonschoo.unh.edu/colead>

» [Click to view course offerings](#)

*Professor:* Timothy E. Barretto, M. Katharine Hanson

The award-winning community leadership program (CSL) prepares students for influential roles within community organizations by combining hands-on community outreach with an academic study of communities, leadership, citizen influence, nonprofit organization management, and general education. The community leadership program was the recipient of the 2007 Spirit of New Hampshire Champion Award for Higher Education.

Students participate in faculty-supervised community outreach in a wide variety of locations, including schools and other learning-focused agencies, crisis shelters, environmental organizations, animal care facilities, nursing homes, advocacy programs, town offices, citizen groups, and other community-related organizations.

Through their coursework, community placements, and individualized plans of study, students learn how to supervise volunteers, facilitate effective meetings, speak comfortably and knowledgeably to groups of various sizes, analyze community issues and their causes, manage financial information, organize projects and events, research and prepare grant proposals, create effective newsletters, influence public opinion, and organize people to work toward positive solutions for shared problems.

The community leadership program is designed to flexibly and effectively meet the needs of a

diverse group of students including recent high school graduates as well as experienced community service workers.

### **Admissions Requirements**

Applicants to the community leadership program area must present college preparatory English and at least two years of satisfactory work in college preparatory mathematics and demonstrate community service or leadership experience plus strong verbal and written communication skills.

### **Curriculum Fee**

Community Leadership: \$64\*

\*This one-time, nonrefundable curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that is unique to the applied nature of the specialization. The curriculum fee covers the entire two-year course of study for one specialization. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's *Time and Room Schedule*. All fees are subject to change.

### **Community Leadership Curriculum Standards**

Community leadership students must maintain a minimum 2.0 cumulative grade-point average in required major classes after two semesters (minimum 26 credits) to take additional required CSL classes. Students with cumulative major course averages less than 2.0 must repeat classes with lower grades and raise their average to the required 2.0 before taking additional major classes. Students must have a minimum cumulative 2.0 grade-point average in required major classes to qualify for graduation from the program.

### **Career Opportunities:**

Volunteer manager, grant writer, lobbyist, public relations and marketing assistant, event planner, outreach coordinator, fundraiser/development specialist, publications media assistant, community organizer, staff supervisor.

### **Community Leadership Program of Study**

**First Year, Fall Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CSL	200	Technology for Community Service & Leadership	2
CSL	401	Introduction to Community Service & Leadership	4
CSL	405	Communication within Communities	4
COM	209	Expository Writing and Reading	4
MTH	2__	Math I or II (determined by assessment)	3

**First Year, Spring Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CSL	402	Introduction to Non-Profit Organizations	4
CSL	403	Organizing & Supervising Volunteers	4
COM	210	Public Speaking	2
SSCI	201	Human Relations or similar elective (determined with advisor)	4
SSCI	202	Social Issues or equivalent	4
		Participation in UNH Leadership Program	

**Second Year, Fall Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CSL	407	Non-profit Budgeting and Accounting (or elective)	3
CSL	490	Civic and Community Internship	4
CSL	508	Essentials of Fundraising for Community-based Organizations	2
CEP	415	Community Development Perspectives (or equivalent)	4
COM	211	Critical Reading	2

**Second Year, Spring Semester**

<b>Abbreviation</b>	<b>Course Number</b>	<b>Title</b>	<b>Credits</b>
CSL	210	Capstone Seminar	4

CSL	404	Managing Change & Conflict in Communities	4
CSL	406	Literature of Family & Community	4
CSL	509	Essential of Grant Writing for Community-based Organizations	2
		Elective	4

Total: 64 - 68 credits

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## Culinary Arts and Nutrition (CAN) ▼

» <http://www.thompsonschooel.unh.edu/can/>

» [Click to view course offerings](#)

*Professor:* Charles A. Caramihalis

*Associate Professor:* Nancy M. Johnson

The Culinary Arts and Nutrition (CAN) program has two distinct concentrations: culinary arts and dietetic technician.

### Admissions Requirements

Applicants to **Dietetic Technology** must present college preparatory English and a minimum of two years of satisfactory work in college preparatory mathematics and sciences (one science being biology, with a lab). College preparatory chemistry is highly recommended.

Applicants to **Culinary Arts** must present college preparatory English and a minimum of two years of satisfactory work in college preparatory mathematics.

### Curriculum Fee

Culinary Arts and Nutrition

Culinary Arts: \$507\*

Dietetic Technician: \$507\*



\*This one-time, nonrefundable curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that is unique to the applied nature of the concentration. The curriculum fee covers the entire two-year course of study for one concentration. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's *Time and Room Schedule*. All fees are subject to change.

## Culinary Arts

[www.thompsonschoo.unh.edu/can/culinary.html](http://www.thompsonschoo.unh.edu/can/culinary.html)

Students who complete the requirements for the culinary arts concentration are prepared for a variety of positions as entry-level chefs in the hospitality industry. In a program that combines classroom work with practical experience, students learn and explore career opportunities, menu development, cost control, food safety, baking, nutrition, management skills, and general education. Through a unique partnership with University Hospitality Services, students complete rotations in state-of-the-art production kitchens on campus at Holloway Commons. These rotations provide opportunities to develop proficiency in contemporary and classical culinary techniques and cooking methods related to a la carte, banquet, and quantity food production and service. The culinary arts concentration is annually reviewed by its own advisory committee of industry professionals, program faculty, and chef-instructors who revise the curriculum to meet changing industry needs.

### Career Opportunities:

Chef - restaurants, hotels, private clubs, theme parks, catering and banquets, destination resorts, cruise ships, corporate chains, and healthcare facilities.

### Culinary Arts Program of Study

#### First Year, Fall Semester

Abbreviation	Course Number	Title	Credits
CAN	201	Food Preparation Fundamentals	2
CAN	203	Introduction to Culinary Arts	3
CAN	207	Hospitality Sanitation and Safety	2
CAN	242	Culinary Skill Development	4
MTH	2__	Math I or II (determined by assessment)	3

**First Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
CAN	204	Baking and Pastry Products	4
CAN	226	Dining Room Practicum	3
CAN	243	Quantity Food Production and Display Cooking	4
COM	210	Public Speaking	2
SSCI	202	Social Issues	4

**Second Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
CAN	206	Food and Beverage Cost Control	4
CAN	228	Culinary Nutrition	2
CAN	244	Catering Operations: Buffets and Banquets	4
CAN	245	American Regional Cuisine	4
CAN	298	Work Experience	0
TSAS	205	Computers in the Workplace	2

**Second Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
CAN	211	Food and Beverage Facilities Planning	3
CAN	212	Hospitality Personnel Management	3
CAN	235	International Cuisine	5
COM	209	Expository Writing and Reading	4
SSCI	203	Environment and Society	2

Total: 64 credits

**Dietetic Technology**

[www.thompsonschoo.unh.edu/can/dietetic.html](http://www.thompsonschoo.unh.edu/can/dietetic.html)

This concentration is accredited by the Commission on Accreditation of the American Dietetic Association (CADE). The program underwent a successful review for reaccreditation in 2010. Graduates are prepared for a variety of positions in health care: helping to treat and prevent disease, managing employees, developing menus, teaching nutrition classes for the public, and

educating clients about the relationships among food, fitness, and health. In a program that combines classroom work and practical experience, students learn the nutrition care process and develop skills in food production and delivery.

### Career Opportunities:

Dietetic technicians, registered (DTRs) work in a variety of settings, including hospitals, nursing homes, research facilities, schools, day-care centers, correctional facilities, restaurants, health-care facilities, food service operations, WIC programs, public health agencies, Meals on Wheels, community health programs, health clubs, weight management clinics, community wellness centers, food companies, contract food management companies, and food vending and distributing operations.

### Dietetic Technology Program of Study

#### First Year, Fall Semester

Abbreviation	Course Number	Title	Credits
CAN	201	Food Preparation Fundamentals	3
CAN	207	Hospitality Sanitation and Safety	2
CAN	210	Introduction to the Dietetic Technology Profession	1
MTH	20__	Math I or II (determined by assessment)	3
NUTR	400	Nutrition in Health and Well Being	4
TSAS	205	Computers in the Workplace	2

#### First Year, Spring Semester

Abbreviation	Course Number	Title	Credits
CAN	200	Introductory Chemistry	3
CAN	202	Quantity Foods Practicum	3
COM	209	Expository Writing and Reading	4
NUTR	476	Nutritional Assessment	4
ZOOL	401	Human Biology	4

#### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits

Abbreviation	Course Number	Title	Credits
CAN	206	Food and Beverage Cost Control	4
CAN	260	Dietetics Practice in the Community	3
CAN	275	Diet Therapy and Counseling	4
COM	210	Public Speaking	2
SSCI	201	Human Relations	4

**\*Second Year, Spring Semester Registration Pathway**

Abbreviation	Course Number	Title	Credits
CAN	212	Hospitality Personnel Management	3
CAN	265	Community Nutrition for Dietetic Technicians	2
CAN	276	Dietetics Practice in Long Term Care	1
CAN	290	Dietetics Practice in Acute Care	5
CAN	295	Professional Issues for Dietetic Technicians	1
SSCI	204	Leadership Effectiveness and Group Performance OR	2
SSCI	203	Environment and Society	2

Total: 65 credits

\*Students in the registration pathway must complete a minimum of 450 hours of supervised practice in Culinary Arts and Nutrition, community nutrition and clinical nutrition in on-campus facilities, local hospitals and long term care facilities. Upon successful completion of the program, these students will be eligible to sit for the registration exam to be credentialed as a dietetic technician, registered (DTR). A dietetic technician, registered (DTR) is eligible for membership in the American Dietetic Association, an organization of food and nutrition professionals. Students may choose the non-registration pathway. Students who wish to be eligible to sit for the dietetic technician, registered exam must complete all major classes with a grade of C or better to gain placement in CAN 276 and CAN 290. Students not meeting this academic standard are encouraged to repeat classes or complete the non-registration pathway.

**\*\*Second Year, Spring Semester Non-Registration Pathway**

Abbreviation	Course Number	Title	Credits
CAN	212	Hospitality Personnel Management	3

CAN	222	Local Food for Local Tables	4
CAN	265	Community Nutrition for Dietetic Technicians	2
SSCI	204	Leadership Effectiveness and Group Performance OR	2
SSCI	203	Environment and Society	2
		Elective	4

**Total: 66 credits**

\*\*Students in the non-registration pathway gain experience in Culinary Arts and Nutrition and community nutrition supervised practice rotations and round out their program of study with a course on local foods and an elective of their choice.

**Career Opportunities:**

Restaurant owner/manager, caterer, food and beverage sales, food buyer, food and beverage manager, food services director.

**Restaurant Management Program of Study****First Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
CAN	201	Food Preparation Fundamentals	3
CAN	203	Introduction to Culinary Arts	3
CAN	206	Food and Bev Cost Controls	4
CAN	207	Hospitality Sanitation and Safety	2
CAN	226	Dining Room Practicum	3
TSAS	205	Computers in the Workplace	2

**First Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
ABM	208	Managerial Accounting	4
CAN	202	Quantity Food Practicum	3
COM	209	Expository Writing and Reading	4
MTH	20__	Math I or II (determined by assessment)	3

**Second Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
CAN	228	Culinary Nutrition	2
CAN	241	Applied Buffet and Catering Management	4
CAN	298	Work Experience	0
COM	210	Public Speaking	2
SSCI	201	Human Relations	4
		Elective	2 - 4

**Second Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
ABM	207	Applied Marketing	4
ABM	232	Business Law	4
CAN	211	Food and Beverage Facilities Planning	3
CAN	212	Hospitality Personnel Management	3
CAN	222	Local Food for Local Tables	4

Total: 64 - 66 credits

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## **Forest Technology (FORT) ▼**

» <http://www.thompsonschoo.unh.edu/fort>

» [Click to view course offerings](#)

*Professor:* Matthew C. Chagnon, Donald W. Quigley

Students in the forest technology (FORT) program are uniquely prepared for careers in the forest industries and natural resource management in New Hampshire and New England. Classroom lecture is backed up by practical field work in each of the subject areas. The curriculum is accredited by the Society of American Foresters (the first two-year program in the U.S. to earn this designation) and reviewed by an advisory committee representing the full spectrum of forestry organizations in the region. There is strong emphasis on leadership, safety, communication skills, accuracy of field work, data collection, and professional

presentation. Unique facilities for teaching and learning include centrally located classroom and shop facilities; 3,000+ acres of University-owned forest land; a new sawmill and Forest Industries Training Center (FITC); logging equipment; technologically advanced navigation, data collection and analysis equipment; and a faculty with vast field experience in the subject areas dedicated to teaching.

### **Admissions Requirement**

Applicants to the forest technology program area must present college preparatory English and at least two years of satisfactory work in both college preparatory mathematics and science (one science being biology, with a lab).

### **Curriculum Fee**

Forest Technology, specialization, \$623\*

\*This one-time, nonrefundable curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that is unique to the applied nature of the specialization. The curriculum fee covers the entire two-year course of study for one specialization. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's *Time and Room Schedule*. All fees are subject to change.

### **Forest Technician**

Forest technicians help plan, direct, and operate forestry enterprises. Students in the forest technician specialization experience a breadth and depth of instruction. They are exposed to the theory and practice of planting, thinning, and other silvicultural operations, including harvesting supervision. They learn how to design, lay out, and construct roads and trails; how to map and survey property; how to manage woodlands to improve timber quality and wildlife habitat and conserve soil, water, and other natural resources. Graduates work in the wood products-related industries, in public forestland management agencies, with forestry consulting firms or urban tree care companies, and with a range of conservation organizations. Graduates can become licensed in New Hampshire to practice forestry on private lands.

### **Career Opportunities:**

Forestry consultant, forest fire control and use technician, mapping technician, geographic information systems/global positioning systems (GIS/GPS) technician, timber and log buyer, log scaler, lumber grader, sawmill technician, arborist, urban tree care specialist, timber cruiser/forest inventory technician, forestry equipment/products sales representative.

### Forest Technician Program of Study

#### First year, Fall Semester

Abbreviation	Course Number	Title	Credits
FORT	261	Dendrology	3
FORT	263	Forest Ecology	2
FORT	263A	Forest Ecology Lab	1
FORT	265	Forest Orientation Seminar	1
COM	209	Expository Writing and Reading	4
MTH	203	Algebra and Trigonometry	3
TSAS	205	Computers in the Workplace	2

#### First Year, Spring Semester

Abbreviation	Course Number	Title	Credits
FORT	260	Forest Mapping	2
FORT	266	Forest Surveying	4
FORT	270	Applied Silviculture	4
FORT	275	Forestry Field Practices	1
FORT	280	Aerial Photography Interpretation	2
SSCI	202	Social Issues	4

#### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits
FORT	269	Wildlife Ecology and Conservation	3
FORT	272	Mensuration	4
FORT	277	Logging	4
FORT	281	GIS for Foresters	2
FORT	297	Forestry Work Experience	0
COM	210	Public Speaking	2



		Elective(s)	2 - 3
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### Second Year, Spring Semester

Abbreviation	Course Number	Title	Credits
FORT	267	Leadership, Supervision and Safety	2
FORT	273	Management Operations and Analysis	3
FORT	274	Industrial Forest Management Tour	1
FORT	276	Forest Products	4
FORT	278	Forest Insects and Diseases	2
FORT	479	Forest Fire Control and Use	2
		Elective(s)	2 - 4

Total: 65 - 69 credits

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## Horticultural Technology (HT) ▼

» <http://www.thompsonschoo.unh.edu/ht>

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*Professor:* John L. Hart

*Associate Professor:* Rene J. Gingras, Dana M. Sansom

Horticultural technology (HT) students study applied plant science, preparing for environmentally attuned careers in "the green industry." Rigorous first-year foundation courses in plant materials, plant growth and development, and soils support second-year concentrations in landscape operations or ornamental horticulture. Employment opportunities in these areas continue to be excellent. Graduates enter a rapidly expanding job market in ornamental plant production, floral design, nursery and garden center management, fruit and vegetable production, parks and grounds management, and landscape design, construction, and maintenance. Many recent graduates have established their own horticulture enterprises, and others continue their education toward a four-year degree in areas such as environmental horticulture, floriculture/greenhouse management, business management, or landscape architecture. Another option that is available to Thompson School students is to continue for a third year to complete the requirements for the business management concentration offered

through the applied business management program.

### **Admissions Requirements**

Applicants to the horticultural technology specialization must present college preparatory English and at least two years of satisfactory work in both college preparatory mathematics and science (one science being biology, with a lab).

### **Curriculum Fee**

Horticultural technology: both specializations, \$718\*

\*This one-time, nonrefundable curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that is unique to the applied nature of the specialization. The curriculum fee covers the entire two-year course of study for one specialization. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's *Time and Room Schedule*. All fees are subject to change.

### **Landscape Operations**

Landscape horticulture has been projected to be one of the fastest growing service industries of the coming decade. It is a field that also offers unparalleled aesthetic satisfaction and meaningful reward. To succeed in the landscape industry increasingly requires a degree of technical and scientific expertise, as well as creativity, artistry, and problem-solving skills. Students in the landscape operation concentration gain a solid foundation by completing core requirements in the fundamentals of plant growth and development, soils, plant identification, pruning, and plant health care. They then complete a series of landscape maintenance, construction, design, and business courses. This combination prepares them to become successful members of the landscape industry. In their classes, students meld theory and practice, then apply what they learn in weekly lab periods and on-site visits to area operations.

### **Career Opportunities:**

Landscape designer; landscape construction specialist; garden center/ nursery sales;

maintenance/management for golf courses, schools and parks, private and public grounds.

## Landscape Operations Program of Study

### First Year, Fall Semester

Abbreviation	Course Number	Title	Credits
HT	201	Freshman Seminar	1
HT	205	Plants, People and Place	2
HT	207	Plant Structure and Function	4
HT	415	Soils and Land Use (Half-term I)	2
COM	209	Expository Writing and Reading	4
SSCI	203	Environment and Society	2
TSAS	205	Computers in the Workplace	2

### First Year, Spring Semester

Abbreviation	Course Number	Title	Credits
HT	234	Pest Management	4
HT	256	Horticultural Pruning	2
HT	417	Soils and Plant Nutrition (1/2 term)	2
MTH	20__	Math I or II (determined by assessment)	3
SSCI	201	Human Relations OR	4
SSCI	202	Social Issues	4
		Approved Elective Courses	1 - 5

### Second Year, Fall Semester

Abbreviation	Course Number	Title	Credits
HT	251	Introduction to Design Communication	2
HT	257	Woody Landscape Plants	3
HT	260	Grounds Maintenance	2
HT	263	Landscape Construction	4
HT	297	Horticultural Work Experience	2
COM	2__	Public Speaking OR Critical Reading	2
		Approved Elective Credits	1 - 5

**Second Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
HT	258	Herbaceous Ornamental Plants	2
HT	270	Grounds Management	2
HT	272	Landscape Design Studio	4
HT	288	Horticultural Business Management	4
		Approved elective credits	4 - 8

Total: 66 - 72 credits

**Ornamental Horticulture**

Students who prefer to be generalists in horticultural technology may opt for the ornamental horticulture concentration. Students gain the broadest possible background in horticultural technology, which is attractive to employers in all specialty areas. To succeed in ornamental horticulture, students require a degree of technical and scientific expertise as well as creativity and problem-solving skills. They first complete core requirements in the fundamentals of plant growth and development, soils, plant propagation, plant identification, and plant health care. Then students work closely with a faculty adviser to choose approved elective coursework to round out their program of study. In their classes, students meld theory and practice then apply what they learn in weekly lab periods and on-site visits to area operations.

**Career Opportunities:**

Owner/manager of a garden center, nursery, flower shop, or fruit and vegetable business; wholesale/retail plant producer; research/botanical garden technician; floral designer.

**Ornamental Horticulture Program of Study****First Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
HT	201	Freshman Seminar	1
HT	205	Plants, People and Place	2
HT	207	Plant Structure and Function	4

HT	227A	Horticulture Facilities Management	2
HT	415	Soils and Land Use (1/2 term)	2
COM	209	Expository Writing and Reading	4
TSAS	205	Computers in the Workplace	2

**First Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
HT	227B	Horticulture Facilities Management	2
HT	234	Pest Management	4
HT	404	Plant Propagation	4
HT	417	Soils and Plant Nutrition (1/2 semester)	2
MTH	20__	Math I or II (determined by assessment)	3
SSCI	203	Environment and Society	2

**Second Year, Fall Semester**

Abbreviation	Course Number	Title	Credits
HT	227C	Horticulture Facilities Management	1
HT	240	Introduction to Floral Design	2
HT	275	Floral Crop Production	2
HT	286	Fruit and Vegetable Production	3
HT	297	Horticultural Work Experience	2
COM	2__	Public Speaking OR Critical Reading	2
		Approved Elective Credits	4 - 8

**Second Year, Spring Semester**

Abbreviation	Course Number	Title	Credits
HT	227D	Horticulture Facilities Management	1
HT	258	Herbaceous Ornamental Plants	2
HT	276	Bedding Plant Production	2
HT	288	Horticulture Business Management	4
SSCI	2__	Human Relations OR Social Issues	4
		Approved Elective Credits	3 - 7

Total: 66 - 72 credits

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## **TSAS Communication (COM) ▼**

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Thompson School students are required, as part of their general education requirements, to complete a minimum of six credits in the area of communication. All students take COM 209, Expository Writing and Reading. An additional two credits must be taken in either critical reading, public speaking or technical writing or another pre-approved course. Some concentrations require a specific two-credit course which is listed under their respective program of study.

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## **TSAS Courses (TSAS) ▼**

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The TSAS departmental course designation is used for courses required by multiple program areas. TSAS 205, Computers in the Workplace meets the computer literacy requirement for applied animal science, food service management, forest technology and horticultural technology program areas.

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## **TSAS Mathematics (MTH) ▼**

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Mathematics is another required area of study. Incoming students are administered a math assessment during their student orientation. Several program areas require a specific math course, i.e., civil technology and forest technology students are required to complete MTH 203, Algebra and Trigonometry. Check program of study listings for requirements/options for the

various program areas.

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## **TSAS Social Science (SSCI) ▼**

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*Associate Professor:* Regina A. Smick-Attisano

Thompson School students are required to complete a minimum of six credits in the social sciences. Some program areas require specific SSCI courses. See the programs of study listings for specific course information or a list of course options.

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Hampshire at  
Manchester

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## Undergraduate Course Catalog 2011-2012

### University of New Hampshire at Manchester ▼

» <http://www.unhm.unh.edu>

*Interim Dean:* Sally Ward

### Introduction ▼

The University of New Hampshire at Manchester was established in 1985 as the University's sixth college to provide access to UNH associate, bachelor, and graduate degree programs for people who live and work in central New Hampshire. The college combines the tradition of liberal arts and professional degree programs with a focus on applied programs in business, science, and technology. The college offers students a rich, urban learning environment where they combine theory and practice. Through internships, capstone experiences, undergraduate research, and service-learning, students build portfolios that position them for continued success in their chosen careers after graduation. UNH Manchester is centrally located in Manchester's historic mill yard, where it has served as a catalyst for the revitalization of the city's downtown area and symbolizes the region's growth and diversity.

### UNH Manchester Degree Programs ▼

For a complete listing of undergraduate programs, go to [www.uhnm.unh.edu](http://www.uhnm.unh.edu).

UNH Manchester offers University of New Hampshire undergraduate degree programs in liberal arts, science, and technology. Each year more than 1,600 students who live and work in the Merrimack Valley region choose UNH Manchester for its range of educational resources and positive learning environment. The UNH Graduate School offers UNH graduate degree and professional programs to working professionals in the region at the UNH Manchester campus.

UNH Manchester's small classes encourage interaction and collaboration between faculty and students and support educational excellence. A wide range of student activities and clubs provide students with opportunities to get involved, make friends, develop leadership skills, and enjoy a complete university experience. Students find a convenient, affordable university



education designed to meet the unique requirements of commuting students. The University Center, located in Manchester's historic mill yard at 400 Commercial Street, is convenient and easily accessible by major highways and city bus service.

Undergraduate degree students in Manchester earn the same UNH degree as their peers on the Durham campus. Students are required to satisfy University admission and graduation requirements, which include completion of at least 128 credits, a 2.0 minimum cumulative grade-point average, Discovery Program requirements[c1] , and[c2] , for the bachelor of arts degree, a foreign language requirement. The foreign language is not required in the bachelor of science programs.

Students also may pursue UNH associate in arts or associate in science degree programs full- or part-time with a choice of concentrations. Graduation requirements for the associate degrees include completion of 64 credits, a 2.0 minimum grade-point average, and an interdisciplinary core course. Those[c3] students who complete the last 16 credits of the associate degree with a grade-point average of at least 2.5, earn a cumulative associate degree grade-point average of 2.5 or higher, and are recommended by their academic advisers are guaranteed admission to a baccalaureate program at the University in either Durham or Manchester. The University does not, however, guarantee admission to a specific college or program.

Selected graduate degrees from UNH also are available through the University of New Hampshire at Manchester. The UNH Graduate School offers post-baccalaureate programs for professionals in business administration, counseling, educational administration and supervision, public administration, public health, social work, teacher education, teacher leadership, and software systems engineering. Programs are offered in a wide variety of evening delivery models including our popular weekend MSW program. Most programs may be completed within two or three years on a part-time basis

### **Minors**

The following **academic minors** are available at UNH Manchester for enrolled baccalaureate candidates. Further information may be obtained from the Academic Counseling Office, (603) 641-4170.

*American Sign Language and Deaf Studies*[c4]

*Art*

*Business*

*Communication Arts*

*Computer Information Systems*

*Education*

*English*  
*History*  
*Humanities*  
*Philosophy*  
*Political Economy*  
*Political Science*  
*Psychology*  
*Sociology*  
*Women's Studies*[\[c5\]](#)

### **Pre-Majors**

Students entering the associate in arts program in general studies may prepare for transfer admission to many baccalaureate degree programs available through the University's Manchester and Durham campuses. By working closely with an academic counselor, general studies students can select structured course plans or pre-majors that are compatible with almost every baccalaureate major.

### **Certificate Programs for Professional Advancement**

UNH Manchester's credit certificate programs are designed for individuals who want to enhance their credentials for a new position or to take the first step toward a college degree. The programs also meet the needs of working professionals with post-secondary degrees who need to expand their knowledge or update their skills.

Each program provides a concentrated learning experience in a specific subject area designed for students with varied educational backgrounds and experience. The college's accessible course schedules allow students to attend day or evening classes, full- or part-time.

### **Requirements**

Students must complete between 16 and 20 credits at UNH Manchester in their chosen program to earn a certificate. Students must maintain an overall GPA of 2.0 or better in all courses. Some certificates require a minimum grade of C in each certificate course.

A certificate of completion will be awarded to those who successfully meet program requirements. Individuals completing a certificate program will be invited to participate in UNH Manchester's commencement ceremonies.

### **Enrollment**

Individuals interested in enrolling in a certificate program for professional development must complete the enrollment form. The completed form and a \$20.00 enrollment form processing fee should be submitted to the UNH Manchester Office of Admissions at least 10 working days

before the start of a semester or a summer session to ensure priority processing. Contact the Office of Admissions for more information or to request an enrollment form at (603) 641-4150.

***Communication Skills for Managers (Four courses, 16 credits)***

The fundamentals of oral and written communications are presented in this certificate program. Critical thinking is emphasized. Students learn to read, write, and speak more effectively both personally and professionally.

***Business and Accounting Skills for Managers (Four courses, 16 credits)***

Students gain a basic understanding of American businesses and how they work. A general overview of the functional areas in business as well as fundamental concepts of accounting, finance, and the use of computers to manage information is presented in the coursework.

***Human Behavior Studies (Four courses, 16 credits)***

An understanding of psychological, cultural, and social aspects of human behavior is developed in this program. The coursework explores how culture and intellect influence behavior and communication with others.

**College Transition Program**

The University of New Hampshire at Manchester's College Transition Program (CTP) enables students to begin their University studies as candidates for the associate in arts degree while receiving an intensive, year-long (two semester) plan of academic support and study skill enhancement.

Students are identified as CTP-eligible during the standard admission application review process. CTP students are required to supplement their academic schedules with noncredit coursework to strengthen study skills.

Attendance at the New Student Orientation, mandatory testing and placement, and enrollment in the CTP support services and course work are required for all CTP students. After orientation, CTP students work closely with academic advisers to design appropriate course plans, establish performance goals, determine which learning support services are required, and monitor academic achievement.

Students who successfully complete two semesters of CTP may continue on to earn their associate degree through either full-time or part-time study.

**College Transition Program for ESOL Students**

The College Transition Program (CTP) for ESOL students is an innovative program designed to

help students prepare for success in college and in life. Beginning in the fall semester, students join a learning community on the UNH Manchester campus. A combination of academic assessments and individual advising will guide students to appropriate courses in writing, reading, and mathematics.

The College Transition Program for ESOL students is a year-long program combining academic courses with a variety of activities and workshops designed to build the skills for success in college. Beyond academic courses, the program includes:

- orientation and on-going academic advising where students learn about college resources and how to successfully navigate the college environment;
- math and English assessments that help students choose classes to build on prior knowledge and prepare to achieve their goals;
- appropriate levels of ESOL classes when deemed appropriate;
- mentors who encourage students to explore their interests, develop skills, and prepare for their future;
- academic support seminars where students learn study skills and test taking techniques that will build confidence in the classroom and improve student success;
- student clubs and activities where students become part of the college community and develop organizational and leadership skills that will last a lifetime;

The College Transition Program for ESOL students is open to people with a high school diploma. Interested applicants are encouraged to apply before April 1, the priority deadline for the fall semester. Potential students and their families are encouraged to meet with an admissions counselor from the UNH Manchester Office of Admissions. Students will learn about the application process and how the program can help them achieve their goals.

For more information, please contact the UNH Manchester Office of Admissions at (603) 641-4150 or e-mail [unhm.admissions@unh.edu](mailto:unhm.admissions@unh.edu).

### **Application Deadlines**

The UNH Manchester application deadline for the fall semester is June 15 and November 1 for the spring semester. For priority consideration for financial aid, the application deadline is

March 1 for the following academic year.

**For More Information**

The UNH Manchester catalog is available online at

[www.unhm.unh.edu/pdf/catalog/catalog.pdf](http://www.unhm.unh.edu/pdf/catalog/catalog.pdf). To request a catalog or more specific information about UNH Manchester courses and degree programs, contact the Office of Admissions, University of New Hampshire at Manchester, University Center, 400 Commercial Street, Manchester, NH 03101, e-mail [UNHM.admissions@unh.edu](mailto:UNHM.admissions@unh.edu); phone (603) 641-4150; fax (603) 641-4125; TTY/TTD (603) 641-4308.

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### University of New Hampshire at Manchester

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- Business Administration

#### Programs of Study

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### General Studies ▼

#### General Studies (A.A.)

The Associate of Arts in General Studies offers students academic flexibility in a program that combines the foundations of a liberal education and elective courses that satisfy personal interests. The A.A. in General Studies is the first two years of a baccalaureate program and all 400-level courses transfer to and fulfill the University's Discovery requirements. Students who earn an A.A. in General Studies have a foundation for continued study in any major while they develop problem-solving ability, cognitive skills and learning techniques that are vital to a lifetime of learning. Many students begin their college study in the A.A. General Studies program. Depending on personal interests and academic goals, students may choose to apply to a baccalaureate degree program prior to completion of the A.A. degree.

To graduate with an Associate of Arts degree in General Studies, students must complete 64 credits, earn a minimum cumulative GPA of 2.0 and fulfill two types of requirements: University (Discovery Program) and degree requirements and earn a minimum cumulative GPA of 2.0. The program includes nine courses from the Discovery Program curriculum. Working with their advisors, students enhance their program of study with elective courses where they can explore their interests and possible baccalaureate degree majors. The last 16 hours of credit must be UNH courses completed following admission and matriculation, unless permission is granted to transfer part of this work from another institution.

The A.A. General Studies Program includes the following course requirements

Two writing-intensive courses, one of which must be ENGL 401, First-Year Writing

One course in quantitative reasoning

Two courses chosen from two of these three categories: Biological Sciences, Physical Sciences

or Environment, Technology and Society. One must be a lab course.

One course in Historical Perspectives

One course in World Culture or Fine and Performing Arts

One course in Social Science

One course in Humanities

Completion of interdisciplinary core course,  
Humanities I or Humanities II

One Inquiry or Inquiry attribute course, to be completed within the student's first 48 earned credits

Elective courses

For more information contact the Office of Admissions at 603-641-4150 or [unhm.admissions@unh.edu](mailto:unhm.admissions@unh.edu).

## **Biological Sciences ▼**

Biology is the study of living organisms in both laboratory and field conditions. It concerns itself with questions of understanding the living world, its complex interrelationships and the role of human beings within it.

The Associate of Science in biological sciences program at UNH Manchester is designed to serve either as a terminal degree or as a springboard for students interested in the life sciences which include majors in biology, microbiology, zoology, plant biology, wildlife management, environmental conservation, biochemistry and animal sciences. Employment opportunities in the public and private sectors include education, food, water, wastewater and other industrial laboratories, clinical laboratories, biotechnology, environmental research and monitoring and animal behavior.

Students must complete a minimum of 68 credits to graduate. There are two tracks in the A.S. degree program at UNH Manchester: biology and microbiology.

### **Biology Track Requirements**

Math 425, Calculus I, or MATH 424b, Calculus for Life Sciences

PSYC 402, Statistics in Psychology (other statistics courses such as BIOL 528 or ADM 430 may be used to satisfy this requirement).

BIOL 413, Principles of Biology I

BIOL 414, Principles of Biology II

CHEM 403, General Chemistry I

CHEM 404, General Chemistry II

BMS 503, General Microbiology

CHEM 545/546, Organic Chemistry and Organic Chemistry Laboratory

BMCB 658/659, General Biochemistry and General Biochemistry Laboratory

BIOL 541, General Ecology

GEN 604, Principles of Genetics

### **Microbiology Track Requirements**

Students opting for the microbiology track must take all courses listed in the biological sciences program with the exception of BIOL 541 General Ecology. Two additional courses selected from BMS 504 Brewing and Industrial Microbiology, BMS 602 Pathogenic Microbiology, or BMS 603 Bacteriology of Food are required of students in the microbiology track.

*Note: Pre-medical and pre-dental students should enroll in CHEM 651-652 and 653-654 at Durham. These courses may substitute for CHEM 545/546 and BMCB 658-659. In addition they should also enroll in MATH 426.*

For more information contact Stephen Pugh, Program Coordinator, at 603-641-4128 or [spugh@unh.edu](mailto:spugh@unh.edu); or contact the Office of Admissions.

## **Business Administration ▼**

Students must complete a minimum of 64 credits to graduate with an Associate of Science degree in Business Administration. A minimum cumulative GPA of 2.0 is required for graduation. In addition to completing eight Discovery Program courses and one Inquiry or Inquiry attribute course within their first 48 earned credits, students must complete seven courses (28 credits) in the major and one elective course.

### **Required Courses**

ADM 400, Introduction to Business

CIS 411, Introduction to Computer Applications



ECN 412, Introduction to Microeconomics  
ADM 532, Introduction to Financial Accounting  
ADM 533, Introduction to Managerial Accounting

### **Business Administration Electives**

*(Choose two of the following courses. Students may select electives from 600-level ECN or ADM courses with advisor permission. \*)*

ADM 430, Introduction to Business Statistics  
CIS 510, Fundamentals of Computer Information Systems  
CIS 515, Multimedia: Introduction & Applications  
CIS 520, Database Management Concepts  
CIS 542, Operating System Applications  
CMN 457, Introduction to Interpersonal Communication  
CA 450, Public Speaking  
ECN 411, Introduction to Macroeconomic Principles  
ECN 625, The Regulation of Business  
ECN 635, Money, Banking and Macroeconomic Activity  
ECN 640, Business Law and Economics  
ECN 650, Economics for Managers  
Other 600-level ECN or ADM courses by permission

\*

*Students planning to pursue the B.A. in Business should select ADM 430, Introduction to Business Statistics and ECN 411, Introduction to Macroeconomic Principles.*

For more information contact Kelly Kilcrease, Program Coordinator, at 603-641-4186 or [kelly.kilcrease@unh.edu](mailto:kelly.kilcrease@unh.edu) or contact the Office of Admissions.

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### University of New Hampshire at Manchester

#### Introduction

#### Other Programs

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- Computer Information Systems
- Engineering Technology
- English
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- Humanities
- Politics and Society
- Psychology
- Sign Language Interpretation
- The Undeclared Option

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### American Sign Language and Deaf Studies Minor (ASL) ▼

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### Biological Sciences (BSCI) ▼

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### Biology (BIOL) ▼

» <http://www.unhm.unh.edu/current-students/academics/degree-programs/ba-bs.php?id=19>

» [Click to view course offerings](#)

*Associate Professor:* Lorraine D. Doucet, Stephen R. Pugh

*Assistant Professor:* Sarah Prescott

*Lecturer:* Patricia Halpin

Biology is the study of living organisms in both laboratory and field conditions. It concerns itself with questions of understanding the living world, its complex interrelationships and the role of human beings within it.

The B.A. in biological sciences at UNH Manchester is designed to: 1) allow students to earn a baccalaureate degree in biology at UNH Manchester; 2) allow students to combine study in biology with other programs and disciplines by completing a second major, a minor, or a self-designed set of elective courses along with their biology degree; 3) allow students to complete a major in biology while taking required courses in Education in preparation for the 5-year MAT or M.Ed. programs and state certification in secondary science education; and 4) provide an opportunity for students to complete a baccalaureate degree in biology while completing the required courses for admission to medical, dental, veterinary, physician assistant, pharmacy, physical therapy and other professional graduate programs.

The biological sciences program at UNH Manchester can also serve as a springboard for students interested in the B.S. Programs in the life sciences at UNH Durham, which include majors in biology, microbiology, zoology, plant biology, wildlife management, environmental conservation, biochemistry and animal sciences.

Employment opportunities in the public and private sectors include education, food, water, wastewater and other industrial laboratories, clinical laboratories, biotechnology, environmental research and monitoring and animal behavior.

Students must complete a minimum of 128 credits and satisfy the University's Discovery Program and foreign language requirements. BIOL 413, 414 may be used to satisfy the biological sciences Discovery requirement and CHEM 403, 404 may be used to satisfy the Physical Sciences Discovery requirement. PSYC 402 may be used to satisfy the Quantitative Reasoning Discovery requirement; however, students interested in graduate or professional programs would be encouraged to take MATH 425, Calculus I, or MATH 424b, Calculus for Life Sciences to satisfy the Quantitative Reasoning requirement.

The UNH Manchester B.A. in Biological Sciences Program is structured with three levels of coursework.

### **Biology Core Curriculum (9 courses, 37 credits)**

*The biology core curriculum consists of five required biology courses*

BIOL 413-414, Principles of Biology I and II

BMS 503, General Microbiology

BIOL 541, General Ecology

GEN 604, Principles of Genetics

*Two required chemistry courses*

CHEM 403-404, General Chemistry I and II

*One course in mathematics*

MATH 418, Analysis and Application of Functions, or

MATH 425, Calculus I, or

MATH 424b, Calculus for Life Sciences

*One course in statistics*

PSYC 402, Statistics in Psychology (other statistics courses such as BIOL 528 or ADM 430 may be used to satisfy this requirement).

Depending on their specific academic and career goals and in consultation with their advisor, students may elect to take additional supporting science courses such as CHEM 545/546, Organic Chemistry with lab (one semester); CHEM 547/549 - 548/550, Organic Chemistry I and

II with lab (two semesters); BMB 658/659, Biochemistry with lab; MATH 426 Calculus II; and Physics 407-408, General Physics I and II. These courses are often required for admission to medical, professional and other graduate programs.

### **Self-Designed Concentration in Biology**

(4 courses, 16 credits)

Students will select, in consultation with their advisor, four biology courses at the 600-700 level to be taken at UNH Manchester or UNH Durham.

### **Capstone Experience**

The capstone experience will be fulfilled by taking the one-credit course, BSCI 701, Senior Seminar, during either semester of the senior year and a capstone experience, such as BSCI 792, Research, BSCI 793, Internship, or BSCI 795, Independent Study, Senior Seminar will meet weekly during either semester of the senior year in a seminar format to share information about students' research or independent study activities, listen to presentations on timely issues in biology and to support and provide training in poster production, Power Point and other methods of oral presentation and scientific writing as students prepare to present the results of their capstone activities at the Undergraduate Research Conference or other venues.

In addition, all students will take elective courses to fulfill the 128-credit requirement for a B.A. degree. These elective courses could fulfill the requirements for a major or minor in another program or they could fulfill a self-designed interdisciplinary concentration. They could include some of the supporting science courses listed above. These courses would be selected in consultation with their advisor and the appropriate faculty advisor in another program.

*Note: Pre-medical and pre-dental students should enroll in CHEM 651-652 and 653-654 at Durham. These courses may substitute for CHEM 545/546 and BMB 658-659. In addition they should also enroll in MATH 426.*

For more information contact Stephen Pugh, Program Coordinator at 603-641-4128 [spugh@unh.edu](mailto:spugh@unh.edu); or contact the Office of Admissions.

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**Business (ADM) ▼**

» <http://www.unhm.unh.edu/programs/business/>

» [Click to view course offerings](#)

*Professor:* Thomas D. Birch

*Associate Professor:* Kelly Kilcrease

*Instructor:* Walter Alderman

*Lecturer:* William Troy

The Bachelor of Arts in Business has a strong interdisciplinary focus. The curriculum adheres to a philosophy that effective decision-making requires a broad understanding of institutional and cultural climate within which businesses are operating. The program utilizes the resources of Manchester's business community and its economic strengths. During the first two years of study, students take introductory classes in business administration, economics, accounting, business statistics and information systems along with elective and discovery Program courses. The intermediate business core includes required courses in marketing, organizational behavior and financial or operations management. Additionally, students choose an option of focused study either in Accounting and Finance, Business Economics and Political Economy, Business and Technology, Management, Marketing, or Human Resource Management.. For students with a unique interest, the opportunity also exists to create a Self-Designed concentration with approval of his/her advisor and the Coordinator of the Business program.

A culminating capstone experience enables students to apply their knowledge in the form of an internship, applied senior project, or special topics seminar. Because this is a Bachelor of Arts program, students fulfill the foreign language requirement.

### **Business Program of Study**

Students must complete 128 credits to graduate. Each required course must be completed with a minimum grade of C-. Students must attain a minimum GPA of 2.0 in major courses required for graduation. Majors cannot use ADM 430, ECN 411, or ECN 412 to satisfy both Discovery program and major requirements. Transfer students must complete at least half of their credits in the major and the eight-credit capstone experience in residence at UNH Manchester.

Introductory Business Core Courses (8 courses)

ADM 400, Introduction to Business

ECN 411, Introduction to Macroeconomic Principles

ECN 412, Introduction to Microeconomic Principles

CIS 411, Introduction to Computer Applications

CIS 510, Computer Information Systems

ADM 430, Business Statistics

ADM 532, Financial Accounting

ADM 533, Managerial Accounting

Intermediate Business Core (3 courses)

ADM 610, Marketing Principles and Applications

ADM 620, Organizational Behavior

ADM 601: Financial Management

Business Field Concentrations (4 courses)

Accounting and Finance

*4 courses from the following*

ECN 635 Money, Banking, and Macro Activity

ADM 675 Special Topics:

Auditing

Taxation (pending)

Investments (pending)

Intermediate Accounting (pending)

Budgeting (pending)

ADM 685 Applications in Business Mgt.: International Finance

Business Economics and Political Economy

*4 courses from the following (including at least one course at 600-level or above)*

POLT 401, Politics and Society

POLT 403, United States in World Affairs

POLT 560, World Politics

ECN 640, Business Law and Economics

ECN 625, Regulation of Business

ECN 635, Money, Banking and Macroeconomic Activity

ECN 650, Economics for Managers

ECN 670, Public Sector Economics

HUMA 412, Industry and Welfare

HUMA 660, The Moral Dimensions of Economic Life

POLT 595, 596 Explorations in Politics

POLT 762, International Political Economy

ADM 695, Independent Study

Business and Technology

*4 courses from the following*

CIS 405, Introduction to the Internet and Web Authoring

CIS 425, Introduction to Computer Programming

CIS 515, Multimedia: Introduction and Applications

CIS 520, Database Design and Development

CIS 550, Networking Concepts

CIS 610, System Analysis and Design

Management

*4 courses from the following*

ADM 453, Leadership for Managers

ADM 550, Business Law

ADM 630, International Management

ADM 650, Operations Management

ECN 650, Economics for Managers

Marketing

*4 courses from the following*

A. At least two must be from marketing

ADM 675 Special Topics: Integrated Marketing Communications

ADM 675 Special Topics: Services Marketing

ADM 685 Special Topics: Selling & Sales Management

ADM 685 Special Topics: E-Commerce

B. May also include two courses from:

ADM 675 Special Topics: Negotiations

ADM 695 Independent Study (Marketing/Communication Project)

CA 450 Introduction to Public Speaking

CMN 455 Introduction to Mass Communication

CMN 457 Introduction to Interpersonal Communication

CA 516 Speech Writing

CA 531 History and Organization of Advertising

CA 550 Communications and Organizations

CA 610 Communication Technologies and Culture

UMST 500 Internship (in Marketing or Communication)

CIS 515 Multimedia Applications

ET 625 Technical Communication

ENGL 503 Persuasive Writing



## Human Resource Management

*4 courses from the following*

ADM455: Management of Human Resources

ADM520: Training and Development

ADM640: Business Communication and Conflict

ADM660: Employment and Labor Law

## Self Designed Concentration

4 courses (or 16 credit hours) with faculty approval, including at least one course at 500-level or above.

Business Capstone Experience (2 courses ADM 701 and one senior business seminar (in the ADM 750, 760, or 770) fulfills the Discovery Program Capstone requirement for business majors and are taken during the senior year)

ADM 701, Business, Government and Society and

ADM 750, Business Internship Seminar or

ADM 760, Applied Senior Project or

ADM 770, Special Topics Senior Seminar

*Note: Because this is a Bachelor of Arts program, students must fulfill a language requirement. Efforts will be made to enhance fluency through subsequent courses and community experiences.*

For more information contact Kelly Kilcrease, Program Coordinator, at 603-641-4186 or [kelly.kilcrease@unh.edu](mailto:kelly.kilcrease@unh.edu); or contact the Office of Admissions.

## **Business Minor**

The minor in business allows students to pursue their interests in the liberal arts and sciences while building a foundation of business skills and adding a valuable credential to their portfolio and resume. The minor in Business requires successful completion of five Business courses or 20 credit hours from the courses listed below.

The three required courses

ADM 400, Introduction to Business

ADM 532, Introduction to Financial Accounting

ECN 412 or 411, Intro to Microeconomics or  
Macroeconomics

Two courses from the following list are required (at least one of which must be at the 600-level or above)

ADM 430, Business Statistics

ADM 533, Managerial Accounting

ADM 601, Financial Management

ADM 610, Marketing Principles

ADM 620, Organizational Behavior

ADM 650, Operations Management

Another 600- or 700-level course in Business (ADM) or Economics (ECN) may be substituted for courses listed above with permission of the Business Program Coordinator. This may include an Internship course (UMST 500), Special Topics courses (ADM675/685), or an Independent Study in Business (ADM 695).

Students must complete the five courses with a cumulative minimum grade point average of 2.0 in the five courses (20 credits), with no course below a C- grade. Transfer course approval for the minor would be limited to at most two relevant courses successfully completed at another accredited institution, subject to syllabi review and approval. Students must complete a minimum of 20 credits for the minor, with a maximum of eight credits transferred from accredited institutions and a minimum of 12 credits completed in residence at UNH.

For more information contact Bill Troy, Minor Supervisor, at 603-641-4345 or wtroy@unh.edu.

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## Communication Arts (CA) ▾

» <http://www.unhm.unh.edu/programs/ca/>

» [Click to view course offerings](#)

*Associate Professor:* Barbara J. Jago, Jeffrey F. Klenotic, Anthony Tenczar

*Senior Lecturer:* Patrice T. Mettauer

Students majoring in Communication Arts (CA) explore the how and why of the ways we communicate through our words, actions, and media technologies. The program examines a variety of communication practices –speech, motion pictures, writing, sound, and personal relationships—as these are applied and developed across a range of social, cultural, professional, organizational and historical contexts. In addition to classroom instruction, the program provides students with opportunities for fieldwork (including internships and service learning) that connect them to the urban community and integrate their education within "real life" communication settings.

Communication Arts prepares students for many careers and postgraduate options, including advanced graduate study. Students emerge from the program with a rare combination of hands-on and theoretical knowledge that is attractive to employers in professions such as film, radio, television, digital video, web, journalism, public relations, sales, advertising, counseling, conflict mediation and others. The Communication Arts degree also translates to related work in government, social service and community affairs. Employers in the general business community seeking well-rounded, liberal arts graduates who can think creatively and communicate effectively in a variety of formats also find our graduates highly desirable. Further, through internships students have the opportunity to learn more about their chosen fields and better prepare for the transition to professional life.

Beyond the academic and professional rewards, study in Communication Arts enhances the meaning and richness of our everyday lives by enabling us to see and understand the intricate ways in which communication binds people together.

### **Degree Requirements**

Students must complete a minimum of 128 credits and satisfy the University's Discovery Program and foreign language requirements. Communication Arts majors must complete 10 courses (40 credits) and maintain an overall grade point average in the major of 2.0 or better. Transfer students must complete at least 20 credits in the CA major at UNH Manchester. CMN 455, 456 and 457 may not be used to satisfy Discovery Program requirements for CA majors.

Information on prerequisites for CA courses can be found in the course descriptions at the back of this catalogue. CA majors considering taking CIS 515, HIST 690, HUMA 796, or PSYC 762 must meet the prerequisites for each course and should consult with their faculty advisor before registering. Degree requirements for the major are presented below.

**I. Required Core Courses** – 12 credits (3 courses) Students must earn a “C” or better in each course if it is to count toward either the UNH Manchester Communication Arts major or the UNH Durham Communication major.

CMN 455, Introduction to Media Studies

CMN 456, Propaganda and Persuasion

CMN 457, Introduction to Interpersonal Communication

**II. Selected Coursework** – 28 credits (three courses from area A, two from area B, two from area C). Students must earn a “C -” or better in each selected course to satisfy CA requirements.

A. Communication Practices: Applied (12 credits).

Any three courses.

CA 444, Manipulating Media

CA 450, Introduction to Public Speaking

CA 500, Media Writing

CA 501, Internship: Communication in the Urban Community

CA 502, Image and Sound

CA 503, Techniques for News Reporting

CA 504, Film Criticism

CA 506, Gender

CA 508, Conflict in Relational Communication

CA 510, Language and Interaction

CA 512, Scriptwriting

CA 513, Radio News Production

CA 514, Fundamentals of Video Production

CA 515, Advanced Video Production

CA 516, Speechwriting

CA 517, Fundamentals of Audio Production

CA 520, Special Topics in Applied Communication

CIS 515, Multimedia: Introduction and Applications

HIST 690, Public History

PSYC 762, Counseling

**B. Communication Practices: Organization, History and Policy (8 credits).**

Any two courses.

CA 525, Media Programming

CA 526, Organization of Newswork

CA 527, History of Film

CA 528, Media Policy and Law

CA 531, History and Organization of Advertising

CA 535, Marital Communication

CA 539, Communicating in Families

CA 540, Public Relations

CA 550, Special Topics in Communication Organization, History and Policy

HUMA 640, Birth of Rock and Roll

**C. Communication Practices: Theory and Research (8 credits).**

Any two courses.

CA 600, Research Methods: Media

CA 601, Exploring Relationships

CA 610, Communication Technologies and Culture

CA 611, Theories of Relational Communication

CA 612, Narrative

CA 614, Communication and Power

CA 615, Film History: Theory and Method

CA 618, Documentary

CA 720, Seminar in Communication Arts

CA 795, Independent Study

**Capstone Requirement**

The capstone requirement will be satisfied in a student's senior year by completion of a specific four-credit capstone course at the 600 or 700 level. Students may not enroll in a capstone course until they have completed all three CA program core courses (CMN 455, 456 and 457) and all CA Area A and Area B requirements. The capstone course can also fulfill an Area C course requirement.

The capstone experience offers seniors an opportunity to synthesize and apply knowledge and skills gained throughout their Communication Arts major coursework. The capstone course requires students to conduct an original research study, a creative media project, an internship, or an advanced service learning project in Communication Arts under the close supervision of a Communication Arts faculty member. Students are strongly encouraged to share their capstone

projects with the larger UNH community through participation in the Undergraduate Research Conference, a presentation in the Brown Bag lunch series, publication in the UNH undergraduate journal *Inquiry*, or presentation in some other public venue. Students should work closely with their advisors to make sure the capstone requirement has been satisfied.

Courses that satisfy this requirement include but are not limited to: CA 601, Exploring Relationships; CA 614, Communication and Power; CA 615, Film History: Theory and Method; CA 720, Seminar in Communication Arts; and CA 795, Independent Study.

The core requirements for Communication Arts are identical to those for Communication, therefore credit for CMN 455, CMN 456, CMN 457 automatically transfers for students transferring from Manchester to Durham to major in Communication, as well as for students transferring from Durham to Manchester to major in Communication Arts. All other courses in Communication Arts have a CA designation. The transfer of these courses to satisfy degree requirements for the Communication major in Durham is determined on a course-by-course basis by Communication faculty. Likewise, the transfer of Communication courses (other than CMN 455, 456, 457) to satisfy degree requirements for the Communication Arts major in Manchester is determined on a course-by-course basis by Communication Arts faculty.

### **Suggested Concentrations in Communication Arts**

Students are welcome to choose courses from across the Communication Arts curriculum, but those wishing to meet specific academic or professional goals may plan coursework using one of the concentrations suggested below. In addition, students may enhance their studies with activities beyond the classroom, including a wide range of internships available across the region. Communication Arts students may also participate in the University's Web radio station, [www.UNHM.net](http://www.UNHM.net), as well as in numerous area film festivals.

#### **Concentration in Media and Cinema Arts**

CA 444, Manipulating Media  
CA 500, Media Writing  
CA 501, Internship  
CA 502, Image and Sound  
CA 504, Film Criticism  
CA 512, Scriptwriting  
CA 514, Fundamentals of Video Production  
CA 515, Advanced Video Production  
CA 517, Fundamentals of Audio Production  
CA 525, Media Programming  
CA 527, History of Film

CA 600, Research Methods: Media  
CA 610, Communication Technologies and Culture  
CA 615, Film History: Theory and Method  
CA 618, Documentary

**Concentration in News and Public Relations**

CA 450, Introduction to Public Speaking  
CA 500, Media Writing  
CA 501, Internship  
CA 503, Techniques for News Reporting  
CA 513, Radio News Production  
CA 516, Speechwriting  
CA 517, Fundamentals of Audio Production  
CA 525, Media Programming  
CA 526, Organization of Newswork  
CA 528, Media Policy and Law  
CA 531, History and Organization of Advertising  
CA 540, Public Relations  
CA 600, Research Methods: Media  
CA 610, Communication Technologies and Culture  
CA 618, Documentary

**Concentration in Relational Communication**

CA 501, Internship  
CA 506, Gender  
CA 510, Language and Interaction  
CA 535, Marital Communication  
CA 539, Communicating in Families  
CA 601, Exploring Relationships  
CA 611, Theories of Relational Communication  
CA 612, Narrative  
CA 614, Communication and Power  
CA 720, Seminar in Communication Arts

For more information contact Anthony Tenczar, program director, at 603-641-4316 or email [atenczar@unh.edu](mailto:atenczar@unh.edu) or contact the Office of Admissions.

**Communication Arts Minor**

The objective of the “minor in Communication Arts” is to provide students with a knowledge base that not only approximates the overall range of communication practices included in the Communication Arts major, but also gives students the opportunity to select several courses that may be of special interest to them or that may more directly complement their major field of study or enhance their professional interests.

The Communication Arts minor requires the completion of five courses, twenty credits, according to the requirements below. An overall average of 2.0 in minor courses is required, with no individual grade lower than a C-. Students should work with their advisors to insure that any prerequisites for 500 level courses have been met, or that permission to enter the course has been granted by the appropriate course instructor. Courses used to satisfy General Education requirements may also be used to satisfy CA minor requirements.

### **I. Breadth Courses**

Select any two courses, as long as they are NOT from the same category.

#### **Category A**

CMN 457 - Introduction to Interpersonal Communication

#### **Category B**

CMN 455 - Introduction to Media Studies

CA 502 - Image and Sound

#### **Category C**

CMN 456 - Propaganda and Persuasion

CA 450 - Introduction to Public Speaking

### **II. Depth Courses**

Select any three 500 level CA courses, except CA 501.

Note: Students who use CA 502 as a “breadth” course may not use it as a “depth” course.

For more information contact Jeff Klenotic, Minor Supervisor, at 603-641-4130 or email [klenotic@unh.edu](mailto:klenotic@unh.edu).

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## Computer Information Systems (CIS) ▼

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*Associate Professor:* Mihaela Sabin

*Assistant Professor:* Michael Jonas, Karla E. Vogel

### Computer Information Systems (B.S.)

The Computer Information Systems (or Information Technology) field, in its broadest sense, encompasses all aspects of computing technology. As an academic discipline, CIS is concerned with issues related to selecting, creating, applying, integrating, and administering computing technologies. CIS is also concerned with aspects related to advocating for users of computing technologies and meeting their needs within an organizational context.

The Bachelor of Science degree in Computer Information Systems (CIS) prepares graduates with knowledge, skills, and best practices to work in the highly integrated field of computing technologies and to grow into leadership positions. The program also enables graduates to further their studies at the graduate level and pursue research in a computing-related discipline.

Career opportunities for students with a CIS degree are varied, but may include such areas as software applications developer, data security specialist, database developer/administrator, e-commerce analyst/programmer, help desk manager, multimedia developer, network/system administrator, technical writer, technology trainer, user support specialist, testing and quality assurance specialist, or web developer. Career options exist in a wide range of organizations as all businesses, industries, and nonprofits continue to use, develop, and integrate information technology solutions.

### Program Educational Objectives

Within five years of graduation a CIS student should be able to:

1. Apply knowledge and skills in core and advanced information technologies to help an organization achieve its goals.
2. Advocate for users of information technologies, whether they are end-users of information systems, managers of enterprise applications, developers of IT solutions, or customers of IT-reliant work systems.
3. Develop, manage, and evaluate computing and communication systems and services.
4. Live and work as contributing, well-rounded members of society.

## **Program Outcomes**

The program enables students to achieve, by time of graduation, the following competencies:

1. An ability to apply knowledge of computing and mathematics appropriate to the discipline.
2. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
3. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
4. An ability to function effectively on teams to accomplish a common goal.
5. An understanding of professional, ethical, legal, security and social issues and responsibilities.
6. An ability to communicate effectively with a range of audiences.
7. An ability to analyze the local and global impact of computing on individuals, organizations, and society.
8. Recognition of the need for and an ability to engage in continuing professional development.
9. An ability to use current techniques, skills, and tools necessary for computing practice.
10. An ability to use and apply current technical concepts and practices in the core information technologies.
11. An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
12. An ability to effectively integrate IT-based solutions into the user environment.
13. An understanding of best practices and standards and their application.
14. An ability to assist in the creation of an effective project plan.

The CIS program outcomes are aligned with criteria for accrediting computing programs ((a) to (i)) and Information Technology programs ((j) to (n)) as recommended by the ABET Computing Accreditation Commission and the ACM Computing Curricula – IT 2008 Information Technology guidelines.

## **Program of Study**

Students majoring in Computer Information Systems must complete 128 credits to graduate, satisfy the University's Discovery Program, and complete 60 credits in the major with a

minimum of C- in each course and 16 credits in a self-designed concentration in an area of study that enhances learning in the CIS discipline. Students must maintain an overall cumulative GPA of 2.0 or better.

Transfer students who elect to major in Computer Information Systems must earn 60 approved credits for completion of the CIS major, of which at least 24 credits must be completed at UNH Manchester; and 16 approved credits for completion of a self-designed concentration.

### **Program Requirements**

The CIS program of study requires one mathematics course from the following: MATH 420 Finite Math, MATH 424 Calculus for Biological Sciences, or MATH 425 Calculus I. Any of these courses may be used to satisfy the Quantitative Reasoning Discovery skills requirement.

#### *Introductory Core (4 courses, 16 credits)*

CIS 405, Introduction to the Internet and Web Authoring (may be used to satisfy the Environment, Technology and

Society, Discovery breadth requirement)

CIS 425, Introduction to Computer Programming

CIS 510, Fundamentals of Computer Information Systems

CIS 542 Operating Systems Applications

#### *Intermediate Core (4 courses, 16 credits)*

CIS 505, Advanced Web Authoring

CIS 520, Database Design and Development

CIS 550, Networking Concepts

CIS 560, Computer Law and Ethics

#### *Integrative and Professional Experience (5 courses, 16 credits)*

CIS 710, Object-Oriented Software Development

CIS 715, Information Security

CIS 685, Professional Development Seminar (1 cr)

CIS 690 Internship Experience (3cr)

CIS 790 Capstone Project (satisfies the Discovery Senior Capstone Experience requirement)

*CIS Electives (3 courses, 12 credits)*

Candidate CIS elective courses are: CIS 515, CIS 620, CIS 630, CIS 640, CIS 698, CIS 705, CIS 720.

*Concentration (4 courses, 16 credits)*

Majors can creatively design a concentration of courses that meet their academic and professional goals and career plans. Four courses can be selected across a wide university curriculum, reflecting majors' interests in a liberal arts, scientific, engineering, interdisciplinary, or professional area of study. The concentration must be approved by the student advisor before the student's junior year.

For additional information about the Computer Information Systems program contact Mihaela Sabin, Program Coordinator, 603-641-4144, or email [mihaela.sabin@unh.edu](mailto:mihaela.sabin@unh.edu); or contact the UNH Manchester Office of Admissions, 603-641-4150, email [unhm.admissions@unh.edu](mailto:unhm.admissions@unh.edu).

### **Minor - Computer Information Systems**

To earn a minor in Computer Information Systems, students must complete 20 credits with no individual grade lower than C- and a 2.00 average in minor courses. Students may take any five courses from the CIS, CS or PHIL 447 offerings, two of which must be at the 500 level.

For more information contact Karla Vogel, Minor Supervisor, at 603-641-4127 or [kv@unh.edu](mailto:kv@unh.edu).

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## Engineering Technology (ET) ▼

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*Assistant Professor:* Michael Jonas

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### Engineering Technology (ET)

Engineering Technology requires the application of engineering and scientific knowledge and methods combined with technical skills in support of engineering activities. Graduates may work in a variety of areas including engineering design, manufacturing, field service, testing and sales and may work in management positions related to engineering, manufacturing and computer technology.

The UNH Manchester Engineering Technology programs are accredited by the Technology Accreditation Commission of ABET, 111 Market Place Suite 1050, Baltimore, MD 21202-4012, Tel: 410 347-7700.

The Engineering Technology Program at UNH Manchester offers only junior- and senior-level coursework. Students admitted to this program must have an appropriate associate degree from the New Hampshire Technical Institute or an equivalent institution accredited by the Technology Accreditation Commission of the Accreditation Board of Engineering and Technology (TAC/ABET) or show academic evidence of ability to successfully complete the requirements of this calculus-based program. After two major courses, non-matriculated students must either be admitted to the program or declare that they are not planning to pursue a degree in Engineering Technology.

The programs at UNH Manchester are designed to meet the needs of both full and part-time students with a mix of classes scheduled during the day and in the evening.

## Program of Study

Students may major in Electrical Engineering Technology, Electrical Engineering Technology with a concentration in Computer Technology, or Mechanical Engineering Technology. All entering ET students should have completed mathematics through Differential and Integral calculus - (Calculus I & II). Students without Calculus II will be required to take ET 630 - Analytical Methods in Technology. Students with Calculus II may have ET 630 waived, although it is recommended that it still be taken as there are other useful topic requirements covered. Students must complete a minimum of 128 credits and satisfy the University's Discovery Program .

Electrical Engineering Technology (EET) and Electrical Engineering Technology with a concentration in Computer Technology (EET-CT) Educational Objectives

Program educational objectives are the skills and abilities graduates are expected to demonstrate during the first few years of employment. EET and EET-CT program educational objectives include:

1. Achieving employment in an EET and EET-CT-related position with appropriate title and compensation.
2. Demonstrating EET- and EET-CT-related technical problem-solving skills.
3. Functioning effectively in diverse and multidisciplinary teams.
4. Communicating effectively with both technical and non-technical audiences.
5. Adapting to changes in technology through continuous personal and professional development.
6. Being capable of assuming increasing professional responsibility.
7. Conducting all professional activities with integrity and demonstrating a sense of social and environmental responsibility.

## EET and EET-CT Program Outcomes

Program outcomes are the skills and abilities students are expected to demonstrate at graduation. Program outcomes for the EET and EET-CT program include:

1. Using principles and tools of science, mathematics, engineering and technology to design, implement and evaluate solutions to complex technical problems.

2.

Developing electronic and computer systems using appropriate test equipment (with an awareness of related hardware and software issues) and using results of analyses to improve designs or methodologies.

3.

Successfully developing a meaningful hardware/software-based project considering ethical, social, economic and technical constraints.

4.

Communicating effectively both orally and in writing.

5.

Working effectively in a team environment.

6.

Developing research and problem-solving skills to support lifelong personal and professional development.

7.

Evaluating the broader effects of technology and identifying connections between technology and economics, politics, culture, ethical responsibility, social structure, the environment and other areas.

### **Program Courses:**

#### **Electrical Engineering Technology (EET)**

ET 625, Technical Communications

ET 630b, Analytical Methods in Technology

ET 655, ET Seminar Series

ET 671, Digital Systems

ET 674, Control Systems & Components

ET 677, Analog Systems

ET 733, Business Organization and Law

ET 734, Economics of Bus. Activities

ET 762, Illumination Engineering

ET 788, Introduction to Digital Signal Processing

ET 790, Microcomputer Technology

ET 791, Electrical Engineering Technology Project (***Senior Capstone Project- 2 semesters-satisfies the***

ET 680, Communications and Fields

***Discovery Senior Capstone Experience requirement)***

CS 410, Introduction to Scientific Programming

General Education Requirements and Writing Intensive (WI) Requirement

**EET Computer Technology Option (EET-CT)**

ET 601, Data Structure & Databases

ET 625, Technical Communications

ET 627, Adv. Developmental Theory of E-commerce

ET 630b, Analytical Methods in Technology

ET 647, Adv. Perspectives in Programming

ET 655, ET Seminar Series

ET 667, Graphics and Animation

ET 671, Digital Systems

ET 707, Object Oriented Design

ET 717, Network Security

ET 733, Business Organization and Law

ET 734, Economics of Bus. Activities



ET 737, Web Server Databases

ET 747, User Interface Design

ET 777, Adv. Distributed Programming Trends

ET 787, Artificial Intelligence and Expert Systems

ET 790, Microcomputer Systems

ET 791, Electrical Engineering Technology Project (**Senior Capstone Project - 2 semesters - satisfies the**

**Discovery Senior Capstone Experience requirement**)

General Education Requirements and Writing Intensive (WI) Requirement

*Mechanical Engineering Technology (MET) Educational Objectives*

Program educational objectives are the skills and abilities graduates are expected to demonstrate during the first few years of employment. MET program educational objectives include:

1. Achieving employment in a MET-related position with appropriate title and compensation.
2. Demonstrating MET-related technical problem-solving skills.
3. Functioning effectively in diverse and multidisciplinary teams.
4. Communicating effectively with both technical and non-technical audiences.
5. Adapting to changes in technology through continuous personal and professional development.
6. Being capable of assuming increasing professional responsibility.
7. Conducting all professional activities with integrity and demonstrating a sense of social and environmental responsibility.

MET Program Outcomes

Program outcomes are the skills and abilities students are expected to demonstrate at

graduation. Program outcomes for the MET program include:

1. Using principles and tools of science, mathematics, engineering and technology to design, implement and evaluate solutions to complex technical problems.
2. Developing mechanical systems and using results of analyses to improve designs or methodologies.
3. Successfully developing a meaningful mechanical-based project considering ethical, social, economic and technical constraints.
4. Communicating effectively both orally and in writing.
5. Working effectively in a team environment.
6. Developing research and problem-solving skills to support lifelong personal and professional development.
7. Evaluating the broader effects of technology and identifying connections between technology and economics, politics, culture, ethical responsibility, social structure, the environment and other areas.

**Program Courses:**

**Mechanical Engineering Technology (MET)**

ET 625, Technical Communications

ET 630a, Analytic Methods in Technology

ET 639/640, HVAC 1 & 2

ET 641, Production Systems

ET 644, MET Concepts in Design and Analysis

ET 655, ET Seminar Series

ET 674, Control Systems and Components

ET 675, Electrical Technology

ET 733, Business Organization & Law

ET 734, Economics of Business Activities

ET 762, Illumination Engineering

ET 751, Mechanical Engineering Technology Project (**Senior Capstone Project - 2 semesters - satisfies the**

**Discovery Senior Capstone Experience requirement)**

CS 410, Introduction to Scientific Programming

General Education Requirements and Writing Intensive (WI) Requirement

Mechanical engineering technology students must satisfactorily complete CHEM 403, General Chemistry, or offer evidence of equivalent coursework.

For information about the Engineering Technology Program, contact B.S. Engineering Technology Program Chair and Program Coordinator for the Electrical Engineering Technology (EET) and the EET Computer Technology Option, Professor David A. Forest, at 603-641-4320 or by email to [daforest@unh.edu](mailto:daforest@unh.edu) or [davidunh@comcast.net](mailto:davidunh@comcast.net).

For information about the Mechanical Engineering Technology program (MET), contact Professor Ralph Draper, Mechanical Engineering Technology Program Coordinator, at 603-641-4323 or [rwd@unh.edu](mailto:rwd@unh.edu).

For admissions information contact the Office of Admissions at 603-641-4150.

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**English ▼**

» <http://www.unhm.unh.edu/programs/english/>

*Professor:* Deborah Brown, Fred Metting

*Associate Professor:* Susanne F. Paterson, Susan A. Walsh

*Assistant Professor:* Gail Fensom

*Senior Lecturer:* Robert M. Pugh

Through the study of a wide variety of literary materials, English majors deepen their understanding of history, culture, language, and human behavior. They also gain skill in writing, reading, and critical thinking.

The faculty of the UNH Manchester English department specializes in 20th century poetry, poetry writing, women's literary traditions, American literary folklore, New England culture, protest literature, nature writers, American and British fiction, Victorian literature and art, Renaissance drama, interdisciplinary studies, composition, journalism, grammar, and connections between American literature and American music.

Many upper-level courses are conducted as seminars, and individual conferences with professors are common. When possible, field trips to see local performances of drama and poetry readings are planned in conjunction with specific literature courses.

Job prospects for English majors after graduation are varied. English majors find employment in libraries and museums, government agencies, nonprofit organizations, publishing companies, journalism, the media, social work, banking, and many other fields. English graduates also are well prepared to enter graduate study in fields such as law and business.

### ***English Program of Study***

For the English major at UNH Manchester, students must complete a minimum of 128 credits and satisfy the University's Discovery Program and foreign language requirements and a minimum of 40 credits in major course work. Introduction to Critical Analysis (ENGL 419) must be completed with a grade of C or better. Except for ENGL 419, all courses must be completed with a grade of C- or above in order to count toward the English major.

Major requirements include ENGL 419, two 500-level courses, six courses numbered 600 or above, one course numbered 500 or above, and, of these, one course which qualifies as a diversity offering, with an overall grade-point average in the major of 2.0 or better. The capstone will be Senior Seminar, ENGL 787. In selecting these courses, students must meet the following distribution requirements:

- ENGL 419, Introduction to Critical Analysis, or ENGL 529, Writing About Literature
- Literature before 1800: Either two advanced courses (numbered 600 or above), or one advanced course and ENGL 512 or 513
- Literature after 1800: Either two advanced courses, or one advanced course and one course from the following list: ENGL 514, 515, or 516

- Total English courses must include ENGL 419, two 500 level courses, six courses numbered 600 and above, one course numbered 500 level and above, and, of these, one must include a diversity course

A typical first-year program in the first semester consists of Freshman English and three Discovery Program requirements or electives. In the second semester, the student typically would take Introduction to Critical Analysis, an introductory literature course, and two Discovery Program requirements or electives.

### ***Writing Focus for English Majors***

The English department offers a writing focus for English majors interested in creative or other specialized types of writing. Students who might be interested include students with an interest in graduate school in English or writing; students thinking about teaching and teaching writing; students considering law school or journalism training; students looking for careers in marketing and advertising; students wanting to write for corporate in-house publications; students thinking about freelance writing for magazines; and students who enjoy creative writing.

Four of the following nine courses are required. Students should take at least one 500-level course before taking 600- and 700-level courses.

English 501, Creative Non-Fiction

English 502, Technical Writing

English 503, Persuasive Writing

English 623, Essay Writing

English 625/626, Writing Fiction

English 627/628, Writing Poetry

English 710, Teaching Writing

Special Studies in Writing courses will be offered on an occasional basis.

For more information about the English program, contact Susanne Paterson, program coordinator, (603) 641-4115, e-mail [sfp@cisunix.unh.edu](mailto:sfp@cisunix.unh.edu). Or contact the UNH Manchester Office of Admissions at (603) 641-4150, e-mail [unhm.admissions@unh.edu](mailto:unhm.admissions@unh.edu).

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## **English (ENG) ▾**

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## **History (HIST)**



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*Professor:* John J. Cerullo, John P. Resch

*Affiliate Associate Professor:* Robert L. Macieski

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### History (BA)

*Professor:* John J. Cerullo, John P. Resch

*Affiliate Associate Professor:* Robert L. Macieski

The study of history is an essential element of a liberal arts education. The History major develops both an awareness of the past, and the tools to evaluate and express one's knowledge. Study of the past gives meaning to the present, increasing understanding of the political, social, economic, and cultural forces that influence human life. The study of history may include all of human culture and society, and UNH Manchester's History program allows great latitude in the subjects that may be studied. In fact, the interdisciplinary nature of the field makes it a natural focus for study that may encompass a variety of other fields.

The student who majors in History will have the opportunity to study the breadth of human experience, and will acquire the skills in critical reading and writing that form the foundation of an educated life. Students of history learn to analyze conflicting evidence, to find cause and effect, to express themselves effectively, and to ask relevant questions. Through careful observation and evaluation of information they seek explanations for human events.

Students majoring in history must complete a minimum of 128 credits, satisfy the University's Discovery Program and foreign language requirements, and take ten four-credit history courses or their equivalent. Students must receive at least a C in HIST 500 and HIST 797, and at least a C- in the other eight courses with an overall average in these courses of 2.0 or better.

History majors are urged to complete HIST 500 in the semester following the major declaration and HIST 797 during the senior year. A major must take at least eight additional History courses, of which a minimum of three must be at the 600 level or above. Only one 695/696 Independent Study course may be used to fulfill the 600-level requirement, and no more than two Independent Studies may be used toward the 40-ten-course requirement. No more than two 400-level courses may be counted toward the major. The program must be planned in

consultation with an adviser.

*The distribution of required courses for the major is as follows:*

HIST 500, Introduction to Historical Thinking

HIST 797, Colloquium in History (fulfills the Discovery Program Capstone requirement for history majors and is taken during the senior year)

An approved area of specialization: Four courses numbered 500 and above centered around a nation, region, time period or interdisciplinary theme (two of these courses may be in another program, if the student's adviser approves).

Complementary history courses: at least three history courses from outside the area of specialization.

History elective: may be a history course from either the area of specialization, or from a complementary area.

A particular feature of the history program at UNH Manchester is the opportunity to do internships for academic credit. These internships, which enable students to work in museums, historical societies, government agencies, archives, and in other institutional settings, may be arranged with the help of the faculty. A typical first-year program consists of at least two history courses (e.g., Introduction to Historical Thinking, Western Civilization, Historical Survey of American Civilization); Freshman English; three to five Discovery Program requirements; and electives.

For more information about the history program, contact John Cerullo, program coordinator, at (603) 641-4109, or e-mail [jcerullo@unh.edu](mailto:jcerullo@unh.edu). Contact the UNH Manchester Office of Admissions at (603) 641-4150; e-mail [unhm.admissions@unh.edu](mailto:unhm.admissions@unh.edu).

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## Humanities (HUMA) ▼

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*Associate Professor:* Terry M. Savage

The UNH Manchester Humanities program is an interdisciplinary study of the human condition, past and present. The program is based on careful examination of substantial works from a variety of disciplines and is intended to develop intellectual skills, specialized knowledge, and breadth of understanding. It provides students with a broad foundation of knowledge and skills in the liberal arts combined with a coordinated, self-designed program of studies in an area of individual student interest.

The program attracts highly motivated students who wish to assume significant responsibility for the content and direction of their studies. Humanities students develop skills of analysis, critical assessment, and effective communication as they study diverse works of art, music, literature, history, philosophy, and the sciences. Individually designed programs may cover the full range of student interests: for example, the social and ethical implications of genetic engineering or the examination of an historical period through study of its literature, arts, history, philosophy, and sciences. Students complete their major with two capstone seminars. The first, HUMA 795, Study of Creativity, explores the nature of creativity through the lives and works of individuals such as Leonardo da Vinci, Kathe Kollwitz, Mozart, Freud, Einstein, and Georgia O'Keeffe. The second seminar, HUMA 796, Study of Contemporary Issues, explores current social and political issues with a focus on developments in public policy, science, and business, and their impact on social values.

Humanities majors find employment in a wide range of fields or pursue graduate study in subjects such as law or education. Skills and knowledge developed through the major are important in virtually all social and career responsibilities. A Humanities major or minor can also complement work in other majors such as elementary or secondary education, business, communications, or computer information systems.

### **Program of Study**

For the Humanities major at UNH Manchester, students must complete a minimum of 128 credits and satisfy the University's Discovery Program and foreign language requirements and students must complete 40 credits with a minimum grade of C in each course. The required courses for the Humanities major are:

Core Courses (required of all majors)

HIST 500, Introduction to Historical Thinking

or

ENGL 419, Introduction to Critical Analysis



HUMA 411, Humanities I

HUMA 412, Humanities II

Discovery Program Capstone Courses:

HUMA 795, Humanities: Study of Creativity

HUMA 796, Humanities: Study of Contemporary Issues

Self-Designed Concentration

This is an approved program of studies designed by the student in consultation with a faculty advisor. In addition to courses available on the Manchester campus, students may, with prior approval, use courses from area colleges and the University's Durham campus. The concentration is made up of two humanities courses (HUMA prefix) at the 600 or 700 level and three courses from any relevant discipline at any level.

For more information contact Terry Savage, Program Coordinator, at [tmsavage@unh.edu](mailto:tmsavage@unh.edu) or 603-641-4149; or contact the Office of Admissions.

### **Humanities Minor**

The Humanities minor is an excellent way to add breadth of perspective to specialized study in particular disciplines. Many professions encourage students to develop skills and knowledge outside their area of professional interest. The Humanities minor can meet this objective and make college education a more enlightening and rewarding experience.

To earn a minor in Humanities students must complete 20 credits with a minimum grade of C in each course. Students must take the following courses: HUMA 411 Humanities I; HUMA 412 Humanities II; one course in any Humanities discipline at any level; one 600 or 700 level Humanities course; HUMA 795 Humanities: Study of Creativity or HUMA 796 Humanities: Study of Contemporary Issues

For more information contact Terry Savage, Minor Supervisor, at [tmsavage@unh.edu](mailto:tmsavage@unh.edu) or 603-641-4149

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## Politics and Society (PS) ▼

» <http://unhm.unh.edu/current-students/academics/degree-programs/ba-bs.php?id=12>

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*Professor:* Thaddeus M. Piotrowski

*Associate Professor:* Michael Contarino

*Lecturer:* Melinda Negrón

The Bachelor of Arts degree in Politics and Society provides an interdisciplinary approach to the study of Politics. The program emphasizes the many ways in which politics both shapes and is shaped by social, cultural, economic and historical context. The program explores such issues as the historical context of political processes and ideas, how economics and politics impact one another, and how political ideas are framed, legitimized, de-legitimized and manipulated in different social contexts.

Politics and Society majors develop critical thinking, communication and research skills essential for careers in government, politics, journalism, diplomacy and business. Graduates of the program also will be well-prepared for graduate studies in Law, Political Science, Sociology, Public Policy, Public Administration, Business Administration, Journalism, Diplomacy, International Relations and History.

As the University's urban campus, UNH Manchester is well-positioned to connect students to local, state and national politics through coursework, research, and internships. Students will have opportunities to work on local and national political campaigns, in local government and with community organizations for credit as a part of their Senior Capstone project.

The Politics and Society program is designed to meet the needs of the region's diverse student population including traditional-age and older students. Students will fulfill the university's Discovery Program and major requirements by attending classes either full- or part-time. Transfer students are encouraged to apply.

For complete more information contact Program Director Michael Contarino at 603-641-4138 or [mike.contarino@unh.edu](mailto:mike.contarino@unh.edu); or contact Program Co-Director Melinda Negron-Gonzales at 603-641-4364 or [melinda.negron@unh.edu](mailto:melinda.negron@unh.edu); or contact the Office of Admissions.

### Program of Study

Students must complete 128 credits to graduate, including 56 credits in the Politics and Society major.

Students must maintain an overall cumulative GPA of 2.0 and a cumulative GPA in the major of 2.0. No credit toward the major will be given for any course in which the student receives a grade of less than C-. Students also must fulfill the UNH Discovery Program requirements. Up to three courses may be used toward both the Politics and Society major and the UNH Discovery Program requirements. Transfer students must take at least 28 credits in the major at UNH Manchester.

### Program Requirements

The Politics and Society Major Includes

7 introductory courses in five social science disciplines and history

3 interdisciplinary Politics and Society core courses at the 500/600/700 level

3 500/600/700-level courses in Political Science and/or Sociology

The PS 701 capstone project and interdisciplinary seminar

Students will complete all lower-level courses before beginning their upper-level program, except by permission of the Politics and Society Program Director. Substitutions may be approved with permission of the Politics and Society Program Director. Writing-Intensive ("W") courses are included at all levels and will be offered all semesters. Students are encouraged to take a course in statistics and an Inquiry course in a related area.

### Required Courses

Seven 400-Level Courses

*All of the following*

POLT 401 Politics and Society

SOC 400 Introductory Sociology

ECN 411 Introduction to Macroeconomics

*One of the following*

HIST 410 Historical Survey of American Civilization

HIST 422 World History in the Modern Era

HIST 435/436 Western Civilization

*One of the following*

POLT 402 Introduction to American Politics

POLT 403 US and World Affairs

POLT 407 Law and Society

*One of the following*

ANTH 411 Global Perspectives on the Human Condition

ANTH 450 Race, Class and Power

*One of the following*

CMN 456 Propaganda and Persuasion

CMN 455 Mass Communication

Seven 500/600/700 Level Courses

*Three of the following interdisciplinary "PS" courses*

PS 501 Social and Political-Economic Theory

PS 502 Political Psychology

PS 503 Political Theory and Historical and Social Context

PS 504 Empire, Democracy and War

PS 505 Political Violence and Terrorism

PS 506 Civil Society and Public Policy

PS 507 The Politics of Food

PS 651 Selected Topics in Politics and Society

PS 702 International Relations: Interdisciplinary Approaches

*Three 500/600/700-level "PS-approved" courses in POLT or SOC (must include at least one POLT course, except by permission of the PS Program Coordinator). At least one course shall be at the 700-level.*

One capstone 700-Level PS course

PS 701W: Senior Project and Interdisciplinary Senior Seminar in Politics and Society

**Political Economy Minor**

Students interested in pursuing a career in government, public service, business, communications or the law can add a breadth of perspective through the minor.

The Political Economy minor consists of five courses (20 credits total). Students must take five of the following courses, with no more than THREE from the same designation (i.e., no more than three ECN or three POLT), and no more than THREE at the 400-level:

ECN 411 (Introduction to Macroeconomic Principles)

ECN 412 (Introduction to Microeconomic Principles)

ECN 635 (Money, Banking and Macroeconomic Activity)

ECN 640 (Business, Law and Economics)

ECN 650 (Economics for Managers)

POLT 401 (Politics and Society)

POLT 403 (US and World Affairs)

POLT 560 (World Politics)

POLT 567 (Politics of Global Resources)

POLT 743 (Comparative Political Economy)

POLT 762 (International Political Economy)

HUMA 412 (Industry and Welfare)

HUMA 660 (Moral Dimension of Economic Life)

ADM 701 (Business, Government and Society)

Substitutions are permitted by permission of minor coordinators, Tom Birch and Michael Contarino.

For more information contact Michael Contarino at 603-641-4138 or Tom Birch at 603-641-4108.

### **Political Science Minor**

The Political Science minor consists of five courses (20 credits total). These courses may be taken in any combination of the four fields and levels (400-700) offered. The fields to choose from are: American politics, political thought, comparative politics and international politics. It is recommended that no more than two courses be taken at the 400 level.

The minimum grade requirement is C- per course. Any grade lower than a C- will not count toward the minor. Students wishing to use transfer credits from abroad or other universities should meet with a political science advisor to determine eligibility toward the minor.

For more information contact Michael Contarino, Minor Supervisor, at 603-641-4138.

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## Psychology ▼

» <http://www.unhm.unh.edu/programs/psychology/>

*Associate Professor:* Gary S. Goldstein, Alison K. Paglia, John E. Sparrow

Psychology is the scientific study of behavior. The UNH Manchester psychology program provides students with a broad background in psychology, introducing them to both the experimental and clinical perspectives in the field. Students majoring in psychology will explore the fundamental principles involved in how people and animals learn and adapt to their environments.

The psychology program, through its independent study and internship programs, offers opportunities for participation in cooperating New Hampshire mental health, human services, and rehabilitation facilities. Students have worked in hospitals, halfway houses, mental health centers, and other agencies. The department also invites guest speakers to discuss important issues in the field.

Psychology graduates find employment as trained research assistants, mental health aides in a wide variety of human services agencies, social welfare caseworkers, teachers in special education programs, and professionals in government, business, and industry. It is normally expected that students who wish to do professional work in the field of psychology will pursue graduate training at the M.A., M.S., Ph.D., or Psy.D. level.

### **Psychology Program of Study**

Students majoring in psychology must complete a minimum of 128 credits, satisfy the University's Discovery Program and foreign language requirements and complete 44 credits with a minimum of C- in each course and a 2.0 overall grade-point average in all major requirements.

Transfer students who elect to major in psychology must complete at least 24 credits in the program at UNH/UNH Manchester to qualify for the degree in psychology. Transfer students must earn a total of 44 approved credits for completion of the psychology major. The department's academic adviser will determine the distribution of these credits. Transfer students should note that courses are allotted only the number of credits granted by the original institution (after adjustments for semester-hour equivalents). Thus, students transferring from an institution at which courses carry less than four credits each must make up for any credit

deficit created by acceptance of transfer credits into the psychology major.

Specific course selections should be discussed with the adviser. Exceptions to the requirements for the major require a petition to the department.

### **Program Requirements**

A. Three core courses (PSYC 401, 402, and 502)

B. Four 500-level breadth courses, as follows:

*Group I: Two courses:*

PSYC 511, PSYC 512, PSYC 513, PSYC 521, PSYC 522, PSYC 531

*Group II: Two courses:*

PSYC 552, PSYC 553, PSYC 561, PSYC 571, PSYC 581, PSYC 582

C. Four 700-level depth courses, as follows:

*Group I: One or more:*

PSYC 702, 705, 710, 712, 713, 720, 722, 731, 733, 735, 737, 741A-D

*Group II: One or more:*

PSYC 702, 705, 755, 756, 758, 762, 763, 765, 771, 780, 783, 785, 791A-G, 793

PSYC 702 and PSYC 705 may be substituted for a group I or group II course, but they may not both be used to fill the same group.

D. Capstone Requirement:

PSYC 793 **or** PSYC 795 w/ UNHM URC presentation **or**

Capstone Seminar (pending)

PSYC 793 and a designated capstone seminar courses may also fulfill a 700-level course

The Durham psychology major has slightly different requirements. Students who plan to transfer to Durham should consult with their adviser.



For more information about the psychology program, contact Gary Goldstein, program coordinator, (603) 641-4179, or e-mail [gary.goldstein@unh.edu](mailto:gary.goldstein@unh.edu). Or contact the UNH Manchester Office of Admissions at (603) 641-4150, e-mail [unhm.admissions@unh.edu](mailto:unhm.admissions@unh.edu)

### Psychology Minor

The minor in psychology consists of five psychology department courses (20 credits), including PSYC 401 and at least two courses at the 500 level or above. No more than four credits of PSYC 795 may be applied to the minor. Each course must be passed with a grade of C- or better, with an overall minimum grade point average of 2.0 for the five minor courses. . No pass/fail or credit/fail courses may be applied toward the minor. Under no circumstances can more than 9 transfer credits be applied toward the minor.

For more information contact Gary Goldstein, Minor Supervisor, at 603-641-4179.

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## Sign Language Interpretation (INTR) ▼

» <http://www.unhm.unh.edu/prospective-students/academics/degree-programs/ba-bs.php?id=14>

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*Associate Professor:* Jack E. Hoza

*Lecturer:* Patrick F. McCarthy

The Sign Language Interpretation program at UNH Manchester is a specialized, in-depth program with a national reputation for quality and has twice been recognized at the national level. In 1999, the program became the first interpreting program in the country to be found in compliance with the National Interpreter Education Standards of the Conference of Interpreter Trainers (CIT). In 2007, the program became the first interpreting program in the nation to be accredited by the Commission on Collegiate Interpreter Education (CCIE). UNH Manchester also houses one of northern New England's most comprehensive collections of books and media materials on sign language interpretation.

The program is guided by the premise that deaf people, as a linguistic minority, possess their

own cultural values, literature, history, traditions and social conventions. Interpretation requires bilingual and bicultural competence in spoken English and American Sign Language. The Sign Language Interpretation program at UNH Manchester provides students with a strong theoretical foundation as a generalist in ASL/English interpretation and helps prepare students for either state-level interpreter screening or national Registry of Interpreters for the Deaf (RID) interpreter certification, depending on students' skill level and experience.

Graduates may go on to pursue specialty areas in interpretation or related fields of study.

Students who complete the Bachelor of Science degree in Sign Language interpretation graduate with a varied and flexible academic base. Students also develop skills such as sustained powers of concentration, versatility in dealing with a variety of people and content areas, fast-thinking and excellent communication skills in the respective languages. Students seeking to become interpreters receive a foundation in American Sign Language, Deaf culture and the interpretation process, and their programs of study often include elective courses in linguistics, sociology, communication and psychology. Students also gain a thorough grounding in the liberal arts through the University's Discovery program.

Graduates of the Sign Language Interpretation program may pursue careers in ASL/English interpretation, Deaf education, rehabilitation, health care, audiology, social work, counseling and the media. The program provides students with a varied and flexible academic base. Graduates are prepared for further study in such fields as psychology, communication, linguistics, sociology and anthropology.

#### Program of Study

Students must complete 64 credits in the major, 40 credits in the University's Discovery program and 24 credits in elective courses. Students must complete 64 credits with a grade of C or better. Students who earn less than a C on a particular course may repeat that course only once. Students must achieve a GPA of 2.5 or better in major courses and must pass both ASL 531 and INTR 630 with at least a B- (or successfully demonstrate competence in American Sign Language and consecutive interpretation, respectively). Transfer students must complete a minimum of eight SLI courses at UNH Manchester.

#### Required Courses

#### Language Courses

ASL 435, American Sign Language I

ASL 436, American Sign Language II

ASL 531, American Sign Language III

ASL 532, American Sign Language IV

ASL 621, Advanced ASL Discourse I

ASL 622, Advanced ASL Discourse II

Culture and Linguistic Courses

INTR 438, A Sociocultural Perspective on the Deaf Community

INTR 539, Comparative Linguistic Analysis  
for Interpreter

Interpreting Courses

INTR 430, Introduction to Interpretation

INTR 439, Ethics & Professional Standards  
for Interpreters

INTR 540, Principles and Practice of Translation

INTR 630, Principles and Practice of  
Consecutive Interpretation

INTR 636, Principles and Practice of  
Simultaneous Interpretation

INTR 732, Simultaneous Interpretation of  
Discussions, Speeches and Reports

INTR 734, Field Experience and Seminar I

INTR 735, Field Experience and Seminar II

For more information contact Jack Hoza, program director, at 603-641-4143 or  
jack.hoza@unh.edu; or contact the Office of Admissions.

### **American Sign Language and Deaf Studies Minor**

To earn a minor in American Sign Language and Deaf Studies, students must complete 24 credits, with no individual grade lower than C-. Students must take the following courses

ASL 435, American Sign Language I

ASL 436, American Sign Language II

INTR 438, A Sociocultural Perspective on the Deaf Community

Three Elective Courses Chosen from the Following

ASL 531, American Sign Language III

ASL 532, American Sign Language IV

INTR 539, Comparative Linguistic Analysis  
for Interpreters

ASL 599, Special Topics in ASL/Deaf Studies

ASL 621, Advanced ASL Discourse I

ASL 622, Advanced ASL Discourse II

For more information contact Jack Hoza, program director, at 603-641-4143 or  
jack.hoza@unh.edu.

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## The Undeclared Option ▼

» <http://www.unh.edu/current-students/academics/degree-programs/ba-bs.php?id=16>

### The “Undeclared” Option

Students who are admitted to UNH Manchester as bachelor's degree candidates, but who prefer to postpone the declaration of a major or academic specialization, may do so through the undeclared option. Undeclared students may take until the second semester of their sophomore year to select a major.

Applicants for admission to UNH Manchester who are uncertain of their academic interests are encouraged to apply as undeclared. After admission undeclared students are assisted by academic advisors in purposeful exploration of academic interests and in making appropriate course selections. At UNH Manchester, the undeclared option can also be an effective way to

prepare for entry to a variety of academic programs that are available at the Durham campus only. Students must declare a major by the time they attain 57 semester hours.

For more information about the Undeclared major, call the Office of Admissions at 603-641-4150 or email [unhm.admissions@unh.edu](mailto:unhm.admissions@unh.edu).

### Undeclared Program Requirements and Program of Study

To graduate from UNH, students must fulfill three types of requirements: University (Discovery Program), degree and major requirements.

While undeclared, students develop their program of study with the guidance of an academic advisor . They work toward completing their Discovery Program requirements and explore their interests and possible baccalaureate degree majors. Once a major is declared, the student follows the major program of study to fulfill graduation requirements.

### To Graduate with a Baccalaureate Degree, Students must Complete the Following Requirements

Completion of at least 128 credits with a minimum cumulative grade-point average of 2.0.

Completion of four writing intensive courses, one of which must be ENGL 401, First-Year Writing

Completion of the University Discovery Program requirements

Proficiency in a foreign language.

Satisfaction of major requirements.

The last 32 hours of credit must be UNH courses completed following admission and matriculation, unless prior permission is granted to transfer part of this work from another institution.

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## **UNHM Special Topics (UMST) ▼**

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### Whittemore School of Business and Economics ▼

[» http://wsbe.unh.edu](http://wsbe.unh.edu)

*Dean:* Daniel E. Innis

*Associate Dean:* Roger B. Grinde , Christine M. Shea

*Assistant Director of Undergraduate Programs:* Gail Stepina

*Academic Counselor:* Tamara S. Rury , Lisa Pappajohn , Ashley K. Lapp

### Introduction ▼

The Whittemore School of Business and Economics (WSBE) prepares students for future careers in management, public service, research, and education. The liberal arts are the basic foundation of the curriculum, and management of change in a global economy is the major emphasis. Each department and program has its unique disciplinary tradition and the simultaneous commitment to broad educational excellence in critical thought, verbal and written communications, quantitative skills, computer literacy, and ethical reasoning. International awareness and cross-cultural understanding are essential components of the educational experience of Whittemore School students. The educational process encourages the integration of practice and theory through student interaction with business, public agencies, and faculty research.

The Whittemore School's undergraduate curricula combine a breadth of liberal education with specifics of professional education in business administration, economics, and hospitality management. Undergraduates enrolled in Whittemore School programs take a substantial part of their coursework, normally over 50 percent, in other colleges in the University in order to fulfill the Discovery Program requirements. Beyond those requirements, students are encouraged to elect additional courses in the arts, the behavioral and social sciences, the humanities, mathematics, and the natural sciences. Thus, students who complete the Whittemore School programs in business administration, economics, and hospitality management are prepared for employment and graduate study in both these and adjacent fields.

The Whittemore School offers minors in business administration, economics, and hospitality management. Within the limits of its resources, the Whittemore School also serves the needs

of undergraduates elsewhere in the University for whom selected courses in business administration, economics, or hospitality management are desirable complements to their primary course of study. To the extent that space is available after majors have enrolled, a limited number of Whittemore School courses are open to nonmajors who have the prerequisite preparation.

A maximum of 32 credits in courses offered by the Whittemore School of Business and Economics may be taken by non-Whittemore School students.

## **Degree Requirements ▼**

The Whittemore School offers a bachelor of arts degree program in economics and bachelor of science degree programs in business administration, economics, and hospitality management. The degrees in business administration and hospitality management are accredited by the Association to Advance Collegiate Schools of Business (AACSB). Students who desire a professional career in public accounting are advised to follow the five-year program leading to a bachelor of science in business administration and a master of science in accounting degree (see [Accounting Program of Study](#) for details). Application for admission to this highly selective program is made in the senior year.

Course listings for business administration are found under accounting and finance (ACFI), business administration (ADMN), decision sciences (DS), management (MGT), and marketing (MKTG). Candidates for a degree must satisfy all of the University Discovery Program requirements for graduation as well as the particular requirements of their individual major programs. In addition, candidates must complete a math course (MATH 420, 424A, or equivalent). Economics majors must also satisfy specific requirements associated with the bachelor of arts degree (see Degree Requirements). No Whittemore School course may be taken on a pass/fail basis by a student majoring in business administration, economics, or hospitality management.

In order to graduate, students must achieve a grade-point average of at least 2.3 (2.0 for the B.A. in economics) in the major courses and a minimum grade of C- (for ADMN 403, students must obtain credit) in each major course. Any WSBE major required course (including ADMN 403) in which a grade below C- is obtained must be repeated. No more than two WSBE courses may be repeated and each course may be repeated at most one time.

Modifications tend to occur in major programs during the four-year period of a student's undergraduate career. Students are expected to conform to these changes. Students



transferring into the Whittemore School from other universities must have business, economics, and hospitality management courses reviewed and approved by the faculty through the Whittemore School Undergraduate Programs Office to be considered for major requirements. Transfer credit is normally granted only for 400 and 500-level courses, and normally only when the transferring institution is AACSB-accredited.

For information concerning advanced degrees, see the [Graduate Catalog](#).

## **Advising System ▼**

Undergraduate advising in the Whittemore School is carried out jointly by academic advisers and the faculty. The academic advisers are based in the Whittemore School Undergraduate Programs Office, where student academic records are kept. The advisers assist students in program planning, preregistration, understanding and meeting general academic requirements, and general academic and career decision making. In addition, the advisers coordinate study abroad and domestic exchange and honors programs. The faculty draw on their own experience, expertise, and interests in helping students with course, program, and career selection.

The peer advising system, established in 1984, was created for the purpose of introducing first-year students to the college experience. Students complete a one-credit, credit/fail course each semester (ADMN 405/406, Freshman Academic Experience I/II), led by selected upper-class students under the direction of the Undergraduate Programs Office. The courses' goals are to familiarize students with their major, college, and University; to introduce students to the nature of academic knowledge, academic standards, and academic/personal management skills essential for success in the University; to provide discussion of a common topic or book; to support students in their personal growth; to develop personal responsibility; and to encourage first-year students to use the advising services on campus.

Undergraduates are encouraged to develop an advisory relationship with one or more faculty members with whom they have mutual interests. All students are urged to seek as much assistance as they need from appropriate sources, but are reminded that theirs is the ultimate responsibility for knowing and meeting the various academic requirements for a degree.

## **Independent Study/Internship ▼**

Juniors or seniors in high academic standing in the Whittemore School may elect the internship or independent study course for variable credit. For either course, the student must secure a faculty sponsor in the area of interest and submit a written proposal prior to the start of the semester in which the project is to be undertaken. Independent study normally involves research, while internships are usually undertaken with cooperation of an off-campus organization and involve a non-routine but practical application of skills and concepts acquired in a student's program.

Independent studies and internships require considerable self-direction and self-monitoring on the part of the student, who must be in high academic standing. Careful prior review of requirements with the undergraduate adviser and faculty sponsor is necessary. Students may earn no more than 16 credits combined in internships, independent studies, field experience, and supervised student teaching experience.

The Washington internship, a semester of supervised work experience in Washington, D.C., is open to any major.

## International Programs ▼

The Whittemore School encourages qualified students to participate in programs of international work and study. The Whittemore School has international opportunities in Budapest, Hungary; Grenoble, France; and Pollenzo, Italy (part of the EcoGastronomy dual major).

Students may also elect to take a **dual major in international affairs**, offered in conjunction with the program for international perspectives or a dual major in **EcoGastronomy**.

Information on other international programs can be obtained from the sponsoring department or the Center for International Education, Hood House, Room 204. WSBE students are highly encouraged to study abroad at schools accredited by the AACSB (Association to Advance Collegiate Schools of Business) and/or EQUIS (European Quality Improvement System).

## Five-Year Programs ▼

### ***Four-One Program: B.S.-M.S.A.***

The American Institute of Certified Public Accountants (AICPA), the national association of professional accountants, has mandated that five years of university education be required for

national certified public accountant (CPA) certification as of the year 2000. Most states have approved similar requirements for licensing/certification. The Whittemore School offers a five-year program designed for students who desire a professional accounting career. The program leads to the joint awarding of a bachelor of science in business administration and a master of science in accounting degree. Application for admission to this highly selective program is made in the senior year. Details are provided in the [Programs of Study](#) sections of this catalog and the [Graduate Catalog](#).

## Minors in WSBE, Courses for non-majors ▼

### *Minors*

The Whittemore School faculty has developed a group of courses for nonmajors that, if available and when combined with certain elective courses, can constitute a minor in business administration, economics, or hospitality management. A list of minor requirements is available at the Whittemore School Undergraduate Programs Office, Room 120, McConnell Hall.

### *Nonmajors*

The Whittemore School also offers courses for nonmajors. Students interested in these courses should contact the undergraduate programs office.

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» <http://wsbe.unh.edu>

#### EcoGastronomy ▼

<http://www.unh.edu/ecogastronomy/>

As a cooperative program, the Whittemore School of Business and Economics and the College of Life Sciences and Agriculture offer all UNH undergraduate students the opportunity to pursue a dual major in EcoGastronomy. The dual major requires completion of the EcoGastronomy program and any other major.

The EcoGastronomy program prepares students for professions within our rapidly evolving food community—from farm to fork to nutrition and health outcomes—where ever-greater integration of agriculture, food, and nutrition requires a broad perspective and a specific blend of skills and knowledge. The dual major in EcoGastronomy is international by providing a context for studying ‘gastronomy’ at the University of Gastronomic Sciences in Pollenzo, Italy.

### Required Core Courses

ECOG 401, Introduction to EcoGastronomy

PBIO 405, Organic and Sustainable Food Production

HGMT 403, Food and Beverage Management

NUTR 400, Nutrition Health and Well Being

ECOG 685, EcoGastronomy in Italy

ECOG 7XX, Senior EcoGastronomy Capstone (under development). Satisfies the capstone requirement of the Discovery Program for the EcoGastronomy major.

#### One Elective

4 credits, upper level, to be selected from the following (students must meet applicable pre-requisites for the desired course): ANSC 602, 694, 698, CD 720, EDUC 630, HIST 618, 666, HGMT 670,771, MGT 732, NR 602, 607, 665, 701, 785, 797, NUTR 720, PBIO 650, 652, 726, SOC 665, TOUR 705, ZOOL 610/611, 772.

#### Foreign Experience

15 credits (Pre-approved by the EcoGastronomy in Italy program coordinator) at the University of Gastronomic Sciences (UNISG, [http://www.unisg.it/welcome\\_eng.lasso](http://www.unisg.it/welcome_eng.lasso)) in Pollenzo, Italy. All dual majors must spend a full semester abroad, most likely during their junior year. The objective of the UNISG is, “to create an international research and training center, working to renew farming methods, protect biodiversity and maintain an organic relationship between gastronomy and agricultural science.”

### **Portfolio**

Students will be required to submit a portfolio annually to the faculty coordinator, and a cumulative portfolio to the instructor of their capstone course for final assessment.

The courses in the dual major program are multidisciplinary, taught by faculty from different departments in the University. They are designed to integrate UNH strengths in sustainable agriculture, hospitality management, and nutrition to offer a unique academic program emphasizing the interdisciplinary, international, and experiential knowledge that connects all three fields. The program is experiential by requiring students to work in the field growing food as well as in the kitchen preparing food and developing the skills associated with both. Students will also experience the local food cultures and get firsthand experience on the issues of food security locally, regionally, and globally.

Students who wish to declare a dual major in EcoGastronomy must have a cumulative grade-point average of 2.5, have declared, or be prepared to declare, a disciplinary major, and complete the Introduction to EcoGastronomy course (ECOG 401) with a grade of C or better.

ECOG 401 is prerequisite for study abroad, ECOG 685. All required classes and the elective are a pre/co-requisite for the senior EcoGastronomy capstone course, ECOG 7XX (under development). Exceptions are possible with a late declaration of the dual major. All foreign experiences must be pre-approved by the EcoGastronomy faculty coordinator.

The completion of the dual major requires no additional credits for graduation beyond the 128 required of all UNH students. All coursework required for EcoGastronomy must be completed with a grade C or better. For information, contact the dual major in EcoGastronomy, 105 McConnell Hall, 862-3327, [ecog.info@unh.edu](mailto:ecog.info@unh.edu).

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### Whittemore School of Business and Economics

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- Accounting and Finance
- Business Administration
- Decision Sciences
- Economics
- Hospitality Management
- International Affairs (dual major)
- Management
- Marketing

## Undergraduate Course Catalog 2011-2012 Whittemore School of Business and Economics ▼

» <http://wsbe.unh.edu>

### Accounting and Finance (ACFI) ▼

» [http://wsbe2.unh.edu/Accounting\\_and\\_Finance](http://wsbe2.unh.edu/Accounting_and_Finance)

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*Chairperson:* Ahmad Etebari

*Professor:* Ahmad Etebari, Fred R. Kaen

*Associate Professor:* Stephen J. Ciccone, John Hasseldine, Ania Madgalena Rose, Jake Rose, Le Xu

*Assistant Professor:* William C. Johnson, Yixin Liu, Mihail K. Miletkov, Wenjuan Xie

*Lecturer:* Scott R. Berube CPA, John D. Colliander, William F. Knowles CPA

Accounting and finance are fundamental academic disciplines in business schools. Accounting provides the basic language of businesses and the underlying structure for information systems. Finance provides important knowledge about asset management, capital markets, and risk strategies. This department coordinates the options in accounting and finance and is responsible for the Master of Science in Accounting.

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### Business Administration (ADMN) ▼

» [http://wsbe2.unh.edu/BS\\_Bus\\_Admin](http://wsbe2.unh.edu/BS_Bus_Admin)

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*Professor:* Ahmad Etebari, Ross J. Gittell, Daniel E. Innis, Fred R. Kaen, Michael J. Merenda, Christine M. Shea, Barry Shore, Jeffrey E. Sohl, A. R. Venkatachalam

*Associate Professor:* Carole K. Barnett, Ludwig A. Bstieler, Stephen J. Ciccone, Vanessa Urch

Druskat, Roger B. Grinde, Peter J. Lane, Jun Li, Anthony T. Pescosolido, Catherine A. Plante, R. Daniel Reid, Ania Madgalena Rose, Jake Rose, Richard Saavedra, Craig H. Wood, Le Xu, Honggeng Zhou

*Assistant Professor:* Melissa M. Bishop, Devkamal Dutta, Lin Guo, Kholekile L. Gwebu, N. Paul Harvey III, William C. Johnson, Yixin Liu, Mihail K. Miletkov, Bruce E. Pfeiffer, M. Billur Talay, Jing Wang, Wenjuan Xie, Goksel Yalcinkaya

The business administration program provides training for individuals interested in managerial or administrative careers in business or in public or private institutions. The Whittemore School's program in business administration is accredited by the Association to Advance Collegiate Schools of Business (AACSB), and is separate from the business program at the UNH-Manchester campus.

Since most graduates of the program embark upon business careers, the program emphasis is in that direction. However, the skills acquired through the business program are readily applicable to the problems faced by not-for-profit institutions such as hospitals, school systems, government departments, and other socially oriented organizations, and the program's objectives have been broadened to include all types of administration.

The curriculum offers professional education in the basic theories, principles, concepts, and analytical tools used by successful modern administrators, combining them with an introduction to the functional areas of management. Additionally, students develop expertise in a particular area of business by earning an option within the business administration degree program. At the same time, typical students achieve a well-rounded education by selecting courses in the liberal arts and the sciences from other colleges and schools in the University.

The business administration program comprises ten 4-credit business administration courses (ADMN prefix) representing foundational business knowledge and skills, one 1-credit business administration course to develop and demonstrate proficiency with computer applications, two 4-credit economics courses (ECON prefix), and one 400-level course in mathematics (MATH prefix). All but one of these required courses are generally completed in the first five semesters of enrollment at WSBE, leaving the student with the flexibility in the final three semesters at WSBE to earn an option in one of the offered areas. University Discovery Program requirements and other non-WSBE classes are generally taken throughout a student's time at UNH.

ADMN 703, Strategic Management: Decision Making, is the capstone course for the business administration program and satisfies the capstone requirement of the University Discovery Program. Students satisfy the Inquiry requirement of the Discovery Program before the end of the sophomore year by completing an inquiry or inquiry-attribute course within the Whittemore

School, or a course offered by another college at the University.

While taking the 10 core business administration courses, a student will gain an introduction to all of the major areas of business. Using this knowledge, students decide upon an area of business in which they desire to concentrate. Within the business degree program, students must designate an option. The latest a student may declare an option is during the fall semester of their junior year, typically prior to preregistration for spring courses. Students are encouraged to discuss their interests with several faculty members and an academic adviser in this decision-making process. The options currently offered in the business administration program are listed here. Due to the dynamic nature of the business world, the portfolio of options offered may change from time to time. Students are expected to stay abreast of these changes through WSBE's Undergraduate Programs Office.

**Options in the Business Administration Program:**

Accounting

Entrepreneurial Studies

Finance

Information Systems Management

International Business and Economics

Management

Marketing

Student-Designed

Options comprise a minimum of four courses, but requirements do vary by option. Due to the specialized nature of some career fields, course requirements are greater in some options than others.

A typical plan of study follows, showing the major-required courses. Students take 16-18 credits per semester. Discovery Program requirements (including the Inquiry requirement in the first two years) and elective courses are taken as well. The options have different requirements, which are provided later. However, a detailed schedule of study for each option is not provided here. Students should check with the WSBE Undergraduate Programs Office for specific recommendations regarding scheduling of courses in the option areas and the suggested plan of study.

**Freshman: Fall**

ADMN 400, Introduction to Business

ADMN 403, Computing Essentials for Business (1 credit, credit/fail grading)

ADMN 405, Freshman Academic Experience I (1 credit, credit/fail grading)

ECON 401, Macro Economics or 402, Micro Economics  
MATH 420, Finite Math or 424A, Calculus for Social Sciences

**Freshman: Spring**

ADMN 406, Freshman Academic Experience II (1 credit, credit/fail grading)  
ADMN 410, Management Information Systems  
ECON 401 or 402  
ENGL 401

**Sophomore: Fall**

ADMN 420, Business Statistics  
ADMN 502, Financial Accounting

**Sophomore: Spring**

*Students typically declare an option during this semester.*  
ADMN 503, Managerial Accounting

*One or two of the following courses*

ADMN 570, Introduction to Financial Management  
ADMN 575, Behavior in Organizations  
ADMN 580, Quantitative Decision Making  
ADMN 585, Marketing

**Junior: Fall**

*Students must declare an option by this semester.*  
Take the remaining courses from the Sophomore Spring list.

**Junior: Spring**

\*Course(s) in option area

**Senior: Fall**

\*Course(s) in option area  
ADMN 703, Strategic Management: Decision-Making (or take in Senior Spring term). This is the capstone course in the business administration program, and satisfies the capstone requirement of the Discovery Program.

**Senior: Spring**

\*Course(s) in option area  
ADMN 703, Strategic Management: Decision-Making (if not taken in Senior Fall term)

\*Depending of the choice of option and the specific requirements thereof, students may be able to take WSBE or non-WSBE electives for some of these courses.

The **Option in Accounting** provides students with opportunities in a variety of fields, including internal audit, external audit, tax preparation and planning, and consulting. Demand for accountants has been consistently strong. The goal of the accounting option is to prepare students for a career in accounting and the qualifications to obtain certifications, such as certified public accountant (CPA), certified management accountant (CMA) and certified internal auditor (CIA). The accounting option also prepares students to enter the M.S. in accounting program offered by WSBE. Obtaining a master's degree is a necessary requirement for taking the CPA exam in most states, including Massachusetts and Maine, and will be a requirement to be certified in New Hampshire starting in 2014.

**Required**

ACFI 621, Intermediate Financial Accounting I  
ACFI 622, Intermediate Financial Accounting II  
ACFI 723, Advanced Managerial Concepts and Applications  
ACFI 724, Auditing  
ACFI 726, Taxation and Management Strategy  
MGT 647, Business Law I

*In addition, one course chosen from the following:*

ACFI 725, Financial Statement Analysis  
ACFI 750, Internship in Accounting  
ACFI 752, Independent Study in Accounting (including Tax Challenge)  
ADMN 799, Honors Thesis in Accounting

The **Option in Entrepreneurial Studies** is designed for students who intend to start a business, work for a new venture, or become involved in a new venture creation within an established organization. The option fosters an entrepreneurial culture throughout the program and the priority is real-world learning in the innovative environment of entrepreneurial ventures. The focus is on innovation and creativity with the goal of exposing students to all the facets of running an innovative business. The program includes active student participation, a seminar format, and several guest speakers. Each student participates in a senior project and an internship at an entrepreneurial company.

**Required**

MKTG 763, Market and Opportunities Analysis

DS 741, Private Equity/Venture Capital

DS/MGT 742, Internship in Entrepreneurial and Management Practice

MGT 732, Exploration in Entrepreneurial Management

The ***Option in Finance*** is designed as a preparation for a broad variety of careers such as corporate finance, banking, portfolio management, and investment analysis. The goal of the finance option is to expose students to all three major branches of finance: investments, corporate, and financial institutions. At the same time, the option allows students some flexibility in choosing courses. The option helps students planning to sit for the chartered financial analyst (CFA) exam, the certified financial manager (CFM) exam, and the certified financial planner (CFP) exam.

**Required**

ACFI 701, Financial Policy

ACFI 702, Investments Analysis

*In addition, two of the following*

ACFI 703, International Financial Management

ACFI 704, Derivative Securities and Markets

ACFI 705, Management of Financial Institutions

The ***Option in Information Systems Management*** will appeal to students who wish to learn how to take advantage of contemporary technologies to solve complex business problems.

The program concentrates on two areas:

- 1) Organizations, with an emphasis on business processes,
- 2) Technology, with an emphasis on systems analysis, design, implementation, and management.

Experiential learning is emphasized in all courses and includes real-life corporate project experience. This unique combination of skills is in short supply, and the employment outlook is outstanding.

**Required**

Information Systems Development: Currently CS 405, Visual Basic I, or equivalent. The faculty coordinator of the option must approve any substitute course for CS 405.

DS 773, Managing Information Across the Enterprise

DS 774, Business Strategies and Solutions

DS 775, Corporate Project Experience

DS 780, Systems Analysis and Design; or

DS 798, Topics in Decision Sciences (specific topics may change from year to year)

The ***Option in International Business and Economics*** offers an interdisciplinary course of study, providing strong business training for students pursuing careers at organizations with an international focus, particularly in multinational corporations, international banks, and government agencies. It achieves this by combining general business training with in-depth knowledge in economics, finance, and management. Students are strongly encouraged to round out their education with either an internship at an international organization or by studying abroad for one semester.

**Required**

ECON 645, International Economics

*Three (3) of the following:*

ACFI 703, International Financial Management

MGT 755, International Management

MKTG 760, International Marketing

ECON 611, Intermediate Macroeconomics

ECON 746, International Finance

*One of the following:*

One of the remaining courses from list above.

4-credit graded internship at an international organization

1-semester study abroad experience that involves at least one approved international business or economics course and that results in at least 12 academic credits being transferred back to UNH.

ACFI 704, Derivative Securities and Markets

ECON 668, Economic Development

ECON 692, International Economic Integration

ECON 745, International Trade

ECON 747, Multinational Enterprises

The ***Management Option*** provides students with opportunities to develop a substantial foundation in the principles of managing the human, organizational, technical, and financial resources of organizations to enhance strategic competitiveness. Courses emphasize problem-solving, planning, and interpersonal skills related to ethical leadership in the new economy, managing innovation and change, and international and cross-cultural issues in organizations. The option emphasizes the generalist's mindset in concert with a specialist's functional

understanding of the firm. Future career paths include an array of management, supervisory, sales, and other positions in established and entrepreneurial businesses. The option is also recommended for students considering graduate education in management or law.

**Required**

MGT 614, Organizational Leadership and Structure

MGT 701, Business, Government, and Society

In addition, two 600- or 700-level MGT courses. Current offerings, which may change from year to year, include:

MGT 647, Business Law I (or MGT 648 Business Law II; MGT option students can count at most one Business Law course toward the MGT option)

MGT 713, Leadership Assessment and Development

MGT 732, Exploration in Entrepreneurial Management

MGT 755, International Management

MGT 798, Applied Management Seminar (open only to MGT option students with GPA of at least 3.2)

MGT 798, Topics in Management (topics will change from year to year)

The ***Option in Marketing*** focuses on how to develop, establish, and maintain products and services of high value for customers as well as how to deliver and communicate them. The option addresses key linkages critical to effective customer and product management, from understanding customer needs and problems to delivering appropriate solutions and services. It further examines decision choices facing managers concerning market selection, entry timing, positional advantage to be pursued, targeting, and executional approaches. Students can earn an option in marketing by successfully completing the requirements in the following table. Students are required to minimally take the following courses:

**Required**

MKTG 752, Marketing Research

MKTG 753, Consumer/Buyer Behavior

MKTG 762, Marketing Workshop

MKTG 763, Market Opportunity Analysis

At least two additional 700-level Marketing (MKTG) courses. Offerings will vary from semester to semester.

For additional courses, students are encouraged to meet with department faculty or with the Academic Advising Office for help in choosing a career track and additional courses.



A ***Student-Designed Option in Business Administration*** is available for those students whose interests are not fully satisfied by any of the other currently available options in business administration. Students desiring a self-designed option must submit the application to the faculty coordinator. After the faculty coordinator's approval, the proposal must receive approval from the academic director of undergraduate business programs and the Whittemore School dean's office.

Students applying for this option will normally be expected to have a grade point average of at least 3.0.

The student-designed option in business administration shall consist of at least five Whittemore School courses, at least three of which shall be from the business administration departments (currently accounting and finance, decision sciences, management, and marketing).

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## **Decision Sciences (DS) ▼**

» <http://wsbe2.unh.edu/department-decision-sciences>

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*Chairperson:* A. R. Venkatachalam

*Professor:* Christine M. Shea, Barry Shore, Jeffrey E. Sohl, A. R. Venkatachalam

*Associate Professor:* Eleanne Solorzano Dowd, Roger B. Grinde, R. Daniel Reid, Craig H. Wood, Honggeng Zhou

*Assistant Professor:* Tevfik Aktekin, Kholekile L. Gwebu, Sanjeev Jha, Jing Wang

*Instructor:* Peter W. Royce

*Lecturer:* Matthew J. Macarty, Benjamin S. Porter

Data-driven decision expertise is critical for the survival and growth of modern enterprises. The Decision Sciences Department brings together faculty with special expertise in decision support systems, enterprise information systems, enterprise integration, management science, business statistics, operations/technology management, operations research, and manufacturing strategy. This department coordinates the options in information systems management and entrepreneurial venture creation.

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## Ecogastronomy (ECOG) ▼

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## Economics (ECON) ▼

» <http://wsbe2.unh.edu/department-economics>

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*Chairperson:* Bruce T. Elmslie

*Professor:* Karen Smith Conway, Bruce T. Elmslie, Richard W. England, Michael D. Goldberg, Evangelos O. Simos, James R. Wible, Robert S. Woodward

*Associate Professor:* Reagan A. Baughman, Marc W. Herold, Andrew James Houtenville, Ju-Chin Huang, Robert D. Mohr, Neil B. Niman, Torsten Schmidt

*Assistant Professor:* Mostafa Beshkar, Le Wang

Economics is the study of how societies organize themselves to produce goods and services and to distribute those products among the members of society. In the modern world, a combination of market forces, public policies, and social customs perform these basic economic tasks. Economists use concepts, models, and data to analyze efficiency of resource use, fairness of economic outcomes, and development of global and national economies. The economics programs are designed to introduce students to the tools of economic analysis and to show students how they can use those tools to analyze and better understand real-world situations.

Undergraduate training in economics is an excellent background for a variety of careers, including banking and financial services, journalism, international business, public service, the diplomatic corps, entrepreneurial ventures, and government administration. An undergraduate major in economics is also excellent preparation for those interested in graduate work in law, business administration, and international relations.

Graduate work in economics can lead to careers in college teaching, research in public and private agencies, and business consulting. Those interested in studying economics at the graduate level should ask their economics professors what undergraduate coursework is appropriate and which graduate schools would be suitable.

Courses in economics are open to nonmajors on a space-available basis. Students majoring in other programs have found that certain economics courses are useful supplements to their own majors and a help in gaining employment. For example, political science majors can profit from studying public economics, economic development, and international economics. Mathematics and engineering students might elect to study econometrics and intermediate microeconomics.

Environmental conservation majors could choose to study ecological or energy economics. For more information on economics electives, please consult the Whittemore School Undergraduate Programs Office (McConnell 120) or the chairperson of the economics department.

The department offers the choice of a B.A. degree or a B.S. degree in economics. The B.A. degree is designed to offer students maximum flexibility in designing a program of study. Students are encouraged to take a wide variety of courses, double major, and take advantage of study abroad programs. The B.S. degree differs from the B.A. degree in that it requires more quantitative and data analysis courses but does not require a foreign language. It provides more structure and direction than the B.A. degree and is more professionally focused.

Students earning either the B.A. or the B.S. degree in economics may not use any of ECON 401, ECON 402, EREC 411, ECN 411, or ECN 412 to satisfy Discovery Program requirements.

B.A. economics majors must complete eight courses in economics plus ADMN 420 with a grade of at least C- (1.67) in each course and an average grade of 2.0 or better in the major courses. These courses must include ECON 401, ECON 402, ECON 605, and ECON 611. In addition, majors must complete either MATH 420 or 424A. Coursework in accounting is recommended but not required. B.A. economics students must also satisfy the B.A. economics capstone requirement to earn their degree and to satisfy the capstone requirement of the University Discovery Program.

B.S. economics majors must complete nine courses in economics with a grade of at least C- (1.67) in each course and an average grade of 2.3 or better in the major courses. These courses must include ECON 401, ECON 402, ECON 605, 611, 726, and 775. In addition, majors must complete MATH 424A and ADMN 403, 410, 420, 502, and 503. ECON 775, Applied Research Skills for Economists, is the capstone course for the B.S. major and satisfies the capstone requirement of the University Discovery Program.

Major credit toward ECON 605 and/or 611 will be awarded to transfer students only if equivalent courses have been taken at the junior level or above. Transfer students must take at least five of their economics courses at UNH. All economics-related courses taken at other institutions must be approved by the economics department in order for them to count toward the major.

Students may petition to substitute one business administration course for an economics elective if the course is at the 600 level or above and if a grade of C- or better is earned. Students may earn no more than 16 credits in internships, independent studies, field experience, and supervised student teaching experience. All economics majors must satisfy

the bachelor of arts or bachelor of science degree requirements, and all Discovery Program requirements. Students satisfy the Inquiry requirement of the Discovery Program before the end of their sophomore year by completing an inquiry or inquiry-attribute course within the Whittemore School, or another course offered by another college at the University.

The economics department offers three specialized options within the bachelor of arts. By selecting economics electives from an approved list, a student majoring in economics can graduate with an option in money and financial markets, global trade and finance, or public policy and sustainability.

*A suggested plan of study for B.A. economics majors follows:*

**Freshman Year**

ECON 401, Principles of Economics (Macro)

ECON 402, Principles of Economics (Micro)

MATH 420 or MATH 424A

ADMN 403, Computing Essentials for Business (1 credit, credit/fail grading)

ADMN 405, Freshman Academic Experience I (1 credit, credit/fail grading)

ADMN 406, Freshman Academic Experience II (1 credit, credit/fail grading)

**Sophomore Year**

ADMN 420, Business Statistics

ECON 605, Intermediate Microeconomic Analysis

ECON 611, Intermediate Macroeconomic Analysis

**Junior and Senior Years**

Economics electives (at least 4)

B.A. economics capstone requirement (ECON 774, Senior Economics Seminar, under development), or another alternative approved by the Economics Department. The capstone must be completed during the senior year.

*A suggested plan of study for B.S. economics majors follows:*

**Freshman Year**

ECON 401, Principles of Economics (Macro)

ECON 402, Principles of Economics (Micro)

MATH 424A

ADMN 403, Computer Essentials for Business (1 credit, credit/fail grading)

ADMN 405, Freshman Academic Experience I (1 credit, credit/fail grading)

ADMN 406, Freshman Academic Experience II (1 credit, credit/fail grading)

ADMN 410, Management Information Systems

## ADMN 502, Introductory Financial Accounting

### **Sophomore Year**

ADMN 420, Business Statistics

ADMN 503, Managerial Accounting

ECON 605, Intermediate Microeconomic Analysis

ECON 611, Intermediate Macroeconomic Analysis

### **Junior and Senior Years**

ECON 726, Introduction to Econometrics

ECON 775, Applied Research Skills for Economists (this is the capstone course for the B.S. Economics program, and satisfies the capstone requirement of the Discovery Program). This course must be taken in the senior year.

Economics electives (at least three)

A minor in economics consisting of five courses is also available. At least three of these courses must be taken at UNH. For more on the minor and options within the major, consult the Whittemore School Undergraduate Programs Office.

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## **Hospitality Management (HMGT) ▼**

» <http://wsbe2.unh.edu/bs-hospitality-management>

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*Chairperson:* Clayton W. Barrows

*Professor:* Clayton W. Barrows, Raymond J. Goodman Jr.

*Associate Professor:* E. Hachemi Aliouche, Nelson A. Barber

*Assistant Professor:* Valentini Kalargyrou, Pei-Jou Kuo

*Affiliate Assistant Professor:* Sylvia H. Marple

*Lecturer:* Carl E. Lindblade, Udo Schlenrich, Daniel R. Winans, Amy L. Winans

The program in hospitality management is an integral part of the offerings of the Whittemore School. It is one of only a few programs worldwide accredited by both the Association to Advance Collegiate Schools of Business (AACSB) and the Accreditation Commission for Programs in Hospitality Administration (ACPHA). Graduates are prepared to assume leadership development, management trainee, and management positions in all sectors of the

service industry, with primary emphasis on the hospitality industry.

Graduates have accepted positions in the lodging and food service sectors (and their allied businesses and wholesalers), software companies, tourism, travel and recreation industries, and in retirement facilities, hospitals, and college and university food service operations.

In order to have a well-rounded university education, students take courses in liberal arts as well as foundation courses in business administration and economics. The hospitality management curriculum builds upon this foundation and provides experience and in-depth education in the lodging and food service-related industries, as well as the broader industries that comprise the hospitality discipline.

The program includes a mix of practical experiences along with classroom activities. These practical experiences are provided by major consulting projects to industry as part of classroom activities, lecture series, seminars, and field trips; a minimum of 800 hours of an approved work experience practicum; and by involvement in the food service and lodging operations with University Hospitality Services (UNH campus dining services).

The Department of Hospitality Management curriculum comprises 14 required courses and three required hospitality electives, two economics courses, six business administration courses, and one mathematics course. Freshman and sophomore years consist of 12 core courses in the abovementioned disciplines. Sophomore, junior-level, and senior-level courses include the functional hospitality and business discipline courses required for one to develop into a successful manager. HMG 703, Strategic Management in the Hospitality Industry, is the capstone course for the major and satisfies the capstone requirement of the University Discovery Program. A wide range of elective courses, independent studies, and internships can complement the required curriculum. Students satisfy the Inquiry requirement of the Discovery Program before the end of the sophomore year by completing an inquiry or inquiry-attribute course within the Whittemore School, or another course offered by another college at the University.

To graduate, students must obtain a 2.3 grade-point average in all major required courses and a minimum grade of C- in each major course. Graduates of this program who are qualified for, and interested in, further allied studies are well prepared for advanced degree programs in hospitality, tourism, business, law, institutional, or health administration. Students may earn up to six total credits in internships, independent studies, field experience, and supervised student teaching experiences.

*A typical plan of study is as follows, showing the requirements of the program.* Students complete 16-18 credits per semester, which includes major requirements, electives for the major, Discovery Program requirements, the Inquiry requirement (completed by the end of the

sophomore year), and free electives.

**Freshman Year**

HMGT 401, The Hospitality Industry: An Historical Perspective and Distinguished Lecture Series

HMGT 403, Introduction to Food and Beverage Management

HMGT 404, UHS Hospitality Practicum I (1 credit, credit/fail grading)

ADMN 405, Freshman Academic Experience I (1 credit, credit/fail grading)

ADMN 406, Freshman Academic Experience II (1 credit, credit/fail grading)

ADMN 403, Computing Essentials for Business

ECON 401, Principles of Economics (Macro)

ECON 402, Principles of Economics (Micro)

MATH 420, Finite Mathematics or MATH 424A, Calculus for the Social Sciences

**Sophomore Year**

HMGT 554, Lodging Operations Management

HMGT 567, Food and Beverage Operations Management

ADMN 420, Business Statistics

ADMN 502, Financial Accounting

HMGT 618, Uniform Systems for the Hospitality Industry

**Junior Year**

HMGT 600, Hospitality Marketing Management

HMGT 667, Advanced Food & Beverage Management

HMGT 625, Hospitality and Employment Law

HMGT 635, Hospitality Human Resource Management

ADMN 575, Behavior in Organizations

Hospitality Management Elective\*

**Senior Year**

HMGT 655, Hospitality Finance and Development

HMGT 703, Strategic Management in the Hospitality Industry

Hospitality Management Electives\*

\*Three elective courses in hospitality management (or two electives and an internship, teacher assistantship, or independent study analysis) are required for graduation.

*A minor in hospitality management comprises five courses. The four listed below are required:*

HMGT 401, Hospitality Industry: Historical Perspectives and Distinguished Lecture Series

HMGT 554, Lodging Operations Management  
HMGT 567, Food and Beverage Operations Management  
ADMN 502, Introductory Financial Accounting

*Choose one of the following:*

HMGT 661, Meeting Planning Management  
HMGT 662, Convention Sales and Service Management  
HMGT 681, Resort Management  
HMGT 750, Senior Operations Seminar  
HMGT 771, Beverage Management/International Wines  
HMGT 777, Casino Management  
HMGT 772, Senior Living Industries Management  
HMGT 698, Topics (special topics)  
HMGT 682, Private Club Management  
HMGT 756, International Franchising  
HMGT 670, International Food and Culture

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## **International Affairs (dual major) ▼**

For program description, see [Special University Programs](#).

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## **Management (MGT) ▼**

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*Chairperson:* Michael J. Merenda

*Professor:* Ross J. Gittell, Michael J. Merenda

*Associate Professor:* Carole K. Barnett, Vanessa Urch Druskat, Peter J. Lane, Jun Li, Anthony T. Pescosolido, Richard Saavedra

*Assistant Professor:* Devkamal Dutta, N. Paul Harvey III, Fiona Sara Wilson



*Affiliate Assistant Professor:* Margaret Naumes

*Lecturer:* Karen L. Fisher, Robert A. Gough Jr., William A. Hassey, Thomas N. Towle, Meera Venkatachalam

*Adjunct Faculty:* Timothy J. Churchard

The study of management focuses on how organizations develop, craft, and implement winning strategies, structures, systems, and values in global markets. Courses emphasize the organization's stakeholders and the accompanying social, political, legal, economic, and technical dynamics of worldwide markets. The department's goal is the development of effective, socially responsible, and ethical leaders through innovative teaching, research, and service. Courses cover such topics as leadership, decision-making, ethics, innovation, organizational learning, entrepreneurship, knowledge and human resource management, governmental policy making, and global competitiveness. The department's approach to teaching involves educational methods that promote experimental learning, self-awareness, theoretical mastery, and case studies and managing oneself. A major emphasis is on action learning through group projects, business plan preparation, and the case method.

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## Marketing (MKTG) ▼

» <http://wsbe2.unh.edu/department-marketing>

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*Chairperson:* Peter J. Lane

*Professor:* Thomas Gruen, Daniel E. Innis

*Associate Professor:* Ludwig A. Bstieler

*Assistant Professor:* Melissa M. Bishop, Lin Guo, Bruce E. Pfeiffer, M. Billur Talay, Goksel Yalcinkaya

*Lecturer:* Audrey Ashton-Savage, William C. Machanic, Chuck Martin, Peter F. Masucci

The marketing department is dedicated to preparing students for 21st century marketing careers by:

- offering students a strong marketing foundation and a career track that will make them attractive to employers upon graduation and provide the basis for lifelong marketing learning;
- interacting with students in ways that encourage individual curiosity, interest, and expression;
- engaging in leading-edge scholarly research and integrating that research into the marketing curriculum.

Concentrating in marketing provides students with a wide array of career paths, including advertising, sales, retailing, market analysis, public relations, marketing research, product or brand management, sales forecasting, competitive analysis, strategic marketing planning, media planning, and several others. Accordingly, the department offers tracks beyond the set of core courses required of all marketing students to help students prepare for such careers. The department coordinates the marketing option and tracks.

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