

UNDERGRADUATE

Course Catalog



UNIVERSITY OF NEW HAMPSHIRE

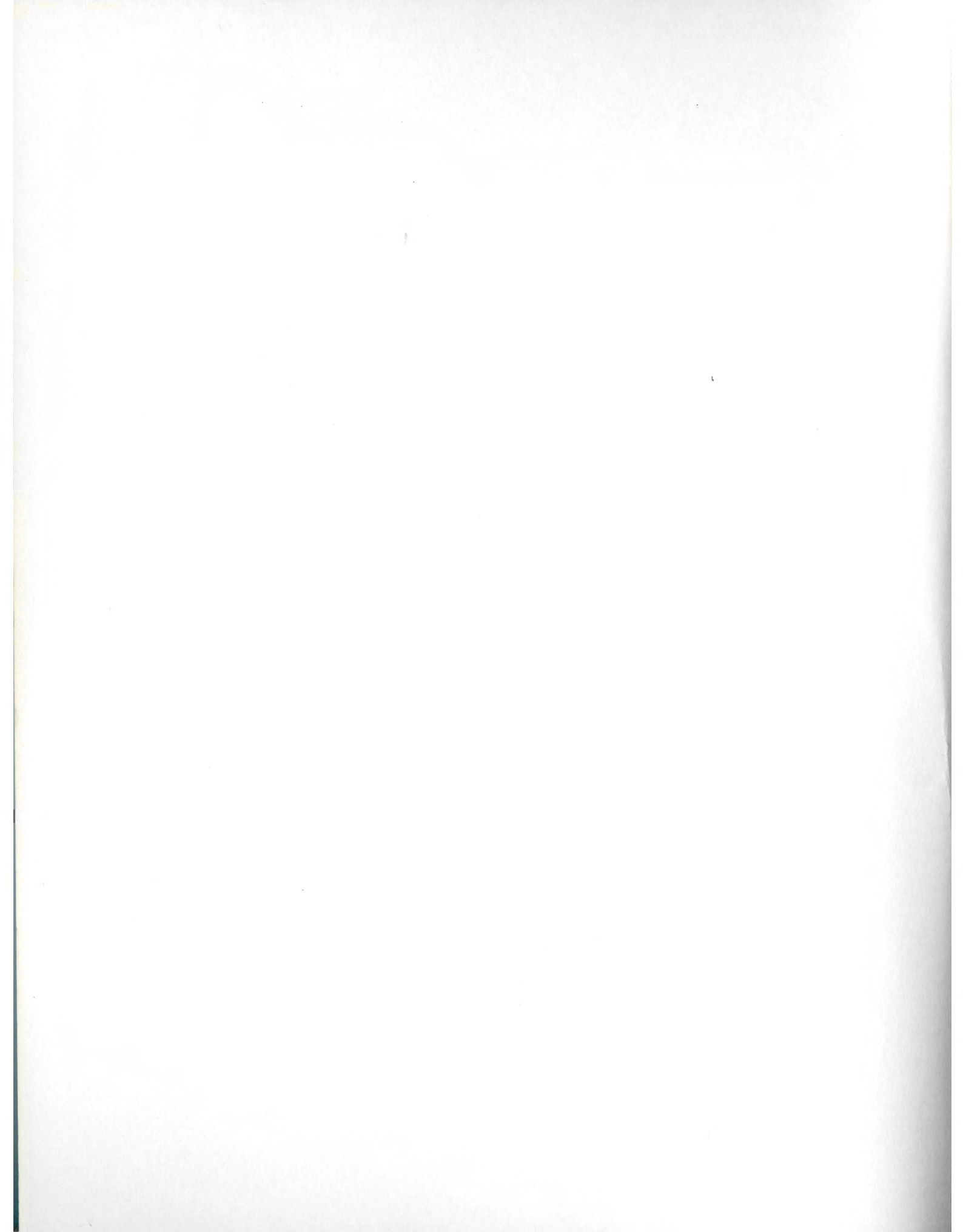




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GENERAL INFORMATION

In the Beginning

When the New Hampshire College of Agriculture and the Mechanic Arts opened in 1868, it had “great expectations and unlimited possibilities,” and little else. It boasted no buildings, curriculum, or classes—not even a campus of its own. It had one full-time professor—the gifted and devoted chemist Ezekiel Dimond. It had a graduating class of three students—William Ballard of Concord, Lewis Perkins of North Adams, Mass., and Charles Sanders of Penacook. And it had a mandate to reach out to the people of the state: to “educate intelligent men in the broadest sense, worthy citizens of a state in which the people ultimately rule, and of whose dearest interests knowledge and virtue are the only safeguards.”

By the time Ballard, Perkins, and Sanders returned for their 50th reunion in 1921, they must have been amazed at how far their alma mater had come. The college had a campus in Durham, thousands of acres strong, with academic and dairy buildings, residence halls, athletic field, and a railroad station. University students had helped to dig ditches, grade athletic fields, and plant trees—a tradition of pride and involvement that continued through the 1940s.

The College Becomes A University

The Agricultural Experiment Station had made the College indispensable to the region’s farming community and state forestry since 1888, providing a rich source of research opportunity for faculty and students as well. The majority of students majored in liberal arts and were more likely to study English or history en route to becoming lawyers, teachers, or business people than they were to study botany or chemistry to prepare themselves to become farmers.

Everything had changed—everything except the College’s relentless drive to push itself to greater levels. By the early 1920s, students and faculty were pressing the state legislature to turn NHC into UNH—the University of New Hampshire. The feat was accomplished in 1923. By decade’s end, the marine laboratory on the Isles of Shoals would offer students the chance to study marine diversity off Portsmouth’s shore. Marine scientists would eventually make the city’s harbor the best surveyed body of water in the world.

To undertake for the state’s Depression-strapped industry what the Agricultural Ex-

periment Station had for its farmers, the University created an “engineering experiment station” in 1929. Here, small firms lacking capital for research and development could submit, free of charge, problems for study—everything from learning about raw materials to designing more economical ways to run manufacturing plants.

The technological revolution continued through the war years and was bolstered later by the influx of students supported by the G.I. Bill.

The University Today

Today the University of New Hampshire is made up of dozens of academic departments, interdisciplinary institutes, and research centers that attract students and faculty from around the world. As state-of-the-art facilities are built to support academic growth, and new residence and dining halls are built to meet the growing popularity of campus life, the University continues to rest lightly on the Durham landscape. Some 13,000 students and hundreds of faculty and staff live and work easily amid the rolling hills and riverbeds of one the most beautiful campuses in the nation.

The University of New Hampshire is lean, strong, and highly responsive to the needs of its public mandate—one that increasingly results in productive partnerships

not only with the state, but the region and nation. The University of today has met its greatest expectations and stands on the threshold of unlimited possibilities.

Look around the University today: what you see is not one, but a great many communities brought together in the process—at once profoundly personal and inextricably social—of discovery and engagement concerning issues of the greatest public importance.

You see a campus in which world class research centers and laboratories, graduate seminars, undergraduate honors classes, service-learning projects, and student internships have mobilized the University’s capacities for teaching, research, and partnership building.

You see faculty and students from health and human services and liberal arts working as part of the Carsey Institute to undertake applied and policy research on improving the quality of family life. You see business people gather through the Hamel Center with faculty and students from engineering and physical sciences and the Whittemore School to explore technological solutions to enhance the vitality of enterprise and business in the knowledge-based economy. You see researchers come together from across the University to undertake a groundbreaking study of the complexities of im-



proving the region's air quality in the era of modern industry.

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 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, as freshmen and seniors, on campus and around the world.

The University's international research opportunities program was the first 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 studies 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, professional, and research and graduate programs. Nearly ninety percent of the full-time faculty members hold doctoral or terminal degrees, and many have earned national and international reputations.

The University of New Hampshire has a threefold mission: the scholarly functions 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, through the Division of Continuing Education, and through research and consultation on particular needs of New Hampshire citizens. The University is dedicated to collaborative learning inside and outside the classroom.

Library

The UNH Library consists of the main Dimond Library, four specialized branch libraries, an extensive government documents collection, and the Douglas and Helena Milne Special Collections and Archives. In addition to more than a million volumes and 6,000 periodical subscriptions, the library has government publications, maps, sound recordings, compact discs, video cassettes, and manuscripts. The library offers extensive electronic resources including indexes in a wide variety of subject areas, databases supplying full-text periodical and newspaper articles, and statistical data sets. Experienced librarians and staff provide expert service to people seeking information or research assistance.

The library is a member of the elite Boston Library Consortium, whose members include some of the most well-known research institutions in the nation. Through the consortium, UNH faculty, faculty emeritus, students and staff at both the Durham and Manchester campuses have full access to a combined collection of more than 31 million volumes via interlibrary loan and on-site visits to member libraries.

The expanded and completely renovated Dimond Library combines the best traditions of the 19th century with the information access of the 21st. It offers three grand reading rooms, seating for 1,200 students and other researchers, computer workstations on every floor, numerous laptop computer hookups throughout the building, and 21 miles of shelving for books.

The four branch libraries specialize in science, mathematics, and engineering. The

Biological Sciences Library is located in Kendall Hall, Chemistry Library is in Parsons Hall, Engineering/Mathematics/Computer Science Library is in Kingsbury Hall, and the Physics Library is in DeMeritt Hall. All branches have reserve materials, reference collections, circulating collections, periodicals, and electronic resources. All branch materials are indicated in the UNH Library catalog.

For more information on Dimond and the branch libraries, visit 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. A stream flowing through a large wooded area in the middle of campus enhances natural open space among the buildings. College Woods, on the edge of campus, includes five miles of well-kept paths through 260 acres of forest.

During the last decade, 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. It also neared completion of the new Holloway Dining Commons. Renovations are planned for Murkland, Kingsbury, and Congreve Halls.

UNH's Entrepreneurial Campus, a recent addition, is a dynamic concept and an actual physical space. The concept encourages innovative collaboration among industrial, government, and academic communities. The initial stages of this initiative focus on environmental technology, advanced communications and advanced materials. The campus consists of two buildings, one for environmental technologies and the other for computer networking/interoperability. Plans are currently being developed for additional buildings. The Entrepreneurial Campus is a place where business people, faculty members, researchers, and students work together, share information, and apply research to real-world problems.

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. Special-

ized programs of study are also accredited by various professional organizations.

All degree programs at the University are approved for veterans' educational benefits. Individuals are encouraged to contact the veterans coordinator in Stoke Hall about specific questions.

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.

Admission

UNH welcomes campus visitors. Prospective students are encouraged to contact the Office of Admissions in order to arrange a campus tour, and/or group information session. Professional staff members are available to assist with visitors' special concerns or questions. In addition, student admission representatives provide information about the University and criteria used by the Admission Committee in reviewing candidates. Please call the Office of Admissions at (603) 862-1360 for further information or to schedule a visit, or visit the Web site at www.unh.edu/admissions/.

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 candidates' secondary school course selections and achievement, recommendations, and the results of a Scholastic Assessment Test (SAT-I) or results from the American College Testing program (ACT). Consideration is also given to character, initiative, leadership, and special talents.

Most successful candidates present at least four years of English and mathematics, three or more years of laboratory science, two or more years of social science, and at least three years of study in a single foreign language or more than one year of study in two different languages. Recommended mathematics preparation includes the equivalent of algebra I, geometry, algebra II, and trigonometry or 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 should have also 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.

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 for each of the University's five school and college divisions in Durham and at UNH Manchester.

(For information concerning bachelor and associate degree programs offered through UNHM, see the section on the University of New Hampshire at Manchester [page 123] or for information concerning the Thompson School of Applied Science, see page 113.)

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 a 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 biological sciences, computer science, environmental conservation, nursing, occupational therapy, and wildlife management.

Admission Test Requirements

All candidates for admission to bachelor's degree programs are required to submit the results of an SAT-I or the ACT. SAT-II tests are not required, but a foreign language subject test may satisfy the foreign language requirement of the bachelor of arts degree programs. 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).

Art and Music Candidates

Candidates applying to a program within the Department of the Arts (except art history) are required to submit a portfolio to the department chairperson (603) 862-2190. Candidates applying for programs in the Department of Music must make arrangements with the department chairperson for an audition (603) 862-2404. Details regarding portfolio or audition requirements may be obtained from the departments.

Early Action

The Admissions Office welcomes high school students who seek fall-semester freshman admission to *apply any time after the start of the senior year and before the February 1 priority deadline*. Admission notifications are provided on a continuous basis through April 15th. Admitted freshmen have until May 1 to confirm their intent to enroll at the University.

The review of freshman candidates begins as soon as a complete application (including official grade reports through junior year and a confirmed senior-year course schedule, the results of the SAT-I or ACT, and a letter of recommendation) is on hand. To apply ensuring early action (an "early reading" by mid-January of the senior year), candidates are encouraged to submit admission applications by December 1. In some cases, the Admission Committee will request senior mid-year grade reports in order to make a final admission decision.

All positive admission decisions made prior to the completion of a candidate's coursework in progress are considered "provisional" and are subject to the verification of satisfactory senior year achievement when final high school transcripts are reviewed by the Admission Committee.

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

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. 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, or through the College Level Examination Program (CLEP).

The University accepts AP Tests in every subject area, with credit and course equivalency based on the score achieved. Contact the Office of Admissions for fur-

ther information (603) 862-1360 or visit www.unh.edu/admissions/ap.html.

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 for all credit by exam and advanced placement testing is 64 semester hours.

Associate Degree Candidacy

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

Students may be considered for admission to associate in applied science degree programs offered by the University's Thompson School of Applied Science. Candidates applying as high school seniors must submit the results of an SAT-I or an ACT. Students granted freshman admission to the Thompson School are eligible to live in a University residence hall.

The University offers an associate in arts degree through the Division of Continuing Education. Associate in arts degree candidates are not guaranteed housing but may contact the Department of Housing (603) 862-2120 to explore possibilities.

Eligibility for Degree Candidacy

Applicants who meet the appropriate requirements for admission may become candidates for any undergraduate degree offered by the University. However, applicants having a bachelor of arts 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 Affairs and the dean's office of the University college division to which the student is applying.

Before seeking readmission, suspended students must remain away from school for at least one semester. Applications from suspended students should include a statement about the applicant's readiness to resume University work.

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 and the extent to which that selection addresses the University's general education requirements. Transfer credit is awarded for completed courses 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 to qualify for general education consideration. Transfer credit evaluations are provided with the offer of admission.

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.

Some programs may have enrollment limitations. Transfer students may contact the Department of Housing (603) 862-2120 to determine the availability of on-campus housing or (603) 862-0303 for assistance locating off-campus housing.

Priority deadlines for transfer applicants are November 1 for the spring semester and March 1 for the fall semester.

No portion of a student's grade-point average will transfer; that is, external averages will not be calculated with UNH grades.

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, or call (617) 357-9620.

Special Student Status

UNH offers a special student classification for persons who wish to participate in University coursework without entering a degree program. Special (non-degree) students register for coursework through the University's Division of Continuing Education. In evaluating requests for full-time status, the Office of Admissions generally applies the same criteria used in the review of applicants for admission to degree candidacy. Special students have full access to the academic advising services within the division. Students must maintain satisfactory achievement to continue with University coursework.

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 applicants 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 indepen-

dent 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.

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 brochure 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 may obtain the FAFSA from local high schools or from the UNH Financial Aid Office.

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 Stafford 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, the student's ultimate re-

sponsibility 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. This is simply the last date on which the federal processor will accept the form. 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.

Most states now have higher education loan plans established by the Higher Education Act of 1965. Contact your local bank, other lender, or the Financial Aid Office for information.

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 Air Force. Entering freshmen may compete for four-year scholarships during the last year of high school, but a variety of scholarships are also available to students already attending the University.

Scholarships pay up to full tuition, all mandatory University 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 also receive a room and board grant for the entire time they are on the scholarship.

For more information contact: Air Force ROTC at (603) 862-1480 or Army ROTC at (603) 862-1078.

Campus Life

Housing

The University offers students a variety of housing options, including small halls of approximately 100 students to medium halls and large halls (ranging from 400 to 600 students). The newest residence, Mills Hall, houses students in suites ranging from four to eight persons. Some halls are single sex; others are coeducational. Upperclass undergraduates may also choose from either of two on-campus apartment complexes—the Gables and Woodside apartments. These apartment complexes are designed to meet the more independent and self-reliant lifestyles of upperclass students. Special-interest housing is offered in many buildings on campus. Some of our programs include the minidorms, where each dorm focuses on a theme, and Smith Hall, where the focus is on international and intercultural activities. There is also a residence hall for students participating in SELF (Students Electing to Live Free), a program whose participants have chosen not to use alcohol or any chemical substances. Graduate and family housing are also available on campus.

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

Undergraduate University housing is available to all full-time baccalaureate degree candidates and to associate in applied science degree candidates. Offers of housing to asso-

ciate in arts degree and Division of Continuing Education students are made 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 upon admission to the University. Offers will be made on a space-available basis. All application materials are available at the Department of Housing located in Pettee House.

For more information, contact the Department of Housing (603) 862-2120.

Dining

High quality food, flexible menus, meal plans, and special events have earned UNH multiple national menu awards. Services have greatly expanded to reflect new trends and ideas, for example, grab and go locations including Philbrook Café, the Wildcatessen, the MUB Food Court and the MUB Coffee Office. The new dining hall on campus, Holloway Commons, offers a fresh state-of-the-art dining experience. "Home Cookin' Recipes," Goodies Packages, and Birthday Cakes programs create a sense of belonging for students. Flexible meal plans give students the option of eating at the dining halls or using Dining Dollars or Cat's Cache at many retail operations around campus.

All students who reside in University housing (except Babcock Hall and the Gables and Woodside apartment residents) are required to purchase a meal plan from the designated mandatory choices. Students living in undergraduate apartments or off campus may choose to purchase any of the meal plans offered. Visit the Web site for the latest information about meal plans and services at: www.unh.edu/dining. Students who have specific nutrition concerns or medically-restricted diets should meet with the registered dietitian and executive chef to review options for dining hall accommodations.

The Dining ID Office can assist with questions. Call (603) 862-1821.

UNH Dining is committed to exceeding the expectations of our guests and takes pride in maintaining our position as a leader in the food service industry.

Memorial Union Building

The Memorial Union Building (MUB) is the University's community center. The union 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 is the official state war memorial.

Currently the MUB is the only building on campus to have complete wireless capabilities in all public spaces and meeting rooms.

Headquartered in the MUB are the Information Center; two movie theaters; the UNH Copy Center; the UNH Bookstore; the Ticket Office; specific lounge/study space for both nontraditional and graduate students; and Granite Square Station, the undergraduate mail center. Computing and Information Services provides a computer cluster, and help desk with walk-in service. The Games Room is equipped with pool and ping pong tables, table soccer, and lounge space with large screen television. The Entertainment Center provides a comfortable atmosphere for relaxing with live performances as well as socializing and study space. The Food Court offers expanded dining options and food service is also available in the Coffee Office. The Student Senate Office; WUNH-radio; *The New Hampshire*, the student newspaper; and nearly 60 other student organizations have office space in the MUB.

Student Organization Services (SOS), a division of the Memorial Union, is responsible for the registration and recognition of more than 130 student organizations and assists students with the mandatory registration process. SOS staff members assist in the coordination of their activities and adherence to student rights and rules. Learning opportunities are provided through leadership and management skills conferences. Staff members are available for advising and assistance with publicity, recruitment, and advertising for student events. SOS staff members work on a variety of programs in conjunction with student organizations such as Jukebox, daytime programming, University events, and weekend programming.

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, 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, phone the Information Center at (603) 862-2600 or visit the Web site at 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 Art Gallery, and the departments of music, theatre and dance, and art and art history bring artists of international stature to campus. Most events are free.

The fine and performing arts are an integral part of undergraduate education. Programs are frequently incorporated into coursework. For further information or a brochure call the numbers listed below:

Department of Music	(603) 862-2404
The Art Gallery	(603) 862-3712
Art and Art History	(603) 862-2190
Theatre and Dance	(603) 862-2919
UNH Celebrity Series	(603) 862-3242
Traditional Jazz Series	(603) 862-2404

Memorial Union	
Ticket Office	(603) 862-2290
on the Web	www.unhmub.com

Campus Recreation

Many opportunities for leisure activities, regardless of skill or ability, are offered through 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, a cardio-theater, three basketball/volleyball courts, an indoor track, a lounge, several classrooms, locker rooms, towel and lock service at the equipment room, saunas, and new synthetic sports fields. 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, or cardio kickboxing. Other opportunities include yoga, tai chi, racquetball, personal training, massage therapy, or running in the Homecoming 5K Race. Non-credit courses are also offered including CPR and First Aid.

The intramural sports program consists of 23 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 and are 3-7 week leagues or short elimination tournaments. The Department of Campus Recreation forms and assists special interest groups or sport club teams to reflect the

varied recreation and cultural preferences of campus community members. Some 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. In addition to the Recreation Center, the Department of Campus Recreation offers ice skating in the Whittemore Center arena during non-peak/non-team hours, manages a large outdoor recreation facility on Mendum's Pond in Barrington with its own sailing and canoe center, runs a children's camp (Camp Wildcat) in the summer, and supports the men's crew boat house. One of the largest student employers on campus, Department of Campus Recreation provides opportunities for more than 300 student employees in a variety of positions. For further information call (603) 862-2031.

Programs and Services for Students

Advising and Counseling 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 support, 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 learning disabilities, graduate school advising and preparation, and scholarship search assistance. Student Support Services is 100 percent federally funded through a \$289,232 grant from the U.S. Department of Education.

Located at Wolff House (8 Ballard Street, next to Health Services), 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) 862-0840, or visit the Web site at 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 or Health Services at (603) 862-1530. When necessary, the center's staff assists with outside mental health referrals.

The staff, which includes certified 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.

Athletics, Men's and Women's

UNH participates in the following intercollegiate men's athletics programs: basketball, cross country, football, hockey, skiing, soccer, swimming, tennis, and track and field.

UNH also participates in the following intercollegiate women's athletics programs: basketball, crew, cross country, field hockey, gymnastics, ice hockey, lacrosse, skiing, soccer, swimming, tennis, track and field, and volleyball. An undergraduate athletic pass provides access to certain sporting events on a space available basis. (See also Campus Recreation, page 7.)

Cat's Cache

Cat's Cache is a convenient way to make purchases on campus. An account may be started when a student signs up for housing, attends June Orientation, or pays tuition. Cat's Cache balances carry from semester to semester, year to year, and can be added to at any time with cash or check or a credit card at our Web site (www.unh.edu/dining). Full refunds are available upon request. There are no fees. If there is no account activity in the most recent semester, your Cat's Cache account will be closed out and any remaining balance will be credited to the student's tuition account.

Cat's Cache is accepted at many retail outlets on campus, including the UNH Bookstore and other shops in the Memorial Union Building; campus vending machines; the pro shop at the Hamel Recreation Center; MUB Food Service; the dining halls; New England Center Acorns Restaurant; and the UNH Dairy Bar.

Computing and Information Services (CIS) www.unh.edu/cis

Computer access. All students have access to networked computing resources on campus. UNH has three microcomputer clusters which offer more than 220 Dell Pentium and Apple Macintosh computers as well as high-speed laser printing. All clusters are completely networked and offer a suite of software as well as access to the Internet via the World Wide Web. The clusters are staffed by student consultants who assist with questions or problems. Three clusters are available 24 hours/day. For information and cluster hours, call (603) 862-0058 for an automated recording.

Training. Each semester, short courses are offered on a variety of topics. Register for a short course via the Web at training.unh.edu. Facilities with Dell Pentium and Apple Macintosh systems may be reserved by faculty and students for hands-on training. For more information, call (603) 862-3667.

Purchase and repair. Students may purchase their own computers at the UNH Computer Store, which sells Apple and Dell computers; Apple, Epson, and Hewlett-Packard printers; and a variety of supplies, peripherals, and software at educational pricing to members of the UNH academic community. Warranty service and computer maintenance and repair are provided through the Computer Service Center. The UNH Computer Store and the Computer Services Center are located at the CIS Center, Hewitt Annex, 54 College Road.

CIS Call and Dispatch Center. As a unit of Help Desk Professional Services, the CIS Call and Dispatch Center provides UNH and USNH faculty, students, and staff with a centralized contact point for computer-related questions and concerns. Telephone consulting to address inquiries on various computer applications is available at (603) 862-4242. Supported products include Macintosh- and Windows-compatible software, communication and network products, Internet utilities, central computer applications, and USNH central administrative software applications. The Call and Dispatch Center also provides central UNH computer-user accounts administration and support as well as UNH network connection problem assistance.

Walk-In Services. CIS Telecommunications and Client Services coordinates Walk-In Services, located at MUB 109. Walk-In Services offers kiosks for e-mail access, Web browsing, and CIS Knowledge Base searches. Staff are available to discuss UNH computing and voice communication-related issues, including central system account distribution, voice mail and account password resets, cell phones, virus scanning services, file conversion, and disk/file repair and recovery. Walk-In Services also distributes CD Loaner Kits containing the latest anti-virus software and UNH network software programs.

ResNet, UNH's Residential Network, provides a high speed network connection for each student living in the residence halls and undergraduate apartments on campus. There are no monthly fees or time limits for using ResNet. There are minimum standards for hardware and software. For information, visit the ResNet Web site at <http://at.unh.edu/resnet>.

UNHINFO. UNH's main Web server functions as the starting search point to find any on-line University information such as

events, jobs, courses, directories, departments, and much more. UNHINFO is accessible to computers with a network connection, including the student computing centers, dorms, and Internet service providers, at www.unh.edu.

Access: Support Services for Students with Disabilities

The University of New Hampshire is committed to providing students with documented disabilities a living and learning experience with equal access to all programs and facilities. The University will make reasonable adjustments and accommodations, and provide academic aids to promote student independence and access to the full range of college activities at UNH.

All students with a disability, who anticipate the need for services, should self-identify and provide written documentation to the Access Office. Please submit documentation as soon as possible after acceptance to smooth coordination of available services. Access is located in the Memorial Union Building, Room 118, (603) 862-2607 (voice/TTY).

General Information for Students with Disabilities

- Students seeking accommodations, academic aids or adjustments; arrangements for moving classes to accessible locations; or priority registration (to be determined on a case by case basis) should contact the Access office at (603) 862-2607 (Voice/TTY).
- Most major buildings have ramps and many have elevators and adapted restroom facilities. Contact Access or Affirmative Action with questions about building facilities.
- Students with disabilities who require handicap parking permits for on-campus use, must seek the permits from their home state (where their driver's license was issued). Applications for New Hampshire handicap permits are available at Parking Services. Questions about temporary handicap parking should also be directed to Parking Services at (603) 862-1010.
- Special arrangements for students who need routine assistance can be made with University Health Services at (603) 862-1530. Types of assistance might include: injections, examinations, laboratory tests, and medication management.
- For information about dietary restrictions due to disability or for special arrangements possible during periods of inclement weather, please contact Food

Service: University Hospitality Services at (603) 862-2583.

- Students with disabilities who plan to live in campus residence halls should contact Housing early to allow for timely arrangements of appropriate rooms and location. Please contact Housing at (603) 862-2120.
- UNH has specifically-equipped vans with lifts which transport students on campus and to other locations along the Wildcat transit routes. Please contact Wildcat Access, (formerly known as Handivan), for more information at (603) 862-2630.
- Concerns regarding the institution's compliance with the Americans with Disabilities Act (ADA), or Section 504 of the Rehabilitation Act of 1973 should be addressed to the ADA/504 Compliance Officer, Affirmative Action Office at (603) 862-2930 (Voice/TTY).
- All Bachelor of Arts candidates must fulfill the University's foreign language requirement by the sophomore year. A student with a documented disability who wishes accommodation on the basis that the disability will prevent him or her from successfully mastering the foreign language requirement, or whose foreign language requirement was waived in high school because of a documented disability, must contact the Access Office.

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.

Greek Life at UNH

Sororities and fraternities hold a special place in the history of UNH. Chapters have been a part of the UNH tradition since 1912. Currently on our campus, membership in sororities and fraternities equals nearly 10 percent of the undergraduate student body. The 16 organizations (11 men's/5 women's) contribute to the surrounding community through service and philanthropic projects. Every year the entire Greek community comes together to participate in a large philanthropic event. In recent years, events have ranged from Dance Marathons to Charity Banquets and have benefited organizations such as the Children's Miracle Network and the Cam Neely House Foundation. In conjunction with service to the community, each chapter offers opportunities for leadership development and social interaction. The system has two governing bod-

ies (Interfraternity and Panhellenic Councils) comprised of current representatives from various chapters. Additional challenge and support is available through the Office of Greek Affairs, which is staffed by a full-time coordinator of Greek Affairs, and two undergraduate interns.

Anyone interested, or who may have questions or concerns about joining a sorority or fraternity, may contact the Office of Greek Affairs, Memorial Union Building (MUB 122), (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 counseling, 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. To schedule an appointment, call (603) 862-1288 or send e-mail to 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.

Judicial Programs

The Judicial Programs Office administers the student judicial 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 re-

spect 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. More specific information regarding the Student Code of Conduct and Judicial Process can be found in *Student Rights, Rules and Responsibilities*. For more information, please call Judicial Program Office at (603) 862-3377.

Multicultural Student Affairs

The mission of the Office of Multicultural Student Affairs (OMSA) at UNH is twofold:

1. To provide services to Black, Latino/a, Asian and Pacific Islanders, Native American, and Lesbian, Gay, Bisexual, Transgender and Questioning students, in order to increase their retention and graduation rates.
2. To support, promote, and assist students and student groups that contribute to making the University a diverse, multicultural community.

In pursuit of this mission, the Office of Multicultural Student Affairs is dedicated to fostering the full participation of these student groups in all facets of the UNH community and assuring that they have equal and fair access to all academic, social, and recreational departments, groups, and activities.

In addition, OMSA as a department within the Student Affairs Division, assists in planning efforts to promote diversity, inclusion, and pluralism in all facets of campus life. It acts as an advocate for students as well as being a liaison to various student organizations and offices. Some of these organizations include the Diversity Support Coalition, Mosaico (the Latino/a Student Association), Black Student Union (BSU), United Asian Coalition (UAC), The Alliance (the Lesbian, Gay, Bisexual, Transgender Student Association), the Native American Cultural Association (NACA), and Hillel (the Jewish Student Association), among others.

The Office of Multicultural Student Affairs is open to all students at the University of New Hampshire. The office also assists the University in facilitating understanding, acceptance, and/or promotion of ethnic and racial diversity, and sexual orientation diversity. This is done through the use of intentional social interactions such as co-curricular programs, panel discussions, workshops,

and various other opportunities that provide for constructive engagement/dialogue.

Staff includes Sean McGhee, director; Bob Coffey, LGBT Program coordinator; Thelma Sanga, Multicultural Program coordinator. For more information, stop by the office in room 327 of the Memorial Union Building (MUB), or phone (603) 862-2050.

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, a Nontraditional Student Advisory Board provides active support to this student population in concert with the Nontraditional Student Intern. The intern works to enhance communication among students by various publications and informs, advises, and generally supports nontraditional students during their time at UNH.

In addition, the Nontraditional Student Organization (NTSO) in the Memorial Union, offers programs and provides lounge space in MUB 112. Students are encouraged to stop by for information, to study in the lounge, or to visit with other students.

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, increase networking among women, and inform the community of issues relating to the status of women. The commission reports annually to the president on its activities and findings. Commission membership consists of a coordinator, chairperson, educational program coordinator, and volunteer representatives from University students, faculty, and staff. Candidates for membership are recommended by the com-

mission and appointed by the UNH president. The commission comprises several working committees, which are open to non-commission members. Located in Batcheller House, the commission also maintains an e-mail discussion list for those interested in its activities. Call (603) 862-3067, send e-mail to womens.commission@unh.edu, or visit the commission's Web page at www.unh.edu/womens-commission for more information.

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. 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 between departments, offices, committees, commissions, and special programs that play a role in fostering diversity on campus and ensuring that the environment is supportive of the minority populations. A central resource for people of color on campus is the Office of Multicultural Student Affairs (OMSA). Contact OMSA at (603) 862-2050 or on the Web at www.unh.edu/omsa. The commission is located in Batcheller House on Rosemary Lane. The office is open Monday through Friday, 9:00 a.m. to 5:00 p.m., (603) 862-2338 or visit the commission's Web page at www.unh.edu/cspc for more information.

President's Commission on the Status of Gay, Lesbian, Bisexual, and Transgender 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 expressions. The commission assists the president in monitoring the campus climate for gay, lesbian, bisexual, and transgender faculty, staff, and students reviewing policies and programs and making recommendations on improving 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 ally community who are interested in participating on the commission are encouraged to contact the chair. Call (603) 862-0545, or visit the commission's Web page at www.unh.edu/glb.

Police, University

The University Police Department, which is committed to the enforcement of laws and University policies supportive of the rights and dignity of all persons, seeks to maintain a campus environment in which learning may thrive. Officers, professionally trained in their respective areas, staff both the police and Security Services units.

Police department staff members participate in a number of programs for the UNH community including adopt-a-dorm and a women's self-defense program. The department also provides literature regarding crime prevention. On request, staff members will meet with groups to share precautions 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 of the classroom with traditional learning in the classroom. Staff members work with students, helping them to succeed academically, to get positively involved in the hall and University community, and to 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 30 professional staff, and 136 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 the assistant vice president for student affairs. Consequently, all students receive special assistance from the Residential Life Office when seeking medical withdrawals or if they will be out of school for an extended period of time. 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 to call for more information at (603) 862-2268.

Sexual Harassment and Rape Prevention Program (SHARPP)

SHARPP is a crisis intervention center dedicated to providing free and confidential services for all members of the University community. SHARPP operates a 24-hour crisis line to respond to the needs of survivors of sexual assault, sexual harassment, childhood sexual abuse or incest, intimate partner violence, and stalking. SHARPP also provides crisis services for those who are close to the survivor: roommates, parents, friends, family members, and instructors. SHARPP offers several support groups, provides advocacy through the criminal justice system, the University's judicial process, and emergency medical proceedings, while helping the survivor obtain academic assistance. SHARPP provides the highest quality awareness and educational programming, as central to its mission. A Men's Discussion group meets throughout the year, and the office schedules campus-wide peer education programs for students in residential halls, classrooms, and Greek houses. Programs are also available for athletic teams, student organizations, and faculty and staff. Volunteering for SHARPP's programs and services provides many opportunities for the development of leadership skills.

The SHARPP office is located in Health Services. The office is open Monday through Friday, 8:00 a.m.–4:30 p.m. The telephone number for the crisis and administrative line is (603) 862-3494. After hours, crisis calls to the office are forwarded to UNH police dispatch, and an advocate can be reached by dialing the crisis line and listening for instructions. The caller's identity is protected and she/he needs only to provide a first name and telephone number. An advocate will return the call immediately.

Student Affairs

The Division of Student Affairs is committed to preparing students to function effectively in a pluralistic society. In conjunction with students and staff, faculty, and community members, the division works

to create a university community which fosters learning and personal development; safeguards the rights of all individuals on campus; and expands understanding of different perspectives. Student Affairs encourages students to develop their interpersonal communication, critical thinking, and decision-making skills.

The Office of the Vice President for Student Affairs provides leadership, management, and planning for the Division of Student Affairs departments and their programs and services. The office provides students with information, problem resolution, or referral. For more information or assistance, call the office at (603) 862-2053.

Student Life Office

Through programs and services offered by the Office of Student Life, students are provided with opportunities to explore and build skills in civic responsibility, ethical behavioral standards, respect for differences, conflict management, and complex problem solving. The Web site is www.unh.edu/student-life/. The director of student life also serves as the assistant vice president for student affairs. Consequently, the office fulfills the role of student advocate and assists students with general concerns. The following programs and offices are included: Judicial and Mediation Programs, Partnership for Social Action, Educational Outreach, and Research and Assessment. Staff also provide the following services: liaison to UNH Chaplains Association, UNH Student Awards Program, Mediation Program, and Emergency Loans.

The University mediation program provides students with an opportunity to resolve disputes beyond traditional processes. The program offers trained and neutral third parties who are not involved in the dispute to students who are in conflict, regarding issues arising out of relationships such as roommates, friendships, dating partners, neighbors, teammates, and members of organizations. These neutral third parties, usually student peer mediators, will facilitate communication between the disputing parties for the purpose of assisting them to identify the issues in conflict, to generate options for resolution, and ultimately assist in the development of their own solution to the dispute. The program is a larger component of an effort on the part of the Student Life Office to provide students with the opportunity to develop important life skills such as anger management, dispute resolution, and effective communication skills.

More information on Judicial Programs, important in upholding standards for the University community, is given on page 10.

The mission of the Student Affairs Research and Assessment Center is to provide the Division of Student Affairs, in particular, the campus community in general, and the profession of Student Affairs more broadly, with information that supports institutional planning, policy formation, and administrative decision-making; and that creates new knowledge. Through collaboration, staff conduct systematic research and assessment projects that expand the knowledge base about student progress and development, improve student programs and services, assess organization effectiveness, and determine whether the education, career, and personal goals of students are effectively being met. The following are examples of the activities of the Student Affairs Research and Assessment Center: creating surveys; collecting and analyzing student data beginning with pre-enrollment characteristics and continuing through follow-up studies of former students; analyzing trends in student behavior, attitudes, satisfaction, retention, and graduation; supporting the work of the Division of Student Affairs Directors as they conduct periodic evaluations to determine whether student programs and services are consistent with, and achieve, their stated objectives; and disseminating the findings of analytical studies to various audiences. A Web site is available at www.unh.edu/student-life/assessment/.

The Partnership for Social Action (PSA) seeks to encourage the development of meaningful connections between members of the University and nonprofit agencies throughout the local, national, and international community through support for community service and service-learning initiatives. A Web site (www.unh.edu/serve) links students, faculty, and staff to on-line resources and volunteer opportunities. PSA works closely with community service-oriented student organizations such as ABC (Alternative Break Challenge), Circle K, and Alpha Phi Omega, engaged in activities such as visits to local group homes, Habitat for Humanity projects, mentoring relationships with local teens, fundraising and special events, and local literacy efforts.

University Advising and Career Center

The University Advising and Career Center, Hood House, (603) 862-2064, provides academic advising to undeclared students in the College of Liberal Arts

and career development support to students and alumni from the University's schools and colleges on campus. 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, offer opportunities to explore career possibilities, and aid in securing employment. Vocational assessments (Myers-Briggs type indicator and Strong Vocational Interest Inventory) are offered to help individuals to identify potential majors and careers. A career library, a nationwide parent/alumni career advisers network comprised of more than 1,400 members, and an internship office help students explore career possibilities. Job opportunities are offered through W.O.R.K. (Wildcat Online Recruiting Kit), the interactive Web-based on-campus recruiting program. Specific job notices are also offered on the center's Web site. Additionally, the center sponsors a variety of 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.

Internships

Supported by the federally funded Job Locator Development Program, the internship office in Career Services 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 W.O.R.K. Program 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 Web site at www.unh.edu/uacc or contact the center at 603-862-2010.

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 Vietnam Veterans Outreach. The coordinator also provides a framework for networking among campus veterans. For further information, send e-mail to Lonn.Sattler@unh.edu.

Writing Center

The Robert J. Connors Writing Center, 7 Hamilton Smith, provides individual help from trained consultants on all issues involving writing: subject choice, composing processes, genre, organization, structure, grammar and formal conventions, and ESL (English as a Second Language). All these services are available without charge to any member of the University community. The center offers consulting on writing to faculty, staff, and students. Students need not be enrolled in any specific course to use its services.

Although the center does not offer an editing or proofreading service, its consultants will work with those who need help in learning to use grammar, punctuation, and writing conventions. The highly skilled staff works with undergraduates on papers and projects, with graduate students on their essays and theses, and with staff and faculty members on projects ranging from grant proposals to journal articles. The Writing Center operates on both a referral basis and a walk-in basis. For further information or to make an appointment, call (603) 862-3272.

Health Services

The University has a state-licensed and nationally-accredited health and wellness program.

Medical Services

Health Services provides comprehensive, student-focused, primary medical care, laboratory testing, radiology, and pharmacy services. During the regular academic year, the clinical staff consists of board-certified physicians, nurse practitioners, nurses, and

medical assistants who have experience working with adolescents and young adults and are committed to prevention and holistic care. They work in teams, three of which focus on general medicine services, commonly seeing, e.g., infectious diseases, injuries, and mental health concerns. The fourth team focuses on women's health and provides annual exams, PAP tests, and numerous other services for women. There is also a Travel Clinic providing clearance and immunizations for foreign travel and an Allergy Clinic providing allergy shots. One may speak by telephone with a triage nurse for advice at any time. Limited services are available for faculty and staff on a fee-for-service basis, including an influenza immunization clinic and worker's compensation clinics.

The staff maintains close relationships with outside specialists in the Seacoast area to whom they may refer patients. Well-staffed and well-equipped community hospitals are nearby and emergency ambulance service is available in Durham at all times. For after-hours urgent care, Health Services has an agreement with one of the local hospitals to provide care for students.

General medical appointments may be made by calling (603) 862-2856, and women's health appointments by calling (603) 862-1806.

Office of Health Education and Promotion

The Office of Health Education and Promotion (Room 203, Health Services Center) presents educational workshops, offers support groups, and facilitates ongoing educational groups on a variety of physical and emotional health issues. Confidential assessment and referral are also available. The office offers alcohol and other drug counseling, nutritional counseling services, as well as anonymous and confidential HIV counseling and testing. A health educator/nurse provides education and support to students living with chronic illnesses. Massage therapy is also available. The resource room (Room 218) contains information on physical and emotional health issues, including HIV/AIDS, alcohol/other drugs, men's and women's health issues, holistic health, wellness, stress management, sexuality, and eating concerns. These services and programs, reflect Health Services's commitment to assisting students in achieving optimal health and well-being. Appointments are made at the Office of Health Education and Promotion, or by calling (603) 862-3823.

Health and Counseling Fee

All undergraduate- and graduate-degree candidates and all full-time non-degree candidates pay a mandatory health and counseling fee. For the academic year 2002-2003, the health and counseling fee was \$471. The mandatory student health 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 with any questions.

Health Insurance

A student health insurance policy is available to students. Please contact Health Services at (603) 862-1530 or (603) 862-4089 for current information.

Health Record Requirement

In order to provide effective care, Health Services requires that students who have been formally accepted for bachelor's or associate degree candidacy, and who register for five or more credits, must have medical records on file with Health Services. These records consist of (1) a health history to be completed by students before registration on a form provided by Health Services and (2) proof of immunity to measles. This is mandatory for registration for all undergraduate and graduate students. For measles, students must meet one of the following criteria: have received two live-virus measles vaccinations at least one month apart after 12 months of age, a positive measles titer (blood test), health provider documentation of past history of measles, or have been born before 1957. 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. Students requesting a religious exemption from vaccination must submit a formal exemption form from their religious affiliation or complete the UNH Health Services Request for Exemption, form 202.5. 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 classes.

Fees and Expenses*

The cost for the 2002-2003 at the University averages about \$17,000 for residents of New Hampshire and about \$26,750 for nonresidents. See the following chart for a breakdown of these costs.

Fees and Expenses (2002-2003)**

	In-state residents	Non- residents
Tuition	\$6,340	\$16,040
<i>Fees</i>		
Activity fee	86	86
Recreational fee	301	301
Memorial Union fee	258	258
Student athletic fee	573	573
Health and counseling fee	471	471
Technology fee	101	101
Subtotal of Required Expenses	\$8,130	\$17,830
<i>Room and Board</i>		
Double room	3,436	3,436
19 meals/wk.	2,446	2,446
Subtotal	\$5,882	\$5,882
<i>Estimated Expenses</i> (to cover books, supplies, transportation, misc.)	2,988	3,038
Total Estimate	\$17,000	\$26,750
<i>Optional Fees</i>		
Health Insurance	1,109	1,109
Parents Association Sponsorship	35	35

Tuition*

Tuition in 2002-2003 was \$6,340 (\$16,040 for nonresidents) per academic year. Undergraduates registering for 12 credits or more per semester pay the full tuition.

Students are permitted to enroll for more than 20 credits only with the approval of their college or school dean. After midsemester, persons carrying more than 20 credits will be billed a per-credit fee of \$264 for each credit above 20 for resident students and \$668 for nonresident students, whether or not a student has obtained the dean's approval. (No refund will be made if a student subsequently drops a course, bringing the credits to 20 or fewer.) Resident undergraduates registering for fewer

than 12 credits pay \$264 per credit hour, plus a registration fee of \$15 per semester. Nonresident undergraduates registering for fewer than 12 credits pay \$668 per credit hour, plus a registration fee of \$15 per semester. The minimum charge for any recorded course is \$264 for residents and \$668 for nonresidents.

Tuition differential charges apply to some majors. College of Engineering and Physical Sciences (CEPS) students, including engineering and computer science majors (both resident and nonresident), will be charged a tuition differential of \$208 per academic year. CEPS students who register for fewer than 12 credits pay a differential of \$9 per credit hour. Whittemore School of Business and Economics (WSBE) majors (both resident and nonresident) are subject to a tuition differential of \$340 per academic year. WSBE students who register for fewer than 12 credits pay a differential of \$14 per credit hour.

All admitted students must pay an enrollment fee—\$300 for residents and nonresidents. The enrollment fee, less \$150 (to cover new student services such as orientation, preregistration, and record preparation), will be credited to the tuition bill. 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 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). Mandatory fees are not refundable. 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 af-

ter 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

Required fees for 2002-2003 included a Memorial Union fee (\$258) for the use and administration of the student union; a recreational fee (\$301) for support of recreational facilities; a student activity fee (\$86) for support of the undergraduate newspaper, yearbook, student government, student lawyer, student radio station, and other student organizations; a technology fee (\$101); a student athletic fee (\$573) to provide support for athletic programs; and a health and counseling fee (\$471) to provide general health care through University Health Services.

There are no waivers or refunds 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 *not* eligible for full or partial refund of fees.

Participants in intercollegiate athletics are required to purchase the student accident and sickness insurance or demonstrate proof of comparable insurance to the respective athletic department. The 2002-2003 cost for student accident and sickness insurance was \$1,109 for a full calendar year.

A \$35 contribution may be included to sponsor the Parents Association.

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 on health services, see page 13.

Memorial Union Fee

For more information on the Memorial Union Building see page 7.

*All charges quoted in this section reflect 2002-2003 rates.

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

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

Safe rides

Coast bus

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

Room and Board

Room and board charges average \$5,882 per 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 a signed 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 thirty days after registration will result in a 50 percent refund of the semester's housing fee. Cancellation thirty 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 de-

posit will be applied against any unpaid University charges.

Refunds on board plans will be granted only on approved waivers or withdrawal from the University. Cancellation of a meal plan before semester opening will result in a 100 percent refund; after semester opening but before the end of the first week of the semester, 75 percent refund; and after the end of the first week but before the end of the fourth week, 50 percent refund. Refunds after the fourth week through the end of the twelfth week will be based on the remaining food cost portion of the meal plan. No refunds will be made after the end of the twelfth week. Generally, rebates will not be allowed for missed meals except in the case of illness.

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 charge will be made for individual lessons in music, as noted in the description of applied music courses. 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 \$700 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.

UNIVERSITY ACADEMIC REQUIREMENTS

To graduate from the University of New Hampshire, baccalaureate and associate in arts students must fulfill four types of University requirements: writing, general education, degree, and major. For associate in applied science degree requirements, see page 114.

University Writing Requirement

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 below. Any course appearing in this list will fulfill one of the writing requirements if taken after September 1, 2003.

All courses that are currently approved as writing intensive appear on this list. Additional courses may be added. **Visit our Web site at unhinfo.unh.edu/registrar/registration.html for the most up-to-date list.** Some courses have both writing intensive and non-writing 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 cur-

rent information on cross-listed courses, visit the Web site listed above.

ACFI 720, 724

ADM 701

ADMN 400, 611, 695W, 798W, 799

AMST 501, 502, 603, 604, 605, 607, 608, 609, 610, 696

ANSC 405, 602, 714, 728, 743, 750, 799

ANTH 411H, 411W, 500W, 511, 517, 614, 616, 690, 697, 780

AOE 650, 702

ARTS 431, 431H, 487, 487H, 608, 610, 654, 655, 656, 676, 677, 678, 690, 693, 795, 799

BCHM 754, 755, 799

BIOL 541, 799

CA 600, 610, 611, 612, 615, 618, 720

CD 614, 777

CHE 608, 612, 613

CHEM 686W, 698, 699, 756W, 763W, 775W

CIE 505, 622, 642, 788

CLAS 401H, 421, 422, 500, 603, 604, 621, 622

CMN 602, 607, 615, 630, 632, 640, 642, 650, 656, 657, 658, 666, 667, 672, 680, 696, 697, 697H, 698, 701, 702, 703, 772

COMM 723

CS 696W, 719, 735, 760, 770W

ECE 617, 618, 790

ECN 411W, 412W, 540

ECON 402H, 605W, 607, 615, 642, 653, 658, 668, 669, 695W, 698, 698A, 698B, 711, 736, 746, 798, 798A, 798B, 799

ECS 799

ENE 520, 608, 612, 613, 643, 645, 656, 746, 748, 788

ENGL 400, 401, 401A, 401H, 403, 500, 500H, 501, 501H, 503, 511, 513, 514, 514H, 515, 515H, 516, 516H, 517, 517H, 518, 518H, 519, 519H, 520, 521, 521H, 522, 523, 525, 529, 529H, 533, 581, 581H, 585, 586, 586H, 595, 595H, 607, 608, 609, 610, 610H, 616, 616A, 616B, 616C, 616D, 619, 621, 623, 625, 626, 627, 628, 630, 631, 632, 649, 650, 651, 652, 655, 657, 657H, 681, 685, 690, 693, 694, 695, 696, 697, 698, 701, 703, 704, 705, 707, 708, 709, 710, 711, 713, 714, 715, 716, 718, 720, 721, 722, 725, 726, 728, 732, 739, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 754, 755, 756, 758, 759, 763, 764, 765, 767, 768, 769, 770, 771, 773, 774, 778,

779, 780, 781, 782, 783, 784, 785, 786, 790, 791, 792, 794, 795, 797, 798

EREC 708, 715, 756, 799

ESCI 530, 705, 726, 734, 759

ET 733

FREN 425, 426, 500, 503, 503H, 504, 504H, 521, 525, 526, 631, 632, 651, 651H, 652, 652H, 675, 676, 677, 762, 765, 775, 782, 785, 790

FS 653, 697, 734, 743, 757, 760, 772, 773, 792, 797

GEN 754

GEOG 541, 582, 584, 685

GERM 500, 640, 645, 645H, 724, 724H, 727, 728, 728H

GERO 600

GREK 795, 796

HHS 510

HIST 405H, 405W, 406H, 406W, 410, 410H, 425H, 425W, 435H, 435W, 436H, 436W, 483, 484, 497H, 497W, 500, 505, 506, 532, 540, 576, 577, 607, 608, 609, 610, 622, 797

HMG T 401, 600, 635, 681, 695W, 703, 799

HMP 401H, 401W, 642, 744

HUMA 401, 411, 412, 480A, 480B, 500, 510A, 510B, 510C, 510D, 511A, 511B, 511C, 511D, 512A, 512B, 512C, 512D, 513A, 513B, 513C, 513D, 607, 608, 609, 610, 640, 650, 651, 700, 730, 795, 796, 798, 799

IA 401, 501, 701

INCO 404B, 404C, 404D, 404E, 404F, 404G, 404H, 404J, 404K, 404L, 404M, 404N, 404O, 404P, 404R, 404S, 404T, 404U, 404W, 404Y, 595W, 604H

†INTR 438, 439, 732

ITAL 425, 500, 503, 504, 521, 522, 631, 632, 651, 652

JPN 425

KIN 527, 550, 561, 606, 621, 658, 659, 681, 710, 761, 781, 783, 786

LATN 755, 756

LING 717, 779, 790, 794

MATH 531, 545, 657, 739, 761

ME 441, 525, 526, 561, 627, 643, 646, 670, 705, 747, 755, 756

MGT 713, 732, 798A

MICR 707, 717, 718, 795W

MKTG 753, 798W

MLS 602, 610, 751, 752, 753, 754

MUSI 703, 705, 707, 709, 711, 713, 715, 781W

NR 410, 502, 506, 602, 604, 636, 663, 701, 703, 705, 711, 713, 721, 726, 738, 753, 775, 799

NURS 501, 535, 606, 619, 624, 646, 703W, 797

NUTR 405, 646, 720, 750, 780, 799

OT 511, 514, 723, 741, 742, 772

PBIO 547, 655, 719, 726, 754, 761, 799

PHIL 401H, 401W, 421, 421H, 436W, 500, 510, 560, 616, 618, 620, 630, 635, 660, 683, 699, 701, 702, 710, 720, 725, 735, 745, 750, 755, 780, 795, 796, 798, 799

PHYS 705, 799

POLT 403H, 403W, 500, 502, 507, 510, 512, 513, 523, 544, 545, 546, 550, 551, 552, 554, 555W, 556, 558, 562, 566, 567, 568, 569, 571, 595, 596, 600, 620, 651, 660, 701, 702, 703, 704, 743, 760, 762, 778, 795, 796, 797B, 797C, 797E, 797F, 797I, 798B, 798C, 798E, 798F, 798I, 799

PORT 500

PSYC 502, 702, 704, 710, 711, 712, 713, 713H, 721, 722, 723, 731, 732, 732H, 733, 735, 737, 741, 752, 752H, 755, 755H, 756, 758, 762, 763, 770, 771, 780, 783, 785, 791, 795H, 795W

RMP 550, 593W, 600, 668, 724

RS 483, 484, 576, 577, 607

RUSS 500, 521, 522, 593, 691, 721, 725

SOC 400H, 400W, 500W, 530W, 540W, 599, 601, 611, 612, 635, 640, 645, 660, 665, 680W, 690, 697, 773, 780, 797

SPAN 500, 521, 522, 631, 632, 650, 651, 652, 653, 654, 797

SW 525, 622, 623, 640A, 641A

TECH 797

THDA 436, 436H, 438, 438H, 621, 627, 653A, 653B, 654, 655, 795, 796, 798

TOUR 400, 767

WS 401, 401H, 595W, 632, 798

ZOOL 626, 690, 713, 719, 729, 733, 796W, 799

‡UNHM courses

General Education Program

The general education program is designed to emphasize the acquisition and improvement of those fundamental skills essential to advanced college work, especially the abilities to think critically, to read with discernment, to write effectively, and to understand quantitative data. It aims to acquaint the student with some of the major modes

of thought necessary to understanding oneself, others, and the environment. It seeks to develop a critical appreciation of both the value and the limitations of significant methods of inquiry and analysis. Its goal, moreover, is the student's achievement of at least the minimal level of literacy in mathematics, in science and technology, in historical perspectives and the comprehension of our own and other cultures, in aesthetic sensibility, and in the diverse approaches of the humanities and the social sciences to understanding the human condition.

General education is intended to serve as a foundation for any major. It aims to go beyond the mastery of job-related skills and educate students so that they learn how to learn. The program is based on the premise that change is the dominant characteristic of our times and that the truly useful education stresses intellectual adaptability and the development of those problem-solving abilities, cognitive skills, and learning techniques vital to lifelong learning.

General Education Requirements

Students must fulfill the following general education requirements:

1. one course in writing skills, which must be taken during a student's first year. This course will satisfy the English 401/Freshman Composition component of the writing requirement;
2. one course in quantitative reasoning, which must be taken during a student's first year;
3. three courses in biological science, physical science, or technology, with no more than two courses in any one area;
4. one course in historical perspectives;
5. one course in foreign culture (may also be satisfied by approved study abroad programs);
6. one course in fine arts;
7. one course in social science; and
8. one course in works of philosophy, literature, and ideas.

General education 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. The required courses cannot be taken on a pass/fail basis. No single course may be counted in more than one general education category. Academic departments may or may not permit general

education courses to count toward requirements for a major. Each course must carry at least 3 credits to qualify for general education consideration.

The specific courses that fulfill each category of the general education requirements are printed below. Any course appearing in this list will fulfill a general education requirement if taken after September 1, 2003.

1. Writing skills

ENGL 401

2. Quantitative reasoning

ADM 430‡

ADMIN 420

BIOL 528

CIS 425

CS 405, 407, 410

EREC 525

HHS 540

INCO 404B*

MATH 419, 420, 424, 425

PHIL 412, 550

PSYC 402

SOC 502

3. Biological science, physical science, and technology

Biological science

ANSC 401

BIOL 411, 412, 413‡, 414‡

BSCI 405‡, 406‡

HMP 501

INCO 404C*

KIN 527, 607

MICR 501

NR 433

NUTR 400

PBIO 400, 412, 421, 582

ZOOL 401, 402, 412, 474, 507, 508

Physical science

CHEM 401, 402, 403, 404, 405, 409

ESCI 401, 402, 405, 409, 450, 501

GEOG 473

INCO 404D*

NR 504

PHYS 401, 402, 406, 407, 408

Technology

BIOL 404, 520

BSCI 422‡

CHE 410

CIS 411‡, 515‡

CS 401, 403

ENE 520

HHS 450

INCO 404E*

NR 415, 435, 502

PHIL 447, 450

TECH 583

4. Historical perspectives

CLAS 406
ENGL 515
HIST 405, 406, 410, 421, 422, 435, 436,
483, 497, 505, 506, 511, 521, 522, 523,
531, 532, 565
HMP 505
HUMA 510C†, 511C†, 512C†, 513C†,
514C, 515C
INCO 404F*, 404G*
ITAL 681A***, 682A***
KIN 561
POLT 403, 508
RS 483

5. Foreign culture

ANTH 411, 500, 512, 515
ARTS 695I
CHIN 503, 504
ENGL 581
FREN 425, 426, 503, 504, 525, 526
GEOG 401, 402, 520, 541
GERM 503, 504, 523, 524, 525
GREK 503, 504, 505, 506
HIST 425, 563
INCO 404H*, 404J*, 404K*
INTR 438‡
ITAL 425, 503, 504, 525
JPN 425, 503, 504
LATN 503, 504
NR 660
POLT 553, 555, 556
PORT 503, 504
RUSS 425, 502, 503, 504
SPAN 503, 504, 525, 526

6. Fine arts

ARTS 431, 480, 487, 532, 570, 571, 572,
573, 574, 580, 581
FREN 522
HUMA 480A**, 510A†, 511A†, 512A†,
513A†, 514A 515A†
INCO 404L*, 404M*, 404N*, 480
MUSI 401, 402, 501, 502, 511
PHIL 421
SOC 580
THDA 435, 436, 438, 450, 459, 461, 462,
463, 487, 546, 548, 583, 624

7. Social science

ANSC 405
ANTH 412, 625
CD 415
CLAS 506
CMN 402, 455, 457
ECN 411‡, 412‡
ECON 401, 402
ENGL 505
EREC 411
FS 525, 545
GEOG 581, 582
GERO 600

HHS 510
HMP 401
HUMA 510D†, 511D†, 512D†, 513D†,
514D, 515D†
INCO 401, 402, 404O*, 404P*, 404R*,
404S*
KIN 560
LING 505, 506
NURS 535,
NUTR 405
POLT 402, 504, 505, 560, 564, 565, 566,
567
PSYC 401
RMP 490, 550, 570
SOC 400, 500, 520, 530, 540
SW 525, 550
WS 401

8. Works of literature, philosophy, and ideas

AMST 501, 502
CLAS 401, 402, 421, 422, 500
CMN 456
ECS 400
ENGL 511, 513, 514, 516, 517, 518, 519,
521, 522, 523, 533, 585, 586, 630, 631,
632, 651, 657, 681, 685
FREN 500, 521, 651, 652
GERM 500, 520, 521
HIST 484
HUMA 401, 411‡, 412‡, 480B**, 500,
510B†, 511B†, 512B†, 513B†, 514B,
515B†, 519‡, 520†, 650, 651
INCO 404T*, 404U*, 404W*, 404Y*, 450
ITAL 500, 521, 522, 651, 652, 681B***,
682B***
LLC 440
PHIL 401, 417, 424, 430, 435, 436, 520,
525, 530, 540, 560, 570, 630, 660
POLT 401, 407, 520, 521, 522, 523, 524
PORT 500
PSYC 571
RMP 511
RS 484
RUSS 426, 500, 521, 522, 593
SPAN 500, 521, 522, 650, 651, 652, 653, 654

*Available only to honors program students and others who have obtained special permission.

**Students may take either HUMA 480A or 480B but not both.

***Students may not receive credit for both ITAL 681A and 681B or 682A and 682B.

†For students who complete the entire sequence of HUMA 510, 511, 512, and 513, enrolling in different discussion sections each time, a fifth general education requirement (in foreign culture) will be waived, although additional credit hours will not be granted.

‡Offered only at UNHM (Manchester).

Degree Requirements

Requirements in this catalog apply to students who enter the University between July 1, 2003, and June 30, 2005. (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. Students are each provided one free copy of the catalog that is in effect at the time of their entry to the University. They are expected to keep that copy for the duration of their time at the University. Any other copies must be purchased, and availability cannot be guaranteed.

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 2.00 for all courses taken at the University in which a grade is given.
2. Completion of the University general education 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 a full-year elementary course in any foreign language, or by completing a semester of a course in a foreign language beyond the elementary year, or by completing a one-year college-level course in American Sign Language (must be 8 UNH credits or equivalent). This 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 Access Office, 118 Memorial Union Building, (603) 862-2607 (Voice/TDD).

Bachelor of Fine Arts, Bachelor of Music

Requirements for the B.F.A. degree are on page 32; for the B.M. degree, on page 44.

Bachelor of Science

1. At least 128 credits in courses numbered 200-799, with a cumulative grade-point average of 2.00 for all courses taken at the University in which a grade is given.
2. Completion of the University general education requirements.
3. Completion of the University writing requirement.
4. For specific requirements, check individual departmental or program listings.

See also pages 53, 69, 78, 95, and 123.

Associate in Arts

1. Completion of at least 64 credits with a minimum grade-point average of 2.00.
2. Completion of two "writing intensive courses," one of which must be ENGL 401, Freshman Composition.
3. Completion of general education requirements as follows (no pass/fail allowed):
 - a. one course in writing skills. This course will satisfy the ENGL 401, Freshman Composition, component of the writing requirement;
 - b. one course in quantitative reasoning;
 - c. one course in the biological sciences, or physical sciences, or technology;
 - d. three courses chosen from the following, with no more than one from each category: historical perspectives; foreign culture; fine arts; social science; works of philosophy, literature, and ideas.

The Division of Continuing Education may prescribe up to four of the six required courses used to satisfy the general education requirements. A list of courses that may be used to meet these requirements will be available from an adviser.

4. A minimum of four courses freely selected by the student.
5. The remaining courses or credits may be earned in one of the career concentrations described on page 125 and/or in elective general education courses.
6. The last 16 credits must be University of New Hampshire courses completed at UNH following admission and matriculation, unless permission is granted to transfer part of this work from another institution.

Associate in Applied Science

For degree requirements, see page 114.

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 (page 23), 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 2.50 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 2.00 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 2.00 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.

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.

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 page 105 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 2.00 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 8 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.

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 (4.00) Excellent
- A- (3.67) Intermediate grade
- B+ (3.33) Intermediate grade
- B (3.00) Superior
- B- (2.67) Intermediate grade
- C+ (2.33) Intermediate grade
- C (2.00) Satisfactory, competent
- C- (1.67) Intermediate grade
- D+ (1.33) Intermediate grade
- D (1.00) Marginal grade
- D- (0.67) Intermediate grade
- F (0.00) 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 general education 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 page 19.

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*.

DEGREES AND MAJOR PROGRAMS OF STUDY

College of Liberal Arts

The teacher education division of the College of Liberal Arts coordinates the five-year undergraduate/graduate teacher education program. See page 33.

Bachelor of Arts

Anthropology
The Arts
 Art History
 Art Studio
Classics
Communication
English
English/Journalism
English Teaching
European Cultural Studies
French
French Studies
Geography
German
Greek
History
Humanities
Latin
Linguistics
Music
 Music History
 Music Theory
 Performance Study
 Preteaching
Philosophy
Political Science
Psychology
Russian
Sociology
Spanish
Theatre
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
Chemistry and Physics Teaching
Earth Science Teaching
Earth Sciences
 Oceanography
Mathematics
Physics
 Biophysics

Bachelor of Science

Chemical Engineering*
 Energy
 Environmental Engineering
Chemistry*
Civil Engineering*
Computer Engineering*
Computer Science*
Computer Engineering*
Electrical Engineering*
Environmental Engineering*
 Industrial Processes
 Municipal Processes
Geology*
Hydrology*
Mathematics*
Mathematics Education*
 Elementary
 Middle/Junior High
 Secondary
Mathematics, Interdisciplinary
 Computer Science
 Economics
 Electrical Science
 Physics
 Statistics
Mechanical Engineering*
Physics*
 Biophysics
 Chemical
 Materials Science

School of Health and Human Services

Bachelor of Arts

Social Work

Bachelor of Science

Communication Sciences and Disorders
Family Studies
 Child and Family Studies
Health Management and Policy
Kinesiology
 Athletic Training
 Exercise Science
 Outdoor Education

Physical Education Pedagogy
Sport Studies
Nursing
Occupational Therapy
Recreation Management and Policy
 Program Administration
 Therapeutic Recreation

College of Life Sciences and Agriculture

Bachelor of Arts

Plant Biology
Zoology

Bachelor of Science

Animal Sciences
 Bioscience and Technology
 Equine Sciences
 Preveterinary Medicine
Biochemistry
Biology
 Ecology, Evolution, and Behavior
 Biology
 General Biology
 Marine and Freshwater Biology
 Molecular, Cellular, and Developmental
 Biology
Community Development
Dairy Management
Environmental and Resource Economics
Environmental Conservation
 Environmental Affairs
 Environmental Science
Environmental Horticulture
General Studies
Medical Laboratory Science
 Clinical Chemistry
 Clinical Hematology
 Clinical Immunohematology
 Clinical Microbiology
Microbiology
Nutritional Sciences
Plant Biology
Soil Science
Tourism Planning and Development
Water Resources Management
Wildlife Management
Zoology

Bachelor of Science in Forestry

Forestry
 Forest Management
 Forest Science

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

International Business and Economics

Management

Marketing

Economics

Hospitality Management

Thompson School of Applied Science***Associate in Applied Science***

Applied Animal Science

Applied Business Management

Civil Technology

Community Service and Leadership

Food Services Management

Forest Technology

Horticultural Technology

University of New Hampshire at Manchester***Associate in Arts***

General Studies

Studio Arts

Associate in Science

Biological Sciences

Business Administration

Bachelor of Arts

Business

Communication Arts

English

History

Humanities

Political Science

Psychology

Bachelor of Science

Electrical Engineering Technology*

Computer Technology

Mechanical Engineering Technology*

Nursing

Sign Language Interpretation

Division of Continuing Education***Associate in Arts***

Career Concentrations

Pre-Engineering and Physical Sciences

Five-Year Degree Programs

Bachelor of Arts and Master of Business

Administration

Bachelor of Science and Master of Business

Administration

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***

International Affairs

Bachelor of Science

Hydrology

Interdisciplinary Minors

African American Studies

Agribusiness

American Studies

Architectural Studies

Asian Studies

Canadian Studies

Cinema Studies

Community Planning

Environmental Engineering

Genetics

Gerontology

History and Philosophy of Science

Humanities

Hydrology

Illumination Engineering

Justice Studies

Latin American Studies

Marine Biology

Materials Science

Ocean Engineering

Oceanography

Plant Pest Management

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 Adult and Occupational

Education

Master of Public Administration

Master of Public Health

Master of Science for Teachers

Master of Social Work

Certificate of Advanced Graduate Study

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.

PROGRAM ABBREVIATIONS

The following abbreviations are used to identify undergraduate and graduate courses offered at the University. An asterisk (*) preceding the letters identifies those disciplines offering graduate-level coursework.

College of Liberal Arts

* AOE	Adult and Occupational Education
ANTH	Anthropology
ARTS	Art and Art History
* ARTS	Painting
CHIN	Chinese
CLAS	Classics
CMN	Communication
* EDUC	Education
* ENGL	English
ECS	European Cultural Studies
FREN	French
GEOG	Geography
GERM	German
GREK	Greek
* HIST	History
HUMA	Humanities
ITAL	Italian
JPN	Japanese
LLC	Languages, Literatures, and Cultures
LATN	Latin
LING	Linguistics
* MUSI	Music
* MUED	Music Education
PHIL	Philosophy
* POLT	Political Science
PORT	Portuguese
* PSYC	Psychology
RS	Religious Studies
RUSS	Russian
SCSC	Social Science
* SOC	Sociology
* 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
* ENGR	Engineering
ENE	Environmental Engineering
* MATH	Mathematics
* ME	Mechanical Engineering
* MS	Material Science
* OE	Ocean Engineering
* PHYS	Physics
TECH	Technology (nondepartmental)

School of Health and Human Services

* COMM	Communication Sciences and Disorders
* FS	Family Studies
* HHS	Health and Human Services
* HMP	Health Management and Policy
* KIN	Kinesiology
* NURS	Nursing
* OT	Occupational Therapy
* PHP	Public Health
RMP	Recreation Management and Policy
* SW	Social Work

College of Life Sciences and Agriculture

* ANSC	Animal Sciences
* BCHM	Biochemistry
BIOL	Biology
CD	Community Development
* EREC	Environmental and Resource Economics
* GEN	Genetics
* LSA	Life Sciences and Agriculture
* MICR	Microbiology
MLS	Medical Laboratory Science
* NR	Natural Resources
* NUTR	Nutritional Sciences
* PBIO	Plant Biology
* RAM	Resource Administration and Management
TOUR	Tourism Planning and Development
* ZOOL	Zoology

Whittemore School of Business and Economics

* ACFI	Accounting and Finance
* ADMN	Business Administration
DS	Decision Sciences
* ECON	Economics
HMGT	Hospitality Management
MGT	Management
MKTG	Marketing

Additional Programs

AERO	Aerospace Studies
AMST	American Studies
* EOS	Earth, Oceans, and Space
GERO	Gerontology
IA	International Affairs
INCO	Intercollege
JUST	Justice Studies
* LS	Liberal Studies
MILT	Military Science
* NRES	Natural Resources and Earth Systems Sciences

Thompson School of Applied Science

AAS	Applied Animal Science
ABM	Applied Business Management
AM	Agricultural Mechanization
CT	Civil Technology
COM	TSAS Communication
CSL	Community Service and Leadership
FORT	Forest Technology
FSM	Food Services Management
HT	Horticultural Technology
MTH	TSAS Mathematics
SSCI	TSAS Social Science

University of New Hampshire at Manchester

ADM	Business Administration
ASL	American Sign Language
BSCI	Biological Science
CA	Communication Arts
CIS	Computer Information Systems
ECN	Economics
ET	Engineering Technology
INTR	Sign Language Interpretation

Colleges and Schools

COLA	College of Liberal Arts
CEPS	College of Engineering and Physical Sciences
SHHS	School of Health and Human Services
COLSA	College of Life Sciences and Agriculture
WSBE	Whittemore School of Business and Economics
TSAS	Thompson School of Applied Science
UNHM	University of New Hampshire at Manchester
DCE	Division of Continuing Education (all courses)
GRAD	Graduate School

COLLEGE OF LIBERAL ARTS

Marilyn Hoskin, Dean
John T. Kirkpatrick, Associate Dean
B. Thomas Trout, Associate Dean
Jeffrey Diefendorf, Senior Faculty Fellow

Fine and Performing Arts Division

Department of Art and Art History
Department of Music
Department of Theatre and Dance
Humanities Division
Department of English
Department of Languages, Literatures,
and Cultures
Department of Philosophy

Social Science Division

Department of Anthropology
Department of Communication
Department of Geography
Department of History
Department of Political Science
Department of Psychology
Department of Sociology

Teacher Education Division

Department of Education

Bachelor of Arts

Anthropology
The Arts
 Art History
 Art Studio
Classics
Communication
English
English/Journalism
English Teaching
European Cultural Studies
French
French Studies
Geography
German
Greek
History
Humanities
Latin
Linguistics
Music
 Music History
 Music Theory
 Performance Study
 Preteaching
Philosophy
Political Science
Psychology
Russian
Sociology
Spanish
Theatre
Women's Studies

Bachelor of Fine Arts

Fine Arts

Bachelor of Music

Music Education
Organ
Piano
Strings, Woodwinds, Brass,
or Percussion Theory
Voice

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, makes possible a richer, more useful life.

Degrees

The College of Liberal Arts offers three degrees: bachelor of arts, bachelor of fine arts, and bachelor of music.

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 on pages 18 and 31.

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 on page 32.

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 on page 44.

Five-Year Program: B.A.-M.B.A.

The College of Liberal Arts and the Whittemore School of Business and Economics offer a combined five-year program leading to a B.A. degree in French, philosophy, or psychology and an M.B.A. degree. Information about the program can be obtained from those departments or from the undergraduate counselor in the Whittemore School.

Combined Programs of Study

In addition to pursuing a single major, students may combine programs of study as follows:

Minors: See page 20; see also interdisciplinary minors, page 23 and below.

Second Majors: See page 20.

Dual-Degree Programs: See page 19.

Student-Designed Majors: See page 105.

Other combined programs and interdisciplinary opportunities: See page 102.

Interdisciplinary Minors

African American Studies

The African American studies minor provides students with an interdisciplinary approach to a central dimension of United States history, literature, and culture. 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 to the sciences. 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 African American experience.

African American studies consists of five 4-credit courses, including an introductory course, a required history course, and three other approved offerings. Students must take at least one course at the 600 or 700 level. The required core courses provide students with a general understanding of the broad and diverse spectrum of African American history, literature, and culture. Electives enable students to develop that understanding by way of special topics courses in their major fields of study, including some that provide students with an opportunity to relate African American issues to African history and culture. Students must earn a C- or better in each course, and maintain a 2.00 grade-point average in courses taken for the minor. Electives may include a senior seminar.

Students interested in minoring in African American studies should contact the coordinator, John Ernest, Department of English, Hamilton Smith Hall (862-3714, e-mail jre@cisunix.unh.edu), or Howard Greene at the African American Studies office, 336A Huddleston Hall (862-3753).

Required Courses

ENGL 517/AMST 502, Introduction to African American Literature and Culture *or*
INCO 450, Introduction to Race, Culture, and Power
HIST 505 or 506, African American History

Elective Courses

Electives will be approved for the minor, with the consent of the appropriate faculty members, and will be announced each semester. Included in the courses listed below are special topics and other courses (for example, courses covering specific periods in American literature or history) that may sometimes focus on African American studies. Check with the minor coordinator or the course instructor each semester for details. Some courses require special approval by the minor coordinator and course instructor. Possible courses currently listed in the catalog include the following:

ANTH 500D, Peoples and Cultures of the World: Sub-Saharan Africa
ENGL 609/HUMA 609/MUSI 609, Ethnicity in America: the African American Experience in the Twentieth Century
ENGL 581, Introduction to Postcolonial Literatures in English*
ENGL 650, Studies in American Literature and Culture
ENGL 681, Introduction to African Literatures in English
ENGL 690, Introduction to African American Literature
ENGL 693, 694, Special Topics in Literature*
ENGL 695, 696, Senior Honors*
ENGL 795, Independent Study*
ENGL 797, 798, Special Studies in Literature*
HIST 595, 596, Explorations in History*
HIST 600, Advanced Explorations in History*
HIST 603, The European Conquest of America
HIST 609, American Legal History: Special Topics*
HIST 611, Civil War and Reconstruction in the United States
HIST 625, Southern History and Literature since 1850*
HIST 587, 588, History of Africa South of the Sahara
HIST 684, History of Southern Africa since 1820
HIST 695, 696, Independent Study*
HUMA 698, Independent Study in the Humanities*
HUMA 730, Special Studies in the Humanities*
MUSI 513, Introduction to the Music of Africa and Asia
MUSI 795, Special Studies in Music*
POLT 513, Civil Rights and Liberties
POLT 600, Selected Topics in American Politics*
POLT 553, Third World Politics
POLT 620, Selected Topics in Political Thought*
SOC 530, Race and Ethnic Relations
SOC 697, Special Topics in Sociology*

WS 595, Special Topics in Women's Studies*
WS 796, Advanced Topics in Women's Studies*
WS 798, Colloquium in Women's Studies*

American Studies

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. We are an intercollege minor drawing courses from fifteen departments. We offer the opportunity to concentrate in Native American Studies. We encourage students to take advantage of the rich resources of the New England region, through internships and independent studies at local museums, libraries, historical societies, and other institutions dedicated to the study and preservation of American culture. Students can also participate in exchange programs at universities with other regional or ethnic studies programs. Independent study, field work projects, and exchanges must be approved by the faculty member supervising the work and by the coordinator of the American Studies minor.

The American Studies minor consists of five courses. Students must take American Studies 501 as early in their careers as possible, preferably before the senior year. In addition, students must take at least one other American Studies course (preferably more), and at least one course concentrating on issues of race, gender, or ethnicity in America (starred [*] courses). Elective courses may not be in the student's major department. No more than two courses of the five may be at the 500 level (departmental prerequisites may be waived for American Studies students at the discretion of the instructor). Students must earn a C- or better in each course, and maintain a 2.00 grade-point average in courses taken for the minor.

Because of the range and breadth of possible American Studies concentrations, students are urged to see the coordinator and fill out an intent to minor form as soon as they become interested in the minor, preferably by the beginning of their junior year. 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 his-

*When course content is relevant to the African American studies minor.

torical period, (for example, the twentieth century); race, ethnicity, gender, or class in America; popular culture; the arts; regional studies; urban, rural, and natural environments; American institutions (education, sports, religion, etc.). Students wishing to concentrate in Native American Studies are urged to take courses marked below with an (NAS). Students might also consider concentrating their major work in courses related to American Studies.

Interested students should contact the coordinator, Lisa MacFarlane, Department of English, 203 Hamilton Smith, (603) 862-3986, e-mail lwm@cisunix.unh.edu.

Two Required Courses

AMST 501, Introduction to American Studies, and one of the following:
AMST 502, Introduction to African American Literature and Culture*
AMST 503, Introduction to Native American Studies
AMST 603, Photography and American Culture
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 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 750, Applied American Environmental Philosophy
AMST 795/6, Independent Study

Three Elective Courses

ANTH 500A (NAS), Peoples and Cultures of the World: North America*
ANTH 501A (NAS), World Prehistory: North America*
ANTH 697 (NAS), Special Topics in Anthropology*
ARTS 487E, Themes and Images in Art: Symbols of Innocence and Experience in the New World
ARTS 610, Regional Studies in America; New England Culture in Changing Times
ARTS 654, 17-18th-Century American Architecture
ARTS 693, American Art
CMN 505, Analysis of Popular Culture
CMN 607, Persuasion in American Politics
CMN 657, Public Address and the American Experience/Rhetoric of the 60s
ECON 515, Economic History of the United States
ENGL 512, Introduction to American Literature
ENGL 515, Survey of American Literature: From the Beginning to the Civil War
ENGL 516, Survey of American Literature: From the Civil War to the Present
ENGL 517, Introduction to African American Literature and Culture*

ENGL 521, The Nature Writers**
 ENGL 522, American Literary Folklore
 ENGL 525, Popular Culture in America
 ENGL 616, Studies in Film**
 ENGL 650, Studies in American Literature and Culture
 ENGL 685, Women's Literary Traditions**
 ENGL 690, Introduction to African American Literature in America*
 ENGL 693/694, Special Topics in Literature**
 ENGL 697/698, English Major Seminar**
 ENGL 739 (NAS), American Indian Literature*
 ENGL 741 (NAS), Literature of Early America
 ENGL 742, American Literature, 1815-1865
 ENGL 743, American Literature, 1865-1915
 ENGL 744, American Literature 1915-1945
 ENGL 745, Contemporary American Literature
 ENGL 746, Studies in American Drama
 ENGL 747, Studies in American Poetry
 ENGL 748, Studies in American Fiction
 ENGL 749, Major American Authors
 ENGL 750, Special Studies in American Literature
 EC 703, Applied Environmental Philosophy
 GEOG 514, Geography of Canada and the United States
 GEOG 610, Geography of New England
 HIST 405, History of Early America
 HIST 406, History of the Modern United States
 HIST 505/506, African American History*
 HIST 507 (NAS), Native Peoples of the Americas*
 HIST 509, Law in American Life
 HIST 511, History of New Hampshire
 HIST 566, Women in American History*
 HIST 603 (NAS), The European Conquest of America*
 HIST 605, Revolutionary America, 1750-1788
 HIST 606, History of the Early Republic
 HIST 609, American Legal History: Special Topics
 HIST 611, The Civil War Era
 HIST 612, Emergence of Industrial America
 HIST 615/616, 20th-Century America
 HIST 617, The Vietnam War
 HIST 619/620, The Foreign Relations of the United States
 HIST 621/622, History of American Thought
 HIST 623, Early American Social and Cultural History
 HIST 624, Topics in Modern U.S. Social History
 HIST 625, Southern History and Literature Since 1850
 HIST 626, Muslims in America
 HIST 771, Museum Studies
 HIST 772, Studies in Regional Material Culture
 KIN 561, History of American Sport and Physical Culture
 MUSI 511, Survey of Music in America
 MUSI 512, Survey of African American Music*
 PHIL 735, Major Figures in Philosophy**
 POLT 402, Power and Politics in America
 POLT 403, United States in World Affairs
 POLT 500, American Public Policy
 POLT 502, State and Local Government
 POLT 504, American Presidency
 POLT 505, American Congress
 POLT 506, Parties, Interest Groups, and Voters
 POLT 507, Politics of Crime and Justice
 POLT 508, Supreme Court and the Constitution
 POLT 509, Bureaucracy in America

POLT 510, Mass Media in American Politics
 POLT 512, Public Opinion in American Politics
 POLT 513, Civil Rights and Liberties*
 POLT 523, American Political Thought
 POLT 525, Multicultural Theory**
 POLT 600, Selected Topics in American Politics
 POLT 701, The Courts and Public Policy
 POLT 702, Urban and Metropolitan Politics
 POLT 704, Policy and Program Evaluation
 POLT 797/798, Section B: Seminar in American Politics
 POLT 797/798, Section F: Seminar in Public Administration

SOC 502, The Family
 SOC 530, Race and Ethnic Relations*
 SOC 540, Social Problems
 SOC 645, Class, Status and Power
 THDA 450, History of Musical Theater in America
 THDA 463, Theatre Dance I
 WS 595, Special Topics in Women's Studies**
 WS 796, Advanced Topics in Women's Studies**
 WS 798, Colloquium in Women's Studies**

*These courses concentrate on issues of race, gender, or ethnicity in America.

** These courses may be taken as electives when the subject is in American studies.

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.

ANTH 500E, People and Cultures of South Asia
 ARTS 697, Arts of the Far East
 CHIN 401/2, Elementary Chinese
 CHIN 503/4, Intermediate 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
 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
 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

*Japanese taught at UNH. Other Asian languages studied elsewhere may be substituted by approval.

Canadian Studies

A minor in Canadian studies brings together expertise currently held by UNH faculty into a systematic program of study allowing students to add to their major program interests a specialization in some aspect of Canadian society. Students will be exposed to courses and independent study opportunities in subject areas including Canadian history, geography, political science, sociology, health care and management, linguistics, natural resources, business, and Québec language, literature, and culture.

Additionally, students will have opportunities to study in Canada through established Study Abroad opportunities between UNH and several universities in Québec and Nova Scotia. The possibility for internships at, for example, the Canadian Embassy in Washington, D.C., also exists.

Please consult the Canadian studies Web site regularly for future modifications to these requirements at www.unh.edu/cie/canada.html.

Required Courses

Four courses chosen from

HIST 567, History of Canada
 GEOG 514, Geography of Canada and the US
 FREN 426, Intro to Québec Studies
 FREN 526, Intro to Francophone Cultures
 FREN 676, Topics in Francophone Cultures
 FREN 785, Francophone Literatures
 POLT 558, Government and Politics of Canada
 HMP 750, Comparative Health Care Systems

or
 Study Abroad Experience for up to 16 credits

or
 Combined study abroad, courses, internships (up to 4 cr. equivalent) or independent study (up to 4 cr. equivalent) for a total of 16 credits.

One course/4 cr. Independent study

This course can be taken in any department, but must be at the 700 level. The student will work with a willing faculty member who will supervise research having 100 percent Canadian content and which will result in a research paper.

Cinema Studies

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 may also 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, 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 which 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 earn 20 credits, with no more than 12 of these below the 600 level. Students must earn at least a C- in each course and maintain a 2.00 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 8 credits, if approved, will “double count.” Courses in cinema studies should be taken in the following sequence: first, one introductory course, ENGL 533, Introduction to Film Studies; followed by at least one of the following more advanced and/or focused courses: CMN 550, Cinema and Society; CMN 650, Critical Perspectives on Film; ENGL 616, 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; or SOC 670, Sociology and Nonfiction Film; and twelve credits of selected elective courses.

Interested students should contact the coordinator, Aleksandra Fleszar, Languages, Literatures, and Cultures-Russian, (603) 862-3545, aif@cisunix.unh.edu.

Introductory Course

ENGL 533, Introduction to Film Studies

Advanced and/or Focused Courses (One required)

CMN 550, Cinema and Society
 CMN 650, Critical Perspectives on Film
 ENGL 616, 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 (Three required)

Electives are drawn from an approved list of courses for the minor, which is compiled and announced every semester. Some electives require special permission by the major department and/or course instructor (such as advanced offerings in a major). The following courses include those that may sometimes have a significant cinema studies component. Check with the minor coordinator or the course instructor each semester for details.

AFAMST 609, Ethnicity in America: The Black Experience in the Twentieth Century*
 AFAMST 696, Special Topics in African American Studies*
 AMST 696, Seminar in American Studies*
 ANTH 697, Special Topics in Anthropology*
 ANTH 797, Advanced Topics in Anthropology*
 ARTS 799, Seminar in Art History*
 CMN 650, Critical Perspectives on Film
 CMN 696, Communication Seminar in Media Studies*
 ENGL 616, Studies in Film
 ENGL 750, Special Studies in American Literature*
 FREN 525, Introduction to French Civilization*
 FREN 675, Topics in French Civilization*
 FREN 676, Topics in Francophone Civilization*
 GERM 523, Women and German Film
 GERM 524, Special Topics in German Film
 GERM 797, 798, Special Studies in German Language and Literature*
 HIST 595, 596, Explorations in History*
 HIST 600, Advanced Explorations in History*
 HUMA 700, Seminar in the Humanities*
 HUMA 730, Special Studies in the Humanities*
 ITAL 525, Italian Cinema
 LLC 440, Cultural Approaches to Film and Fascism
 MUSI 595, Special Topics in Music Literature*
 PHIL 780, Special Topics in Philosophy*
 POLT 595, 596, Explorations in Politics*
 PSYC 591, Special Topics in Psychology*
 PSYC 741, 791, Advanced Topics in Psychology*
 RUSS 426, Film and Communism
 RUSS 797, 798, Special Studies in Russian Language and Literature*
 SOC 670, Sociology and Nonfiction Film
 SOC 797, Special Topics in Sociology*
 SPAN 525, Spanish Civilization and Culture*
 SPAN 526, Latin American Civilization and Culture*
 SPAN 797, 798, Special Studies in Spanish Language and Literature*
 THDA 592, Special Topics in Theatre and Dance*
 WLCE 600, Selected Topics in World Literature*
 WS 595, Special Topics in Women's Studies*
 WS 796, Advanced Topics in Women's Studies*
 WS 798, Colloquium in Women's Studies*

*When course content is relevant to cinema studies.

History and Philosophy of Science

What is science?

When people ponder this question, they are often led to seek answers outside the sciences themselves. This interdisciplinary minor is planned to help students address historical and philosophical questions about science. In the history of science, we ask: 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.

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 523, Introduction to the History of Science
 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: The Nature of Scientific Creativity
 MATH 419, Evolution of Mathematics
 PHIL 424, Science, Technology, and Society
 PHIL 435, The Human Animal
 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, The Great Psychologists
 PSYC 591, Special Topics in Psychology*
 PSYC 770, History of Psychology
 PSYC 771, Psychology in 20th-Century Thought and Society

*with approval

Humanities

The humanities minor studies the fundamental questions and issues of Western civilization. (For a more complete description, see Humanities, page 40.) The minor consists of a minimum of 20 credits of academic work (five courses), with a minimum grade of C from the following courses:

HUMA 401, Introduction to the Humanities
HUMA 480, What a Text Can Teach

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 selected courses from other humanities program courses, one of which should be at the 600-level

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: The Problem of Justice in Western Civilization
HUMA 651, Humanities and Science: The Nature of Scientific Creativity
HUMA 730, Special Studies in the Humanities

Humanities Program Seminar

HUMA 700, Seminar in the Humanities or another approved course

For more information on the humanities minor, please consult the coordinator, David Richman, 329 Huddleston Hall, (603) 862-3724, e-mail huma@unh.edu.

Justice Studies

This interdisciplinary minor spans the social sciences and humanities, from criminology to philosophy of law, focusing on the relationship of law and legal systems to issues of social policy. Interested students may plan a course of study that combines various perspectives and ways of reasoning about problems of justice: jurisprudential, historical, philosophical, and scientific. Students with career interests in law, criminal justice, gov-

ernment, and social services are able to pursue the intellectual and practical concerns of their potential careers in conjunction with their regular coursework. The justice studies minor may be combined with any undergraduate major field.

The justice studies minor includes a 4-credit field experience with placements available in law firms, law enforcement agencies, prosecution, criminal courts and court services, civil courts, probation and parole, and corrections. Eligibility for field experience is limited to senior justice studies minors who have not had prior experience in the justice system. Enrollment by application only.

Required Courses

POLT 507, Politics of Crime and Justice, and/or
SOC 515, Introductory Criminology
JUST 601, Field Experience in Justice Studies

Elective Courses

Students elect three additional courses from a list approved and published yearly by the Justice Studies Executive Committee. Cooperating departments include history, humanities, philosophy, political science, psychology, social work, sociology, family studies, health management and policy, recreation management and policy, resource economics, and development. Departmental offerings that are currently accepted for the minor include the following:

CD 717, Law of Community Planning
DCE 552, Corrections Treatment and Custody
DCE 554, Juvenile Delinquency
EC 718, Law of Natural Resources and Environment
FS 794, Families and the Law
HMP 734, Health Law
HIST 509, Law in American Life
HIST 559, History of Great Britain
HIST 609, American Legal History: Special Topics
HUMA 650, Humanities and the Law: The Problem of Justice in Western Civilization
JUST 550, 551, Mock Trial
JUST 695, Special Topics in Justice Studies
PHIL 436, Social and Political Philosophy
PHIL 635, Philosophy of Law
PHIL 660, Law, Medicine, and Morals
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 701, The Courts and Public Policy
PSYC 755, Psychology and Law
RMP 772, Law and Public Policy in Leisure Services
SW 525, Introduction to Social Welfare Policy
SOC 515, Introductory Criminology
SOC 525, Juvenile Crime and Delinquency
SOC 650, Family Violence
SOC 655, Sociology of Crime and Justice

Students who are interested in minor-ing in justice studies should consult with the coordinators, Susan Siggelakis, 320 Horton Social Science Center, (603) 862-1780 or James Tucker, 426 Horton Social Science Center, 862-1814. Students should file an "intent to minor" form with the Justice Studies Program Office, 101 Horton Social Science Center, (603) 862-1896, by the end of the first semester of their junior year.

Latin American Studies Minor

The Latin American studies minor provides an interdisciplinary approach to the study of Latin America. People of Latin American or Latino heritage will soon 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 which represent three disciplines. Latin American History (HIST 531 or 532) is required. Spanish or Portuguese language courses through the intermediate level are required (completion of SPAN 504 or PORT 504 at UNH, or equivalent courses or equivalency testing). 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. Courses are evaluated on an individual basis to determine acceptability.

ANTH 500B, Peoples and Cultures of the World: South America
ANTH 501, World Prehistory: Meso America
ANTH 697, Mayan Culture
AOE 630, Development of Food/Fiber
EC 535, Environmental Conservation*
FOR 502, The Endangered Forest
FS 773, International Perspectives on Children and Families
HIST 425, Foreign Cultures**
HIST 532, Modern Latin America
HIST 631, 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**
PORT 401, Elementary Portuguese
PORT 503, 504, Intermediate Portuguese
SPAN 601, Phonetics
SPAN 522, Latin American Literature in Translation
SPAN 526, Latin American Culture and Civilization

SPAN 622, Latin American and Brazilian Literature in Translation
 SPAN 653, 654, Introduction to Latin American Literature and Thought
 SPAN 771, Latin American Drama
 SPAN 772, Latin American Novel
 SPAN 773, Latin American Short Story
 SPAN 797, Latin American Literature

*Since less than 50 percent of this course deals with Latin America, you must talk to the professor at the beginning of the semester and declare your 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, call Professor Marco Dorfsman, Latin American studies minor coordinator, Murkland 209, (603) 862-3448, e-mail marcocod@cisunix.unh.edu.

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. 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 one's 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 program director can aid in advising such a major program.

Courses included in the bi-annual *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 are generally offered at least once every two years:

Historical-Cultural

RS/HIST 483, History of World Religions
 HIST 507, Native Peoples of the Americas
 PHIL 520, Introduction to Eastern Philosophy
 HIST 585, Middle East History to the Medieval Islamic Era
 HIST 587, Africa South of the Sahara
 HIST 589, Islam in Africa
 HIST 642, Religious Conflict in Early Modern Europe
 RS/ENGL/AMSTUD 607, Religion in American Life and Thought
 HIST 688, African Religions
 HIST 640, Holy War-Holy Land: The Crusades

Theoretical

PHIL 417, Philosophical Reflections on Religion
 RS/HIST 484, Patterns in World Religions
 ANTH 616, Religion, Culture, & Society
 RS/HIST 682, Cults & Charisma
 RS 699, Senior Seminar in Religious Studies

Textual

ENGL 518, The Bible as Literature
 HIST/RS 576, The Hebrew Bible in Historical Context
 HIST/RS 577, The New Testament in Historical Context
 HIST/RS 601, Seminar in Religious Texts

Interested students should also be alert for special topics courses in history (HIST 600), English (ENGL 697/698), anthropology (ANTH 500), 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, David Frankfurter, Department of History, 436, Horton Social Science Center, (603) 862-3015; e-mail davidtff@hopper.unh.edu.

Women's Studies

The women's studies minor offers students an interdisciplinary introduction to the status and contributions of women in various cultures and historical eras. (For a more complete description, see Women's Studies, page 51.)

For the women's studies minor, students must complete 20 credits of women's studies courses. These must include WS 401, Introduction to Women's Studies, and WS 798, Colloquium in Women's Studies, normally taken at the beginning and end of the course sequence, respectively. In between, students should select other women's studies courses or cross-listed courses from departmental offerings.

Other women's studies courses are WS 595, Special Topics in Women's Studies; WS 632, Feminist Thought; WS 795, Independent Study; WS 796, Advanced Topics in Women's Studies; and WS 797, Internships.

Departmental offerings include the following regularly repeated courses:

ARTS 487D, Themes and Images in Art: Major Mythic Images of Women
 ARTS 690, Women Artists of the Nineteenth and Twentieth Centuries
 CMN 567, Images of Gender in the Media
 CMN 583, Gender and Expression
 ECON 698, Topics in Economics: Women in Economic Development
 ENGL 585, Introduction to Women in Literature
 ENGL 586, Introduction to Women Writers
 ENGL 685, Women's Literary Traditions
 ENGL 785, Major Women Writers
 FS 545, Family Relations
 FS 757, Race, Class, Gender, and Families
 HIST 565, Women in Modern Europe
 HIST 566, Women in American History
 NURS 595, Women's Health
 PHIL 510, Philosophy and Feminism
 SOC/ANTH 625, Female, Male, and Society
 SOC 630, Sociology of Gender

Students may complete the minor requirements by selecting 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; FREN 525, French Women: Subject and Object.

Students who wish to minor in women's studies should consult with the coordinator, 203 Huddleston Hall, (603) 862-2194.

Special Centers

Center for the Humanities

The Center for the Humanities, located in Huddleston Hall, was established in 1986 to support the arts and humanities at UNH. It currently involves approximately twelve departments and more than 125 faculty members from across the University, representing such fields as literature, fine arts, anthropology, philosophy, folklore, history, religious studies, and foreign languages and literature.

Participation in the activities of the center is open to faculty members from across the University who are interested in the humanities as they are broadly defined. The center acts as a forum for discussion and intellectual cross-fertilization regarding humanistic issues and perspectives; it fosters and supports creative research in the hu-

manities, both within and among disciplines; it assists humanities faculty in their educational and curricular activities in general, and in the development of interdisciplinary courses and programs in particular; it serves the humanities faculty, students, programs, and community by assisting in the development and dissemination of educational and research materials; it fosters and develops outreach activities in the humanities for the state and region; and it is a focus for the humanities within the University, the state, and the region.

Institute for Policy and Social Science Research

The Institute for Policy and Social Science Research, Thompson Hall, provides financial, intellectual, and administrative support for social, behavioral, cognitive, and policy-related research and training at the University. It works to raise the contribution of UNH faculty and students to the amelioration of important social problems in New Hampshire, the Northeast, and the nation. To achieve these goals it works in close collaboration with the Institute on Disability, The Carsey Institute, and other UNH centers.

Work of the institute is conducted within seven divisions.

- *JusticeWorks* manages a collaboration among the criminal justice systems of Maine, Vermont, and New Hampshire. It is designed to reduce crime, increase social justice, and raise the efficiency of those implementing the legal system.
- The *Laboratory for Interactive Learning* creates and disseminates books and interactive games that offer innovative learning experiences for adults on a variety of issues.
- The *UNH Survey Center* uses telecommunications technologies to conduct research on public opinion related to the University, state, and public sector organizations.
- The *Center for Effective Communities* supports faculty research on strategies to enhance and use social capital for the amelioration of important social problems.
- The *Center for Art-based Literacy Programs* has created a revolutionary new approach to the teaching of writing to young children. It develops and disseminates materials and conducts teacher training programs for thousands of teachers in the U.S. and abroad.
- The Institute's *Administrative Support Staff* provides financial reporting and grant

management support to those conducting sponsored research projects within the UNH College of Liberal Arts.

- The *Innovative Programs* division of the institute administers the Budapest student exchange program, the Winant summer fellowships in social service, and other projects. The institute offers space and financial support to academic visitors, conducts short courses, and consults on proposal preparation.

Programs of Study

The bachelor of arts programs provide a broad liberal education with a concentration involving a minimum of 32 credits in a major field. Departments may specify certain (but not more than thirteen) required courses. Students must declare a major before the beginning of the junior year. Degree candidates also should satisfy the foreign language proficiency requirements by the start of their junior year. A bachelor of fine arts degree program and a bachelor of music degree program are also available (see Art and Art History and Music). The objectives, opportunities, and departmental requirements of these programs are described below.

Anthropology

(For descriptions of courses, see page 135.)

Anthropology asks the question: What does it mean to be human? We answer this fundamental question with a global perspective on the human condition. Students explore 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 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 cul-

tures. 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.

Majors must complete a minimum of 36 credits with grades of C- (1.67) or higher and a grade-point average of 2.00 or better, distributed as follows:

ANTH 412, 511, 701, and 702.

One topical course (ANTH 516, 601, 610, 614, 616, 618, 625, 630, 680, 697, 714, 715, 720, 750, 760, 770, or 780).

One area course ANTH 500 (A, B, C, D, E, F, G, or Z) or ANTH 501 (A, B, C, D, or E).

Any other three courses in anthropology or related disciplines approved by the academic adviser.

Honors in major and senior thesis options are also available.

Students who declare a major in anthropology are expected to make steady progress towards fulfillment of major requirements. Normally, this means taking at least one anthropology course a 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 their adviser.

Students wishing to major in anthropology should consult with the anthropology chairperson.

A minor consists of five 4-credit courses in anthropology with a C- or better in each course.

Art and Art History

(For descriptions of courses, see page 137.)

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, page 33). Students who major in either studio art or art history must fulfill the fine arts general education requirement with a course outside the department.

Studio Art Major

Candidates applying for admission to the bachelor of arts program and all students wishing to transfer from other schools into the studio art major are required to submit a portfolio. Students already matriculated at the University may declare a studio art major (bachelor of arts degree) after having completed two studio art courses in the Department of Art and Art History with an average of C+ or above; one of these must be ARTS 532, Introductory Drawing. Students enrolling as freshmen at the University may become studio art majors by either of two methods: (a) by admission through acceptance of a portfolio submitted during the senior year of high school; or (b) by entering the University as an undeclared major and taking two studio art courses in the Department of Art and Art History with an average of C+ or above; one of these must be ARTS 532. 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 twelve courses (48 credits), of which the following are required:

ARTS 532, Introductory Drawing

One of the following

ARTS 501, Ceramics
ARTS 525, Woodworking
ARTS 567, Introductory Sculpture

One of the following

ARTS 536, Introduction to Printmaking: Intaglio
ARTS 537, Introduction to Printmaking: Lithography
ARTS 551, Photography

One of the following

ARTS 544, Water Media I
ARTS 546, Introductory Painting

Three additional courses in a studio concentration

Two additional studio electives

ARTS 580, Survey of Art History I
ARTS 581, Survey of Art History II
One 600-level art history course

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.

Art History Major

The art history major provides a comprehensive, in-depth study of Western art from the ancient world to the present and some exposure, as well, 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 eleven courses (44 credits). Two introductory-level courses are required from one of the following three sequences: 1) ARTS 580 and 581; 2) ARTS 480 and one other 400-level art history; 3) ARTS 480 and one 500-level art history other than ARTS 580 or 581.

The upper-level requirements for the major include five 600- or 700-level courses (at least one each from the following categories: Pre-Renaissance, Renaissance/Baroque, modern, and architectural history); and ARTS 795, Methods of Art History; ARTS 799, Seminar in Art History; ARTS 532, Introductory Drawing; and one other studio course. 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.

Bachelor of Fine Arts Major

Incoming freshmen 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 84 credits of which the following courses are required:

ARTS 532, Introductory Drawing
ARTS 546, Introductory Painting
ARTS 551, Photography
ARTS 567, Introductory Sculpture
ARTS 580, Survey of Art History I
ARTS 581, Survey of Art History II
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 600-level art history courses

The possible areas of concentration within the department are: (1) painting, (2) sculpture, and (3) individualized programs. Individualized programs may be designed in the following subject areas: (a) ceramics, (b) drawing, (c) printmaking, (d) photography, and (e) 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 pre-registration.

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. or B.F.A. curriculum and required education courses and 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.

Art education majors may take accredited crafts courses at other institutions as art electives.

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 for their work. It is designed to assist those who (a) are contemplating enrollment at a school of architecture; (b) are particularly interested in architectural history; (c)

want to supplement their technical majors (e.g., civil engineering) with strong academic minors; or (d) plan to pursue careers in preservation, education, community service, and public relations.

The minor in architectural studies consists of 20 credits (ordinarily five courses) distributed in the following way:

Two courses in architectural history chosen from
ARTS 574, Architectural History
ARTS 654, 17th- and 18th-Century American
Architecture

ARTS 655, Early Modern Architecture: Revolution
to World War I

ARTS 656, Contemporary Architecture: The
Buildings of Our Times

ARTS 799, Seminar in Art History

The course in architectural graphics and design
ARTS 455, Introduction to Architecture (when topic
is related to architecture)

A beginning course in drawing
ARTS 532, Introductory Drawing

An elective

Chosen in consultation with the program coordinator of the architectural studies minor (an additional course in architectural history, a studio course, or some other appropriate elective)

Admission to the minor will be authorized by the program coordinator. Interested students should consult with the coordinator in advance of selecting the minor.

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 one introductory course from the 400-500 level and the remaining four courses chosen from 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.

Classics

(For program description, see Languages, Literatures, and Cultures/Classics, page 40. For descriptions of courses, see page 185.)

Communication

(For descriptions of courses, see page 146.)

The Department of Communication offers a major that emphasizes a range of integrative studies in human communication, including rhetorical studies, media studies, and interpersonal/small group studies. Students are taught analysis of communication transactions through historical, critical, and empirical investigations. Students examine verbal, nonverbal, and mediated messages across a wide spectrum of communication interactions: intrapersonal, interpersonal, group, and mass. They explore connections and interrelationships among various types of communication, theoretical perspectives, and methodological approaches.

While the major emphasizes critical analysis and understanding grounded in theory and research, application of understanding to a variety of communication settings and processes is an important dimension of study.

Students wishing to declare communication as a major should contact the director for majors, Professor Sally Jacoby, for application information and requirements.

Majors must complete nine courses (36 credits) with a 2.00 overall average in the major. The distribution of required courses for the major is as follows:

Three introductory courses

CMN 455, 456, and 457 (12 credits). Majors must earn a grade of C or better in all three introductory courses before moving on to the 500-level courses. CMN 402 may not be used to fulfill an introductory requirement.

Three 500-level courses (12 credits), one from each of the following areas

Media Studies (prerequisite: C or better in all three introductory courses): CMN 505, 515, 519, 550, 567, 596

Rhetorical Studies (prerequisite: C or better in all three introductory courses): CMN 504, 507, 557, 597

Interpersonal Studies (prerequisite: C or better in all three introductory courses): CMN 503, 530, 572, 583, 598

Majors must earn a grade of C- or better in all intermediate-level courses. CMN 500 and CMN 599

cannot be used to fulfill an intermediate course requirement.

Three advanced 600- and/or 700-level courses (12 credits) from among any of the three areas of study (prerequisites: CMN 455, 456, and 457 with grades of C or better, and at least one area-relevant 500-level course with a grade of C- or better).

A maximum of 4 credits of independent study (CMN 795) may be counted. Majors must earn a grade of C- or better in all advanced-level courses. CMN 799 (Honors Thesis) and CMN 795.02 (Comm-entary) cannot be used to fulfill an advanced course requirement.

Transfer students must complete 18 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.

A minor is confined to coursework in rhetoric and public address. Five courses (20 credits) are required for completion of the minor. Students must complete CMN 456, Propaganda and Persuasion, with a grade of C or better. Any additional four rhetoric courses with a grade of C- or better from the following list will satisfy the minor requirements, however, one of the listed 500-level courses is required prior to enrollment in any 600- or 700-level course: CMN 500, 504, 507, 557, 604, 605, 607, 656, 657 (may be taken more than once, with different topics), 670, 697, 703, and ENGL 503.

Education

(For descriptions of courses, see page 155.)

Basic Programs

At the undergraduate level students have the opportunity to participate in teacher preparation programs which lead to teacher licensing in elementary and secondary education and preschool to kindergarten education.

Students may also prepare to teach solely at the graduate level. For elementary (K-8) and secondary teaching (7-12) students enroll in either the M.Ed. for elementary and secondary teaching or the M.A.T. for elementary and secondary teaching.

For early childhood education, students enroll in the M.Ed. in early childhood education. For special education, students enroll in the M.Ed. in special education and for reading specialists, students enroll in the M.Ed. in reading.

Undergraduate preparation in preschool-kindergarten teaching is carried out in the Department of Family Studies in coopera-

tion with the Department of Education (See Family Studies, page 70).

Most students who plan to teach in elementary and secondary schools apply to the five-year program. In the five-year program students begin preparation for teaching at the undergraduate level with a semester of field experience and professional coursework 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 for teaching.*

There are also opportunities for certification at the graduate level in 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 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.

Students in music, mathematics, and nursery school/kindergarten have the option of choosing a basic four-year undergraduate program for licensure. Students in these departments should consult with their advisers.

Program Philosophy and Mission

Unit Mission Statement The following conceptual framework guides all of the programs which 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 im-

prove 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 which 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.

Program Themes

Excellence in Practice We expect our students to gain mastery of subject matter, command professional knowledge, and acquire a good grounding in general education, including global perspectives regarding diverse cultures and environments. They will recognize how knowledge in their subject matter areas is created, organized, and linked to other subjects. Upon graduation, they should possess a specialized knowledge of how to teach subject matter to their students and employ multiple, motivational approaches in teaching their subjects. They will know how to orchestrate learning in group settings, placing a premium on student engagement and thoughtfulness. They will remain mindful of their teaching and learning objectives through selection and use of appropriate measures.

In their commitment to students and their students' learning, our graduates will recognize diverse backgrounds and perspectives in their students as well as individual development. They will be able to adjust their practice to meet students' needs, working diligently to help each student reach his or her full potential. They will create and contribute to a classroom atmosphere which

fosters a community of learners, establishes an atmosphere of mutual respect and caring, and cultivates a celebration of diversity.

We expect our graduates to be thoughtful and reflective practitioners who learn from experience. They will be capable of making choices and decisions in complex and demanding situations, analyzing the effects of their actions, taking into account moral and philosophical implications. They will seek to improve their practice by observing others, seeking advice, and drawing upon educational research and scholarship.

Leadership in the Profession We believe that, over time, our graduates will become well-informed decision makers and agents of change, providing leadership within the school community and profession. We seek to equip our graduates with the knowledge, skills, and dispositions necessary for such leadership, but we recognize that development and demonstration of leadership skills takes time and practice within the professional setting. Through study and experience, our graduates will learn to assess the relative merits of educational reform efforts, determining their appropriateness to the classroom, the institution, and the broader societal contexts in which reform is implemented. Drawing upon current theories and research in education, graduates will be able to develop and articulate their own conceptual and philosophical perspectives on teaching and learning. We expect them to develop an understanding of how leadership is informed by varied perspectives on the structure of public education, the nature of educational change, and the teacher's role in the change process. They should be willing to take risks in advocating for high levels of quality within the teaching profession. We expect them to become active members of learning and professional communities. In doing so, they will engage colleagues in their own and other's teaching, learning, and professional development. They will be able to work collaboratively with all members of the community—students, peers, specialists, parents, etc., to contribute to effective learning environments. They will continue to be active learners, participating in professional organizations, pursuing avenues of inquiry through study, research, and dialogue while taking into account the moral and ethical implications of their professional practice and efforts to enhance the school, community, and profession.

*Students in the five-year program may combine their program for teacher licensure with a master's program in their major field department.

Our two program themes, *Excellence in Practice*, and *Leadership in the Profession*, are reflected in the goals and expected student outcomes that form the basis of our program.

Undergraduate Work Toward Teacher Certification

Phase I. Enroll in Exploring Teaching: Education 500.

Throughout all phases of the UNH teacher preparation programs, we stress the importance of excellence in the classroom, and classrooms are where the UNH teacher preparation program begins. Exploring Teaching is the initial phase of the teacher preparation program. Students in Exploring Teaching spend five hours per week in local classrooms to obtain realistic views of current classroom practices. These views provide a backdrop for students to explore what excellence in teaching means to them and to begin the process of deciding whether or not to pursue a career in education.

Students are encouraged to take Exploring Teaching as a sophomore, but completion during junior year could also 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). This co-adviser works with the students, along with the major adviser to plan the undergraduate portion of the five-year Teacher Education Program.

Every student must take 4 credits in each of five areas (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). 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.

Any course taken in the Department of Education that will be used for a teacher licensure requirement must be completed with a grade of B- or better.

Phase III. Internship and Graduate Phase of the Program

Undergraduates should apply to the Graduate School during the first semester of their senior year for the final phase of the teacher education program.

The final phase of the program includes a full-year internship, a 12-credit graduate concentration, electives, and a program portfolio and colloquium. This phase normally takes at least an academic year plus a summer to complete.

The year-long 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 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 director of teacher education at Manchester play a major role in identifying internship sites and should be consulted regarding placement. 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.

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 75 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. Students with an undergraduate grade-point average below 2.67 are usually not admitted.

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, 410-550; Quantitative, 450-600; Analytical, 540-650. Students with scores below 400 are usually not admitted.

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. Recommendations from subject major professors are also important.

In our admission process, we seek evidence that our students 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 their students—each and every one; (3) an ability to interact positively with children and adults; (4) a 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 their environment, especially in the context of a classroom; (7) the ability to make reasonable judgments in a context of complex situations that change from moment to moment; (8) the capacity for clear thinking and an ability to translate their 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 their own learning, which includes the active pursuit of feedback and the willingness to take thoughtful risks.

Early Admission

Provision exists for UNH seniors to apply for “early admission” to the Graduate School, i.e., admission for the second semester of the senior year. Such candidates may petition to have up to 8 credits in graduate coursework simultaneously count toward the bachelor's and master'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. A minimum of a 3.2 cumulative grade-point average is required to qualify for early admission.

A student would apply for early admission on the regular graduate school application.

Four-Year, Undergraduate Option

A bachelor's degree including a one-semester teaching requirement allows students to be recommended for licensure in certain special-

ized areas. Those areas are: mathematics, music, and nursery/kindergarten education.

These program options include a major appropriate for the licensure being sought, in addition to these 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.

The nursery/kindergarten program, because of its emphasis on the young child, has an equivalent set of core courses. FS 708/709 is the equivalent of EDUC 500; FS 743 is the equivalent of EDUC 700; FS 623, 635, and 525 are the equivalent of EDUC 701; FS 734, MATH 621, EDUC 706, 750, 751, or 760 are the equivalent of EDUC 703; FS 733 is the equivalent of EDUC 705; and FS 785, 786, and 788 are the equivalent of EDUC 694.

For admission to supervised student teaching, a minimum 2.50 overall (2.80 for nursery/kindergarten) grade-point average at the time of application is required. Students in music and mathematics need to apply by February 15 of the junior year for student teaching to the Department of Education.

In addition to the four-year undergraduate licensure option, the five-year program with full-year internship and master's degree is available in mathematics and music. Many students who complete the nursery/kindergarten program also go on to complete the five-year program in elementary education. This extends the license to teach to grades 1-8.

Students may also become licensed for kindergarten through grade three (early childhood licensure) by completing the master's degree program in early childhood.

Education, Adult and Occupational

(For descriptions of courses, see page 157.)

The adult and occupational education program focuses on the preparation of students: as teachers of vocational/technical education, as participants in international agricultural education, as extension educators, and as adult educators concerned with human resource development.

This program complements a student major in technical subject matter within departments throughout the University and thus can serve as a viable dual major or minor.

Flexibility is maintained among individual programs, with credits allowed for

qualified students through (1) the Occupational Competency Testing and Evaluation program, (2) internships in industry, (3) Cooperative Extension, and (4) other informal educational settings. Opportunity is provided for vocational teacher certification.

Students who desire to major or minor in adult and occupational education should consult with a member of the faculty of the program.

Students majoring in this program will normally concentrate in one of four areas, although programs for teacher education can be developed in other areas of vocational/technical education on an individual basis.

Areas of concentration are described below.

Agricultural Education Teacher Certification

This program prepares individuals for careers as teachers of agriculture. Individuals completing this concentration are eligible for state certification in New Hampshire and most other states. Recent occupational experience in the field of production agriculture or agribusiness is required for state certification.

For certification a one year internship at the graduate level is required in addition to the other classes which can be completed at the undergraduate or graduate level.

Individuals are encouraged to complete a dual major in a technical agricultural field. For further information, contact David L. Howell.

AOE Required Courses	Credits
EDUC 710A, Concepts of AOE	4
EDUC 710B, Microcommunications	4
EDUC 710C, Youth Organizations	4
EDUC 750, Introduction to Exceptionality	4
EDUC 710D, Planning for Teaching	4
Total	16
Required Education Courses	
EDUC 500, Exploring Teaching	4
EDUC 700, Educational Structure and Change	4
EDUC 701, Human Development and Learning, or FS 525, Human Development	4
EDUC 705, Alternative Perspectives on the Nature of Education	4
Total	16

Forty credits of technical agriculture courses are selected from the following areas: (1) animal science; (2) plant biology; (3) agricultural mechanization; (4) environmental and resource economics; (5) forestry (fifth-year program); (6) some courses from the Thompson School of Applied Science or similar out-of-state institutions may be appropriate.

Additional Programs

Programs for teacher education can be developed in other areas of vocational/technical education on an individual basis.

Trade and Industrial Teacher Certification

Trade and industrial education, with emphases in, but not limited to, building trades and food service, is formulated in three categories of courses to fulfill degree requirements. The degree requirements are 44 credits in general education, 44 credits in professional education, and 40-50 credits in technical subject matter or documented recent occupational experience. Technical subject matter is culminated in a competency test where credit (up to 30 credits) is awarded for successful completion of a written and practical exam. The competency exam is used to evaluate a student's previous occupational experience, when appropriate. Recent occupational experience in the field of specialization is required for state certification. (For certification a one year internship at the graduate level is required in addition to the other education classes which can be completed at the undergraduate or graduate level.) For further information, contact David L. Howell.

AOE Required Courses	Credits
EDUC 710A, Concepts of AOE	4
EDUC 710B, Microcommunications	4
EDUC 710C, Youth Organizations	4
EDUC 750, Introduction to Exceptionality	4
EDUC 710D, Planning for Teaching	4
Total	16
Required Education Courses	
EDUC 500, Exploring Teaching	4
EDUC 700, Educational Structure and Change	4
EDUC 701, Human Development and Learning, or FS 525, Human Development	4
EDUC 705, Alternative Perspectives on the Nature of Education	4
Total	16
Technical Courses	
EDUC 501, Occupational Competency Examination and Evaluation	
EDUC 710G, Field Experience	
Total	40

Adult Education

This program prepares students for careers with Cooperative Extension, industrial training, and within other informal educational settings. It includes opportunity for selected formal courses and for field experience valu-

able for the student's professional development. The most beneficial focus in this area may be a dual major or minor along with concentration in a technical subject matter field within the College of Life Sciences and Agriculture or within other colleges and schools of the University. For further information, contact David L. Howell.

AOE Required Courses	Credits
EDUC 710A, Concepts of AOE	4
EDUC 710B, Microcommunications	4
EDUC 710F, Investigations in AOE	2-4
EDUC 710G, Field Experience	2-16

Recommended Courses

CD 415, Community Development and Perspectives	4
CD 710, Community Development Seminar	2-4
EREC 504, Business Management for Natural Resource Firms	4
EREC 604, Financial Concepts for Natural Resource Firms	4
SOC 500, Introduction to Social Psychology	4
PSYC 401, Introduction to Psychology	4

English

(For descriptions of courses, see page 160.)

Through studying 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. Upon graduation, English majors traditionally enter a broad range of vocational fields and areas of graduate study.

The Department of English offers three majors: the English major, the English teaching major, and the English/journalism major. It also offers courses in writing non-fiction, fiction, and poetry; courses in linguistics; courses in film; courses in folklore; and courses for honors in English.

The English Major

The English major has two chief objectives: to provide all students with a common core of literary experience and to provide each student with the opportunity of shaping a course of study to suit individual interests.

The flexibility and freedom inherent in the second of these objectives places a responsibility upon students to devise a program that has an intelligent rationale. For example, students who intend to pursue graduate study in literature written in English should choose more than the minimum number of advanced literature courses and should seek a broad historical background. Students with special interests in linguistics or writing may, on the

other hand, wish to elect only the minimum number of advanced literature courses required for the major. All students should secure the assistance and approval of their advisers in formulating an early plan for the major program.

For the English major, students must complete a minimum of 40 credits of major coursework including ENGL 519 or 529, two additional 500-level courses, and seven courses numbered 600 and above. Students should see their adviser about minimum grade requirements in major courses. In selecting these courses, students must be sure to meet the following distribution requirements:

1. Two courses in literature before 1800: either two advanced courses (numbered 600 or above), or one advanced course and ENGL 513.
2. Two courses in literature since 1800: either two advanced courses, or one advanced course and one course from the following list: ENGL 514, 515, or 516.

Students interested in majoring in English should consult Tory Poulin, Coordinator of the Department of English, (603) 862-1313.

The English Teaching Major

This major is designed for students wishing to teach English in middle or high schools. Completion of this undergraduate major does not in itself, however, meet state certification requirements. To meet these requirements, students should enroll in the undergraduate major and, by September 15 of their senior year, apply for the fifth-year teaching internship and master's degree program. (For a full description of the program, see page 33.) Undergraduate English teaching majors must pass the following English courses with an average of 2.50 or better: ENGL 514, 516, 519 or 529, 619, 657, 725-726 or 710 and 792, 718 or 791, and two additional literature courses numbered 600 or above. ENGL 513 may be substituted for one of these two courses.

Students who are interested in majoring in English teaching should consult the director of the English teaching program.

The English/Journalism Major

The English/journalism major is designed for students considering careers in print journalism or related fields. Students who complete the program are ready for entry-level writing or editing positions on newspapers or magazines.

The program allows students to develop their writing, reporting, and editing skills while developing a strong background in English literature. English/journalism majors must complete the literature requirements of the standard English major. In addition, they must complete ENGL 621 (Newsriting), ENGL 722 (Feature Writing), at least one other on-campus journalism course, and an internship (ENGL 720) approved by the director of the journalism program. Many journalism students work for the on-campus student newspaper, *The New Hampshire*. Many students hold summer jobs in journalism, and some have part-time journalism jobs during the school year.

Students interested in the English/ journalism major should see Tory Poulin, Coordinator of the Department of English, or a program faculty member.

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. Interested students should inquire at the departmental office.

European Cultural Studies

(For descriptions of courses, see page 166.)

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 in conjunction 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 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 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 more 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 as follows

1. Proseminar (European Cultural Studies 500): Introduction to the field of cultural studies as applied to the study of Europe. (4 cr.)
2. 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 three courses, one in each of the following categories. (12 cr.)
 - a. Languages: 504 or equivalent in an European language or an approved alternate course.
 - b. Social Science: One course from the following offerings: Economics 630 (Comparative Study of Economic Systems), History 435 or 436 (Western Civilization), History 656 (20th-Century Europe), Political Science 552 (Contemporary European Politics), Political Science 550, 651 (Major Foreign Governments).
 - c. Art and Humanities: One course from the following offerings: Arts 580 or 581 (Survey of Art History), ARTS 786, English 619, English 651 or 652, when inclusive of European Literature (Comparative Literatures), World Literature and Culture in English (WLCE) courses that are comparative in topic, Humanities 501, 502, 503, or Music 402 (Survey of Music History).
3. Focus Courses: The focus of the major consists of an individually designed grouping of five courses that will allow 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 philosophy; focus by nation. (20 cr.)

4. Senior Thesis: European Cultural Studies 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 seminar, students present their work to a committee of three ECS faculty members.

European Cultural Studies Minor

The minor in European Cultural Studies consists of 20 credits. ECS 500, foundation requirement courses (see above), and one elective.

French

(For program description, see *Languages, Literatures, and Cultures/French*, page 41. For descriptions of courses, see page 186.)

Geography

(For descriptions of courses, see page 168.)

Geography is best defined as the discipline that describes and analyzes the variable character, from place to place, of the Earth as the home of human society. As such, geography is an integrating discipline, studying many aspects of the physical and cultural environment that are significant to understanding the character of areas or the spatial organization of the world.

Geography aims to provide students with a basis for understanding the world in which we live.

Because its integrating character establishes common areas of interest with many other fields of knowledge, geography provides an excellent core discipline for a liberal education. Those who would understand geography must also know something of the earth sciences, as well as economics, cultures, politics, and processes of historical development.

Students who have a strong interest in the spatial organization of the world and the distinctive character of its major regions and who also want a broad educational experience can achieve these goals effectively by majoring in geography.

Students with degrees in geography have found their education valuable in such fields as urban and regional planning, locational analysis for industry and marketing organizations, cartography, geographical information systems (GIS), library work, military intelligence, international studies, the Foreign Service, travel and tourism, and journalism.

Students planning careers as scholars or teachers in the field should concentrate their coursework in geography and appropriate related disciplines and should plan to go on to graduate study after completing an undergraduate major in geography. Students from

this department have been admitted to first-rate graduate schools in all parts of the United States.

Students who major in geography are required to take ten courses with a minimum grade of C-.

Requirements for the Major

A. All of the following core courses:

- GEOG 401, Regional Geography of the Western World
 GEOG 402, Regional Geography of the Non-Western World
 GEOG 572, Physical Geography

B. One of the following regional courses

- GEOG 512, Geography of Canada
 GEOG 513, Geography of United States
 GEOG 514, Geography of Canada and the United States
 GEOG 520, Geography of Latin America and the Caribbean
 GEOG 531, Geography of Western Europe and Mediterranean
 GEOG 540, Geography of Middle East
 GEOG 541, Geography of Japan
 GEOG 545, Geography of Southeast Asia
 GEOG 610, Geography of New England

C. Three of the following systematic courses

- GEOG 573, Biogeography
 GEOG 581, Human Geography
 GEOG 582, Economic Geography
 GEOG 583, Urban Geography
 GEOG 584, Political Geography
 GEOG 585, Social Geography
 GEOG 673, Environmental Geography
 GEOG 685, Population and Development
 GEOG 686, World Economy and Globalization

D. One of the following physical courses

- GEOG 473, The Weather
 GEOG 570, Climatology

E. One of the following technique courses

- GEOG 590, Cartography
 GEOG 757, Photo Interpretation and Photogrammetry
 GEOG 759, Digital Image Processing for Natural Resources
 GEOG 760, Geographical Information Systems in Natural Resources

F. One elective course in geography

This may be any geography course. However, students intending to continue to graduate school are strongly encouraged to take GEOG 795, Special Topics, and complete an undergraduate thesis.

A minor consists of five courses (20 credits) in geography with a minimum grade of C-.

Students interested in majoring or minoring in geography should consult with the supervisor, Alasdair Drysdale.

German

(For program description, see *Languages, Literatures, and Cultures/German*, page 42. For descriptions of courses, see page 187.)

Greek

(For program description, see *Languages, Literatures, and Cultures/Greek*, page 42. For descriptions of courses, see page 188.)

History

(For descriptions of courses, see page 172.)

The study of history is an essential element of the liberal 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 which 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 which may be studied. The interdisciplinary nature of the field makes it a natural focus for study which may encompass a variety of other fields.

To complete a major in history, students must take ten 4-credit history courses or their equivalent. Students who enter the University as history majors and continuing students intending to declare a history major are considered "provisional majors" until they complete two history courses with a C- or better and have registered for HIST 500, Introduction to Historical Thinking. At that time students can confirm their major and be assigned a departmental adviser. We accord provisional majors all the rights and privileges of any history major. Majors must take HIST 500 and HIST 797, Colloquium in History. The colloquium is usually taken during your senior year. In addition to 500 and 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 695 independent study course 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 HIST 797, and at least a C- in the other eight courses. They must maintain a 2.00 or better in all history courses. General education courses offered by the department may be counted for major credit or for general education credit, but not for both.

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 4 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 the student's adviser.

The program must be planned in consultation with an adviser. A copy of the program, signed by one's adviser, must be placed in one's file no later than the second semester of one's 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 2.00 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 8 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.

The Ethyl Gerrish Scholarship, an award of \$500, is available to students who are full-time and in their sophomore year or above. Applicants must be New Hampshire residents and have a grade-point average of 3.20. There are application guidelines for this scholarship. More details are available from the history office.

The Daughters of the American Revolution Scholarship is funded by the Margery Sullivan Chapter of the D.A.R. The scholarship is a reduction in tuition, and competition for the scholarship is open to full-time, New Hampshire-resident women, majoring in history and of senior class status. Application guidelines are available in the history department 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 3.20 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 3.20 and a grade-point average of 3.20 or better in history courses.

Humanities

(For descriptions of courses, see page 177.)

The humanities program examines the fundamental questions and issues of Western 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.
- Research Project in the Humanities (HUMA 798/799). Each student participates in the research seminar (for a total of 4 credits) throughout the senior year. The seminar provides a context within which students may discuss and receive directions in the course of completing a major research paper. 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 8 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 re-

search paper, as seems appropriate in each individual case.

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 David Richman, coordinator of the Humanities Program, 329 Huddleston Hall, (603) 862-3724, e-mail huma@unh.edu.

Languages, Literatures, and Cultures

The Department of Languages, Literatures, and Cultures offers undergraduate majors in Classics, French, French Studies, German, Greek, Latin, Russian, and Spanish, plus a minor in Italian and coursework in Chinese, Hittite, Sanskrit, Japanese, and Portuguese. A combined B.A. in French/M.B.A. degree and an M.A. in Spanish are also offered through the department.

In addition, the department sponsors several study abroad programs (see page 108) and a variety of cocurricular 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, page 18.

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.

Classics

(For descriptions of courses, see page 185.)

While it is true that classical Greek and Latin are no longer spoken languages, the literature and art of the Ancients speak to us still. To study the classics is to come into direct contact with the sources of Western civilization and culture, both pagan and Christian. An intimate knowledge of our

Greco-Roman heritage furnishes students of the classics with historical, political, and aesthetic perspectives on the contemporary world. An undergraduate classics major provides excellent preparations for careers not only in academic, but also in nonacademic professions. A background in classics is, moreover, highly advantageous for applicants to graduate and professional schools in English, modern languages, history, philosophy, law, medicine, and theology. Finally, for the qualified student who is undecided about a major but interested in a sound liberal arts education, classics may be the best option.

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. Twenty-four of these must be in Greek and/or Latin. A classics major must complete as a minimum a 700-level course in one of the classical languages. A minimum of three courses must be taken at the Durham campus. Students will be encouraged to take courses in related fields such as ancient history, classical art, modern languages, and English, and to take part in overseas study programs in Greece and Italy. For the requirements of the Greek and Latin majors, see page 42.

A minor in classics consists of five courses (20 credits) in classics, Greek, and/or Latin.

The coordinator is Arna Bronstein, Murkland Hall; Languages, Literatures, and Cultures, (603) 862-3545, e-mail arnab@cisunix.unh.edu.

French

(For descriptions of courses, see page 186.)

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, Foreign Service, and teaching. Students considering a career in teaching should see page 33. 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 FREN 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. 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 year-long UNH Junior Year in the Dijon Program is highly recommended. Only in exceptional circumstances will a student be able to attend a non-UNH program. Such an option will need to be carefully considered with a major adviser. Transfer students must earn a minimum of 12 major credits at the Durham campus. 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 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 adviser 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. 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 year-long UNH Junior Year in Dijon Program is highly recommended. Other options are available, but non-UNH programs must be chosen in close consultation with a major adviser. Students are required to enroll in at least one French course each semester abroad.

The French Minor A minor in French consists of 20 credits in French courses num-

bered 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, 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. 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: French 503, 504, 525 or 526, 631 and 632. French 425 or 426 are prerequisite for completing the minor. Those entering this course of study at the level of 504 will be expected to complete French 651. No fewer than three courses have to be taken at UNH. No more than one course conducted in English will be counted toward the minor. In addition, FREN 791 does not count toward the minor. Members of the department supervise the work of both majors and minors.

Study Abroad The department offers a junior year abroad at the University of Burgundy in Dijon, France (see FREN 685-686). This program is open to all qualified students at the University of New Hampshire who have completed FREN 631-632, 651, and 652 by the end of their sophomore year. Early consultation with the director of the program is urged.

In addition to its summer school offerings at the Durham campus, the department sponsors a program at the Centre International d'Études des Langues (CIEL) in Brest, France, where students may enroll in courses equivalent to FREN 503, 504, 631, and 632. Students interested in this program should consult the program's on-campus director early spring semester.

Paris Program Students attend the University of Delaware program in Paris where they take one French language course—ranging from intermediate (FREN 503) to advanced (FREN 632)—and three or four other courses taught in English on French topics. Full semester credit, gen. ed. 5 credit. Two courses can be applied toward the French minor. Students should consult with the program director at the beginning of the fall semester. This program is not for French majors or French Studies majors.

Teaching Assistantship in France Each year the French government offers a teaching assistantship in a French secondary school to a graduating French major nominated by the department. Applications are accepted during the fall semester.

Five-Year, Dual-Degree Program in French and Business Administration The dual-degree program permits students who matriculate with business backgrounds to earn both a B.A. in French and an M.B.A. in five years instead of the normal six. Students must meet all requirements for both the French major and the M.B.A. program offered by the Whittemore School of Business and Economics. A maximum of 16 credits may be counted toward both degrees. Students interested in this program should consult with the departmental adviser to the program early in their freshman year.

German

(For descriptions of courses, see page 187.)

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 literature 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 are also possible. For certification requirements, see the section coordinator.
- Those who intend to pursue graduate study in German language and literature, cross-cultural studies, film, or women's studies, or foreign language education in preparation for teaching careers at the high school or university level.

A major consists of a minimum of 36 credits in German language, literature, and culture beyond GERM 503. No more than 8 of 36 credits may be taken in English toward the major (GERM 521 or 523; 525). Required for the major are GERM 504, 525, 601, 631, 632 (or their equivalents) and 16 other credits, 12 of which must be taken in Durham on the 600 and 700 levels. GERM 520 and 791 do not count for major credit (720 is the equivalent of 520 for majors); 791 is recommended as an elective and required

for teacher certification. Majors are required to spend the minimum of one semester in an approved German-speaking study abroad program, or equivalent.

A minor consists of 20 credits in German courses numbered 503 and above. The minor may include one course taught in English (520, 521, 523, or 525) but not 791.

Study Abroad (See also INCO 685, 686, GERM 585.) Students who have completed one year of German at the college level, e.g., GERM 401-402, may participate in the UNH intensive review course in Rosenheim, Germany (see GERM 585). The University allows both German majors and minors and other students at levels beyond GERM 504 to attend approved Junior Year Abroad programs for UNH credit. UNH is part of the New England Universities consortium (Maine, Vermont, Connecticut, and Rhode Island) which sponsors a program in Salzburg, Austria. UNH students get a discount on Salzburg Program tuition and have an easy transfer of credits. Students may also attend other accredited semester or year programs at universities such as Berlin, Freiburg, Heidelberg, Innsbruck, Marburg, Munich, Tübingen or Vienna. Most Junior Year Abroad programs require a minimum of two years of college German. For intensive language study at any level, students may attend Goethe-Institut centers in Germany for one or more eight-week courses. For details, see the foreign study coordinator, Center for International Education, or the German coordinator. 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.

Greek

(For descriptions of courses, see page 188.)

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. 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.

Italian Studies

(For descriptions of courses, see page 188.)

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, HTIS 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, a year, or a summer (see ITAL 685-686). The program allows students to register for UNH courses taught by UNH faculty. Students with advanced language skills may also enroll in courses at the University of Ascoli Piceno. Internships are also available. There is no language prerequisite.

Latin

(For descriptions of courses, see page 189.)

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 as a minimum a 700-level course in the Latin language. A minimum of three courses must be taken at the Durham campus. 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.

Portuguese

(For descriptions of courses, see page 190.)

Russian

(For descriptions of courses, see page 190.)

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 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 401-790 range, a grade of C or better is required to advance to the next course in the language series.

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 strongly encouraged 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. Transfer students must earn a minimum of 12 major credits at the Durham campus.

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 or 790.

Students wishing to major in Russian should contact the program coordinator in Murkland Hall.

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 (5 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.

Spanish

(For descriptions of courses, see page 191.)

The major in Spanish is offered by the Department of Languages, Literatures, and Cultures. It is designed for students who wish to acquaint themselves more thoroughly with the language, culture, and literature of the Spanish-speaking peoples. In addition, the department offers courses in Portuguese.

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 semester or a full academic year. Financial aid is available for eligible students. Contact the departmental program directors for further information.

The major consists of a minimum of 40 credits. All coursework required for the Spanish major or minor must be completed with a grade of C or better. Specific course requirements are (1) language and culture: 525 or 526, 601, 631, and 632; (2) three of the following 600-level courses: 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 Spanish minor consists of 20 credits above 501, including 631 and 632.

For more information on the major, the minor, and options for the study abroad experience, please see the coordinator of Spanish.

Linguistics

(For descriptions of courses, see page 192.)

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, 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.

A minor in linguistics is also available and consists of any five linguistics courses approved by the linguistics coordinator.

Requirements for the major

All of the following

LING 505, Introduction to Linguistics
LING 605, Introduction to Linguistic Analysis
LING 793, Phonetics and Phonology
LING 794, Syntax and Semantic Theory

One course in historical linguistics

LING 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 734, 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)
PHIL 745, Philosophy of Language (with its prerequisite PHIL 412, Beginning Logic, or PHIL 550, Logic)

The following courses from the Department of Computer Science

CS 415-416: Introduction to Computer Science I and II; CS 730: Introduction to Artificial Language; CS 765, Introduction to Computational Linguistics

Three elective courses from the list below

Anthropology: 795, 796, Reading and Research in Anthropology; B. Anthropological Linguistics
 Communication: 572, Language and Behavior; 672, Theories of Language and Discourse
 Communication Disorders: 522, The Acquisition of Language
 Computer Sciences: 765, Introduction to Computational Linguistics
 English: 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; 778, Brain and Language; 779, Linguistic Field Methods; 790, Special Topics in Linguistics; 791, English Grammar
 French, German, Greek, Latin, Russian, Spanish: 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
 Linguistics: 506, Introduction to Comparative and Historical Linguistics; 620, Applied Experience in Linguistics; 719, Sociolinguistics Survey; 779, Linguistics Field Methods; 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: 734, History and Development of the Russian Language
 Sociology: 797F, Sociolinguistics
 Spanish: 601, Spanish Phonetics; 733, History of the Spanish Language; 790, Grammatical Structure of Spanish

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.

Music

(For descriptions of courses, see page 202.)

The Department of Music offers two degree programs: the bachelor of arts 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 Program

The bachelor of arts 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.

To be admitted formally to the B.A. program, students must give evidence of satisfactory musical training by taking an admission audition. 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.

The bachelor of arts degree is offered with four options: music history, performance study, music theory, and preteaching. The B.A. may also be taken as a degree in music with no option specified. We refer to this as the undifferentiated B.A. in music. The following courses are required of all students: Theory I and Ear Training I (MUSI 471-472, 473-474), Theory II and Ear Training II (MUSI 571-572, 573-574), History and Literature of Music (MUSI 501-502), Advanced Music History, and one of MUSI 703-715 (3 credits), and one course from MUSI 771 (Counterpoint) or MUSI 781, 782 (Analysis: Form and Structure). Additional requirements, grouped by option, are shown below.

B.A. students may use a maximum of eight ensemble credits toward graduation.

Undifferentiated B.A. in Music

Any combination of advanced theory and history (12 credits); performance and/or ensemble study, any combination from MUSI 536-564 or MUSI 736-764 inclusive and/or MUSI 441-461 inclusive (8 credits).

Option 1, Music History

Advanced theory (3 credits); advanced music history (9 credits); performance study, any one of MUSI 536-564 or MUSI 736-764 inclusive (8 credits); conducting, MUSI 731 (2 credits); ensemble study, any combination from MUSI 441-461 inclusive (4 credits).

Option 2, Music Theory

Advanced theory (12 credits); performance study, any one of MUSI 536-564 or MUSI 736-764 inclusive (8 credits); conducting, MUSI 731 (2 credits); ensemble study, any combination from MUSI 441-461 inclusive (4 credits).

Option 3, Performance Study

Performance study, any one of MUSI 536-564 or MUSI 736-764 (16 credits-2 credits per semester); conducting, MUSI 731 (2 credits); ensemble study,

any combination from MUSI 441-461 inclusive (8 credits). Voice students must also complete MUSI 520-521 (4 credits).

Option 4, Music Preteaching

EDUC 500; conducting, MUSI 731-732; orchestration, MUSI 779; techniques and methods (9 credits); choral methods, MUED 741 (2 credits); performance study, any one of MUSI 536-564, 736-764 (8 credits); departmental piano proficiency exam; ensemble study (8 credits). Of the 8 credits in ensemble performance (MUSI 441-461) required during the course of study, it is expected that at least four credits will be from Concert Choir (MUSI 441), Orchestra (MUSI 450), Wind Symphony (MUSI 452), and/or Symphonic Band (MUSI 453). At least 1 credit of performance in a jazz ensemble (MUSI 460 or 461) and 1 credit of Marching Band (MUSI 454) are highly desirable. The music preteaching option is a part of the five-year undergraduate-graduate certification program (see page 33). The department also offers a four-year program leading to teacher certification, the bachelor of music in music education.

For all the options listed above, but excluding the undifferentiated B.A. in music, a public performance is given during the senior year. For students in the music history option, this must be a half lecture or half lecture-recital; for those in performance study, a full recital; for students in the music theory 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.

Bachelor of Music 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 page 33).

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. Selectivity is exercised as appropriate to the professional requirements of each programmatic 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 in music education must maintain a minimum 2.50 grade-point average in the option and have a 2.20 cumulative average at the time of application for student teaching (February 15 of junior year). Further, all music education students must have passed the departmental piano proficiency exam by the end of their sophomore year. Techniques and methods courses must include MUED 745 (strings), 741 (choral), 747 (woodwinds), 749 (brass), 751 (percussion), and 765 (instrumental).

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.

Regarding ensemble requirements for music education students: Of the 8 credits in ensemble performance (MUSI 441-461) required during the course of study, it is expected that at least 4 credits will be from Concert Choir (MUSI 441), Orchestra (MUSI 450), Wind Symphony (MUSI 452), and/or Symphonic Band (MUSI 453). At least 1 credit of performance in a jazz ensemble (MUSI 460 or 461) and 1 credit of Marching Band (MUSI 454) are highly desirable.

Students in the Bachelor of Music in Music Education and the Bachelor of Music in Theory degree programs may use a maximum of eight ensemble credits toward graduation.

Students in the Bachelor of Music in Performance degree program are required to perform a half junior recital.

All bachelor of music students are required to give a public performance during their senior year. For music education students, a half recital is required; 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.

The following shows required courses for each degree.

Bachelor of Music in Music Education

First Year: general education requirements (four courses, 16 credits); techniques and methods: string, MUED 745 (2 credits); and percussion, MUED 751 (2 credits); music theory and ear training: MUSI 471-472 (6 credits), MUSI 473-474 (2 credits); performance study at the "500 level" on major instrument (1 credit per semester); piano, MUSI 467 or 541 (1 credit/semester); ensemble (2 credits). See note on ensemble requirements above. Total credits: 34.

Sophomore Year: general education requirements (one course, 4 credits); EDUC 500 (4 credits); techniques and methods: woodwind, MUED 747 (3 credits) and brass, MUED 749 (2 credits); music theory and ear training: MUSI 571-572 (6 credits), MUSI 573-574 (2 credits); music history, MUSI 501-502 (6 credits); conducting, MUSI 731 (2 credits); piano, MUSI 467 or 541 (1 credit/semester); performance study at the "500 level" in major instrument (1 credit/semester); ensemble (3 credits). See note on ensemble requirements above. Total credits: 36.

Junior Year: general education requirements (three courses, 12 credits); education, EDUC 701 (4 credits); elementary music education, MUED 790 (3 credits); secondary music education, MUED 791 (2 credits); techniques and methods, choral, MUED 741 (2 credits); orchestration, MUSI 779 (3 credits); conducting, MUSI 732 (2 credits); performance study at "700 level" in major instrument (1 credit/semester); ensemble (2 credits). See note on ensemble requirements above. Total credits: 32.

Senior Year: general education requirements (one course, 4 credits); education, EDUC 700, 705, and 751B (10 credits); student teaching, EDUC 694 (8 credits); instrumental methods, MUED 765 (2 credits); music history, one course from 703-715 (3 credits); music theory: one course from MUSI 771, 781, or 782 (3 credits); performance study at "700 level" in major instrument and senior recital (2 credits); ensemble (1 credit). See note on ensemble requirements above. Total credits: 33.

Bachelor of Music in Performance

The following courses are required of all Bachelor of Music in Performance students:

Theory I and Ear Training I (MUSI 471-472, 473-474)
Theory II and Ear Training II (MUSI 571-572, 573-574)

History and Literature of Music (MUSI 501-502)
Conducting (MUSI 731)

3 credits of advanced music history
8 credits of ensemble study, any combination from MUSI 441-461 inclusive

Performance study, any one of MUSI 536-564, 736-764. 3 credits per semester, 4 credits in the final semester.

Additional requirements for particular instruments are grouped below.

Voice

Piano (MUSI 541) four semesters. Must be completed before senior year.

Diction I and II (MUSI 520-521)

Choral Methods (MUED 741)

The Art Song (MUSI 713) or Survey of Opera (MUSI 715)

Counterpoint (MUSI 771) or Analysis (MUSI 781 or 782)

Foreign language 401-402. Must be Italian, German, or French.

Group 5 general education requirement must be satisfied with a foreign language.

Ensemble study must be vocal/choral.

Piano

Any two of Counterpoint (MUSI 771) or Analysis (MUSI 781 or 782).

Piano Literature (MUSI 795E, 1-2 credits)

Piano Methods (MUED 743)

Advanced Piano Pedagogy (MUSI 795V)

2 credits of the required ensemble study must be Piano Ensemble (MUSI 455)

3 credits advanced history or theory

Organ

Any two of Counterpoint (MUSI 771) or Analysis (MUSI 781 or 782)

Conducting II (MUSI 732)

Beginning Techniques in Voice (MUED 540)

Independent study in liturgical music, organ literature, or hymnology (MUSI 795)

Piano Methods (MUED 743)

2 credits of the required ensemble study must be Piano Ensemble (MUSI 455)

3 credits advanced history or theory

All Other Instruments

Piano (MUSI 541) four semesters

One methods class from MUED 745, 747, 749, or 751
Counterpoint (MUSI 771) or Analysis (MUSI 781 or 782)

4 additional credits of ensemble study (MUSI 441-461)

3 credits advanced history or theory

Bachelor of Music in Theory

First Year: general education requirements (2 courses, 8 credits); music theory and ear training: MUSI 471-472 (6 credits), MUSI 473-474 (2 credits); performance study at "500 level" on major instrument (2 credits); piano, MUSI 541 (2 credits); ensemble, any combination from MUSI 441-461 inclusive (2 credits); German (8 credits).

Sophomore Year: general education requirements (4 courses, 16 credits); music theory and ear training: MUSI 571-572 (6 credits), MUSI 573-574 (2 credits); music history, MUSI 501-502 (6 credits); performance study at "500 level" on major instrument (2 credits); piano, MUSI 541 (2 credits); ensemble, any combination from MUSI 441-461 inclusive (2 credits).

Junior Year: general education requirements (2 courses, 8 credits); counterpoint, MUSI 771-772 (6 credits); composition, MUSI 775-776 (6 credits); conducting, MUSI 731 (2 credits); analysis, MUSI 781, 782 (6 credits); performance study at "700 level" on major instrument (2 credits).

Senior Year: advanced theory (3 credits); advanced composition, MUSI 777 (6 credits); two 3-credit courses in advanced music history (6 credits); performance study at "700 level" in major instrument (2 credits); orchestration, MUSI 779 (3 credits); general education requirements (2 courses, 8 credits); 1 elective course (4 credits).

Minor in Music

All students minoring 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 402 and 511.

Philosophy

(For descriptions of courses, see page 213.) Each semester, detailed course descriptions are posted in the department office and on the department Web page at www.unb.edu/philosophy/.

Philosophy has always been 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 dreamt 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 has also always 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), 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 ten 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, 616, 618, 620, or an approved seminar). Majors must also take two seminars (i.e., courses at the 700 level). At least one course must concentrate on major works of 20th-Century European philosophy (525, 620, or an approved seminar) and one course must concentrate on major works of 20th-Century Anglo-American philosophy (618 or an approved seminar). Please note that a single course can satisfy multiple requirements for the major. Courses used to satisfy requirements for the major may be used to satisfy general education requirements. PHIL 495, 795, and 796 normally do not count toward fulfilling major requirement credits; exceptions may be granted by special permission.

Special-Interest Program

Students may add to the above major a special-interest program 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 ten program courses, such students should select, with their advisers' approval, two additional philosophy courses above the 400 level, for a total of twelve courses. One of these should be PHIL 550.

Departmental Commendation

Students accepted for departmental commendation will register for PHIL 699 (usually during the second semester of the senior year) and will write, under the guidance of an adviser, an original paper in philosophy. If completed successfully, students will receive a letter of commendation.

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).

Five-Year, Dual-Degree Program in Philosophy and Business Administrations

The dual-degree program permits students to earn both a B.A. in philosophy and an M.B.A. in five years instead of the normal six. Students must meet all requirements for both the philosophy major and the M.B.A. program offered by the Whittemore School of Business and Economics. A maximum of 16 credits may be counted toward both degrees. Students interested in this program should consult the departmental adviser to the program early in their sophomore year.

Political Science

(For descriptions of courses, see page 218.)

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 can also be re-

garded as essential for good citizenship, since political knowledge helps to explain the formal and informal institutions by which we are governed and the forces which 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 the most helpful foundation for further study in the field. Such an emphasis will also 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 nine courses (36 credits) and not more than twelve courses (48 credits) to be distributed in the following way:

1. Two 400-level courses. These introductory courses should be completed by majors by the end of the sophomore year.
2. Six 500- and/or 600-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 Department of Political Science will not allow the use of 400-level courses to "double count" as a major requirement and a general education requirement. However, if a student has successfully completed three or more 400-level courses, special permission can be obtained to use one of the 400-level introductory political science courses as a general education requirement.

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. 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 adviser to determine eligibility toward the minor.

Internships and Advanced Study

In addition to the courses regularly offered, the department will have available selected topics, advanced study in political science, and internships. Interested students should check with the department office to learn of the offerings for a given semester.

The department also offers several internship opportunities giving students experience in various aspects of government, policy making, and the legal system at the local, state, and national levels. Students need not be political science majors, but a 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 3.00 average or higher to be eligible for consideration. 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.

Psychology

(For descriptions of courses, see page 221.)

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 2.00 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. Students with a first major in psychology may not use any psychology courses to fulfill general education requirements.

Requirements for the Major

A. *Three core courses-PSYC 401, 402, and 502.*

B. *Four breadth (500-level) courses as follows*

Group I: two courses from two different tracks

Cognitive track: PSYC 512 or 513

Behavioral track: PSYC 521

Biological/Sensory track: PSYC 531

Group II: Two courses from two different tracks

Social/Personality track: PSYC 552 or 553

Abnormal/Counseling track: PSYC 561

History track: PSYC 571

Developmental track: PSYC 581 or 582

C. *Three depth (700-level) courses as follows*

Group I: one from any track

Cognitive track: PSYC 712, 713, 741B

Behavioral track: PSYC 721, 722, 723, 732, 741C

Biological/Sensory track: PSYC 710, 711, 731,

733, 735, 737, 741D

General track: PSYC 741A

Group II: one course from any track

Social/Personality track: PSYC 704, 752, 755,

756, 758, 791B, 791C

Abnormal/ Counseling track: PSYC 762, 763,

793, 791D

History track: PSYC 770, 771, 791E

Developmental track: PSYC 780, 783, 785, 791F, 791G

General track: 791A

The third 700-level course may be any additional 700-level course numbered 702-793.

D. *One psychology elective that can be any 500- or 700-level course offered by the psychology department (4-credit minimum; letter grade required; no pass/fail or credit/fail courses).*

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.

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 4 credits each must make up for any credit deficit created by acceptance of transfer credits into the psychology major. Of the three 700-level courses required for the major, at least two must be taken at UNH.

Specific course selections should be discussed with advisers. Exceptions to the requirements for the major require 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.

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 12 psychology transfer credits can be applied to the psychology minor at UNH.

See the department administrative 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 Center until they complete PSYC 401 and 402, at which time they can confirm their major. "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 students, etc.). The academic counselor assists students in all phases of educational planning and decision making, including preregistration, 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 3.20 grade-point average are eligible for these awards. Faculty nominate students from the eligibility list and final se-

lection 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 3.20 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.

Undergraduate Research Conference

The Department of Psychology sponsors the annual George M. Haslerud Undergraduate Research Conference each spring. Undergraduates are invited to submit empirical or theoretical papers for presentation at the conference. Contact the department's academic counselor for more information.

Russian

(For program description, see Languages, Literatures, and Cultures/Russian, page 43. For descriptions of courses, see page 190.)

Sociology

(For descriptions of courses, see page 227.)

Sociology is the study of how society works. The sociology major studies human behavior at the micro level of small groups, the macro level of social movements and comparative development, and the intermediate level of neighborhoods or organizations like corporations and schools. Sociological perspectives emphasize links between the individual and the larger social processes and structures in society, and the discipline values empirical analysis of the social world.

Majoring in sociology provides a solid, multifaceted foundation in the liberal arts, including analytical thinking and writing, as well as 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 sociology department includes courses concentrating on family and

work; environmental sociology; social policy; inequalities of race, class, and gender; and 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, or government or private services, where a major might work in education, health services, social welfare, or research. An undergraduate degree in sociology is also excellent preparation for graduate work in law, social work, counseling, public administration, or further studies in sociology.

To declare a major in sociology, students must have completed Introductory Sociology (SOC 400) with a grade of C or better. New students who declare the major upon admission to UNH must fulfill this requirement during their first semester. The major consists of a minimum of 40 semester credits; SOC 400, 502 (or acceptable substitutes), 599, 601, and 611 are required. Majors must earn a grade of C- or better in each course and must achieve a grade-point average of 2.00 in all sociology courses. At least three of the additional five electives in the major must be at the 600- or 700-level. SOC 502 is a prerequisite for 601; SOC 599 must be completed no later than the junior year and is a prerequisite for majors taking 600- and 700-level courses.

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. There is also the possibility of second majors. Students interested in social work or teaching can develop programs in conjunction with the appropriate departments. The department's honors program is recommended for students with cumulative grade-point averages over 3.20, 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 2.00 or better in these courses.

Spanish

(For program description, see Languages, Literatures, and Cultures/Spanish, page 43. For descriptions of courses, see page 191.)

Theatre and Dance

(For descriptions of courses, see page 229.)

The Department of Theatre and Dance has one of the largest and most varied undergraduate theatre programs in the Northeast, with concentrations in acting, musical theatre, design and technical theatre, dance, secondary education, youth drama, and youth drama for special education. Performance opportunities include six mainstage 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 specialize in acting, directing, teaching, choreography, design and technical theatre, special education, playwriting, youth drama, storytelling, puppetry, secondary school certification, ballet, theatre dance (jazz and tap), musical theatre, and touring theatre. Students interested in performance, technical, and historical aspects will be well 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 freshman and undergraduates each spring.

Requirements for the Major

In addition to general liberal arts preparation, seven specific course sequences are available within the theatre major:

1. courses leading to a theatre major that, if so desired, may be combined with requirements of the Department of Education, in conjunction with a fifth year Masters of Arts in Teaching (MAT) program, to prepare students for secondary school certification with an undergraduate specialization in secondary theatre education;
2. courses leading to a theatre major that, if so desired, may be combined with requirements of the Department of Education, in conjunction with a fifth year of Masters of Arts in Teaching (MAT) program to prepare students for elementary school certification with an undergraduate specialization in youth drama;
3. courses leading to a theatre major that, if so desired, may be combined with requirements of the Department of Education, in conjunction with a fifth year Mas-

ters of Arts in Teaching (MAT) program to prepare students for elementary school certification with an undergraduate specialization of youth drama for special education;

4. courses leading to a theatre major with an emphasis in dance (ballet, tap, jazz, and theatre dance);
5. courses leading to a theatre major with an emphasis in musical theatre;
6. courses leading to a theatre major with an emphasis in design and technical theatre;
7. courses leading to a theatre major with an emphasis in acting.

The basic theatre major allows students to explore a variety of areas. In the freshman and sophomore years, students should enroll for at least two theatre courses per semester and two general education courses per semester. Students meet with the chair of the department, until they are assigned advisers appropriate to the individual's area of interest. The minimum grade requirement is C- per course. Any grade lower than a C- will not count toward the major.

Theatre (B.A.)

General Theatre

I. 28 credits required

THDA 435, Introduction to Theatre; 436 or 438, History of Theatre I or II; 459, Stagecraft; 551, Acting I; 653 or 654, Performance Project/Scenic Arts; 689 A-D, Theatre/Dance Practicum; 798, Senior Seminar

II. 4 credits from theory/history

THDA 450, History of Musical Theatre in America; 520, Creative Drama; 541, Arts and Theatre Management; 621, Education through Dramatization; 627, Methods of Teaching Theatre; 632, Interpretation of Shakespeare in the Theatre; 656, Musical Theatre Repertoire and Audition; 657, Play Reading; 750, Writing for Performance

III. 4 credits from design/technical

THDA 458 Costume Construction; 475, Stage Make-Up; 532, The London Experience; 546, Costume Design for the Theatre; 547, Stage Properties; 548, Stage Lighting Design and Execution; 583, Introduction to Puppetry; 641, Stage Management; 650, Scene Painting for the Theatre; 651, Rendering for Theatre; 652, Scene Design; 683, Advanced Puppetry

IV. 4 credits from performance

THDA 470, Movement and Vocal Production; 552, Acting II; 555, Exploring Musical Theatre; 592A, Special Topics; 622, Storytelling, Story Theatre, and Involvement Dramatics; 624, Theatre for Young Audiences; 655, Musical Theatre Styles; 741, Directing; 755, Advanced Musical Theatre; 758, Acting III

V. 8 credits from any 600-800 level course, including those in sections II, III, IV

THDA 691, Internship in Theatre and Dance; 781, Theatre Workshop for Teachers; 782, Advanced Theatre Workshop for Teachers; 795, Independent Study

Total: 48 cr.

Contact Gay Nardone, Paul Creative Arts, (603) 862-1728, e-mail hgn@cisunix.unh.edu.

The Secondary Teacher Emphasis in Theatre

High school theatre teachers are often responsible for directing plays and musicals (the latter in collaboration with a music teacher). They must have a broad knowledge of all requisite theatre skills. Majors must have a minor, or double major, in a traditional teaching discipline e.g., English, music, history, etc.

Theatre (B.A.)

Emphasis in Secondary Theatre Education

I. 46 credits from theatre area

THDA 435, Introduction to Theatre; 436 or 438, History of Theatre I or II; 459, Stagecraft; 520, Creative Drama; 551, Acting I; 555 Exploring Musical Theatre; 624, Theatre for Young Audiences; 627, Methods of Teaching Theatre; 653, Performance Project or 654, Scenic Arts Project; 689, Theatre/Dance Practicum A-D; 741, Directing; 798, Senior Seminar

II. 4 credits from education

EDUC 500, Exploring Teaching

Total: 50 cr.

It is understood that students involved in the above course curriculum must apply to either the UNH Department of Education or another university for acceptance into a fifth-year M.A.T. (Master of Arts in Teaching) degree and eventual certification.

Contact Gay Nardone, Paul Creative Arts, (603) 862-1728, e-mail hgn@cisunix.unh.edu.

The Youth Drama Emphasis in Theatre

Students considering a career in Elementary Education may be interested in an undergraduate specialization in Youth Drama. When coupled with a Master's Degree in Education, the student is well equipped to succeed in the classroom. All of the graduates of this program in theatre are presently employed as teachers of elementary school-aged children. They believe that the theatrical and practical experiences they obtained as undergraduates prepared them to obtain their teaching positions and for their classroom successes. The energy, concentration, and immediacy of the dramatic involvement seem to produce excellent results. The course sequence for the major option in Youth Drama is included here.

Theatre (B.A.)

Emphasis in Youth Drama

I. 34 credits required

THDA 435, Introduction to Theatre; 459, Stagecraft; 520, Creative Drama; 583, Introduction to Puppetry; 621, Education through Dramatization; 622, Storytelling, Story Theatre and Involvement Dramatics; 624, Theatre for Young Audiences; 653, Performance Project; 689 A-D, Theatre/Dance Practicum

II. 4 credits from the dance area

THDA 463, Theatre Dance I

III. 4 credits in practicum

EDUC 500, Exploring Teaching

IV. 4 credits from education

EDUC 700, Educational Structure and Change
EDUC 701, Human Development and Learning
EDUC 703F, Teaching Science
EDUC 703M, Teaching Elementary Science and Social Studies
EDUC 705, Alternative Perspectives
EDUC 706, Introduction to Reading Instruction

V. 4 credits from

MATH 621, Number Systems for Teachers
MATH 622, Geometry for Teachers
EDUC 703, Alternate Teaching Models
EDUC 706, Introduction to Reading Instruction

Total: 50 cr.

It is understood that students involved in the above course curriculum must apply to either the UNH Department of Education or another university for acceptance into a fifth-year M.A.T. (Master of Arts in Teaching) degree and eventual certification.

Contact Gay Nardone, Paul Creative Arts, (603) 862-1728, e-mail hgn@cisunix.unh.edu.

The Dance Emphasis in Theatre

The Department of Theatre and Dance offers a B.A. in Theatre with a Dance Emphasis in Ballet and Theatre (Tap/Jazz) Dance.

Theatre (B.A.)

Emphasis in Dance

I. 18 credits required

THDA 435, Introduction to Theatre; 459, Stagecraft; 653, Performance Project or 654, Scenic Arts; 689A, Theatre/Dance Practicum; 689B, Theatre/Dance Practicum; 689C, Theatre/Dance Practicum; 689D, Theatre/Dance Practicum; 798, Senior Seminar

II. 8 credits from Theory

THDA 487, The Dance; 586, Dance Pedagogy; 633, Dance Composition; 732, Choreography

III. 8 credits from Fine Arts

THDA 551, Acting I; 546, Costume Design for the Theatre; 548, Stage Lighting Design and Execution; 555, Exploring Musical Theatre; 655, Musical Theatre Styles
ARTS 431, Visual Studies; 572, Art of the Age of Humanism; 573, Art of the Modern World

MUSI 411-412, Fundamentals of Music Theory; 709, Music of the Romantic Period; 711, Music of the 20th Century
PHIL 421, Philosophy of the Arts

IV. 16 credits from performance

THDA 461, Modern Dance I; 462, Ballet I; 463, Theatre Dance I; 562, Ballet II (may be repeated to 4 credits); 563, Theatre Dance II (may be repeated to 4 credits); 576, Pointe; 597, Dance Theatre Performance (may be repeated); 662, Ballet III (may be repeated); 663, Theatre Dance III (may be repeated); 684, Special Topics

Total 50 cr.

Contact Larry Robertson, Newman Dance Studio, (603) 862-3032.

The Musical Theatre Emphasis

A balanced program in Musical Theatre is offered as an emphasis within the Department of Theatre and Dance. This area of emphasis within the major focuses on dance, music, and theatre. It is assumed that students considering the Musical Theatre Emphasis will have a certain amount of proven ability in at least one of the "triple threat" disciplines. After four years of study it is hoped that the student will have a solid background in vocal techniques, and part singing (usually obtained through choral work). Students in the major are given vocal study awards to offset the cost of private lessons from a teacher of their choice.

Theatre (B.A.)

Emphasis in Musical Theatre

I. 22 credits required

THDA 435, Introduction to Theatre; 450, History of Musical Theatre in America; 459, Stagecraft; 653, Performance Project; 689A-D, Practicum; 798, Senior Seminar

II. 12 credits from 400-500 level courses listed below

THDA 470, Movement and Vocal Production; 551, Acting I; 552, Acting II; 555, Exploring Musical Theatre

III. 12 credits from 600-700 level courses listed below

THDA 655, Musical Theatre Styles; 656, Musical Theatre Repertoire & Audition; 755, Advanced Musical Theatre; 756, Producing and Directing the Musical

IV. 6 credits from theatre dance

THDA 463, Theatre Dance I; 563, Theatre Dance II (May be repeated); 663, Theatre Dance III (May be repeated)

V. 10 credits from specialty area

The student and the adviser will select courses in Music, Theatre and Dance appropriate to the needs of the student.

Total: 62 cr.

Contact Carol Lucha-Burns, Paul Creative Arts, (603) 862-3288, LuchaBurns@attbi.com.

Youth Drama in Special Education

Students considering a career in special education may be interested in an undergraduate specialization using youth drama as a methodology in their future classrooms. When coupled with a Master's Degree in Special Education, the student is well equipped to succeed in the classroom.

Students who want specific instruction in special/exceptional populations will be provided theatrical and practical training to prepare them to obtain teaching positions and to have classroom successes. The energy, concentration, and immediacy of drama produces excellent results. The course sequence for the Education and/or Theatre Major option in Youth Drama in Special Education is included here.

Theatre (B.A.)

Emphasis in Youth Drama in Special Education

I. 38 credits required from Theatre and Dance

THDA 435, Introduction to Theatre; 459, Stagecraft; 463, Theatre Dance I; 520, Creative Drama; 583, Introduction to Puppetry; 621, Education through Dramatization; 622, Storytelling, Story Theatre and Involvement Dramatics; 624, Theatre for Young Audiences; 653, Performance Project; 689 A-D, Practicum

II. 16 credits required from Special Education

EDUC 706, Introduction to Reading Instruction; EDUC 750, Introduction to Exceptionality; EDUC 751, Educating Exceptional Learners; MATH 701, Exploring Math for Teachers (or equivalent)

Total 54 cr.

It is understood that students involved in the above course curriculum must apply to either the UNH Department of Education or another university for acceptance into a fifth-year M.A.T. (Master of Arts in Teaching) degree and eventual certification.

Additionally, students would be strongly encouraged to study American Sign Language.

Contact Gay Nardone, Paul Creative Arts, (603) 862-1728, e-mail hgn@cisunix.unh.edu.

The Acting Emphasis

Theatre (B.A.)

Emphasis in Acting

I. 20 credits required

THDA 435, Introduction to Theatre; 436 or 438, History of Theatre I or II; 459, Stagecraft; 689 A-D, Practicum; 798, Senior Seminar

II. 22 credits from performance

THDA 470, Movement and Vocal Production; 551, Acting I; 552, Acting II; 653, Performance Project; 758, Acting III; 759, Acting: Period and Style

III. 4 credits from theory/history

THDA 436 or 438, History of Theatre I or II; 450, History of Musical Theatre in America; 632, The Interpretation of Shakespeare in Theatre; 657, Play Reading; 750, Writing for Performance

IV. 4 credits from design/technical theatre

THDA 458, Costume Construction; 475, Stage Make-up; 541, Arts and Theatre Administration; 546, Costume Design for the Theatre; 547, Stage Properties; 548, Stage Lighting Design and Execution; 583, Introduction to Puppetry; 650, Stage Painting; 651, Rendering for the Theatre; 652, Scene Design

V. 4 credits from musical theatre/dance

THDA 463, Theatre Dance I; 555, Exploring Musical Theatre or 655, Musical Theatre Styles

VI. 8 credits from

THDA 462, Ballet I; 463, Theatre Dance I; 550, The Actor's Voice Through Text; 562, Ballet II; 563, Theatre Dance II; 655, Musical Theatre Styles or 755, Advanced Musical Theatre; 741, Directing I; 742, Directing II

Total: 62 cr.

Contact David Kaye, Paul Creative Arts, (603) 862-0667, e-mail djk@unh.edu.

The Design Emphasis**Theatre (B.A.)****Emphasis in Design and Technical Theatre****I. 26 credits required**

THDA 435, Introduction to Theatre; 436 or 438, History of Theatre I or II; 459, Stagecraft; 551, Acting I; 654, Design/Tech Project; 689 A-D Practicum; 798, Senior Seminar

II. 4 credits from

THDA 546, Costume Design for the Theatre; 548, Stage Lighting Design and Execution; 652, Scene Design

III. 16 credits from

THDA 458, Costume Construction; 475, Stage Make-up; 541, Arts and Theatre Administration; 546, Costume Design for the Theatre; 547, Stage Properties; 548, Stage Lighting Design and Execution; 650, Scene Painting; 651, Rendering for the Theatre; 652, Scene Design

IV. 8 credits from

THDA 462, Ballet I or 463, Theatre Dance I; 532, The London Experience; 583, Introduction to Puppetry; 624, Theatre for Young Audiences; 632, The Interpretation of Shakespeare in Theatre; 657, Play Reading; 691, Internship in Theatre; 741, Directing; 750, Writing for Performance
ARTS 455, Introduction to Architecture; 480, 580/518, Art History; 532, Introduction to Drawing; 546, Introduction to Painting

CS 780, Special Topics in Computer Science (1)
AutoCad, (2) 3-D Studio
ENGL 631, 657, 746, 758, 780, 781, 782
FREN 522
GERM 640
SPAN 752, 757, 771

Total: 54 cr.

Contact Joan Churchill, Paul Creative Arts, (603) 862-4445, e-mail joan@cisunix.unh.edu.

Minor in Theatre and Dance

The general theatre minor consists of 20 credits in theatre. Listed below are a variety of specialized minors that have mandatory requirements.

Musical Theatre Minor**10 credits required**

THDA 555 or 655, Exploring Musical Theatre or Musical Theatre Styles; 450, History of the Musical in America; 653B, Performance Project/Musical Theatre

6 credits from dance

THDA 463, Theatre Dance I; 563, Theatre Dance II; 663, Theatre Dance III

4 credits from upper level musical theatre

THDA 655, Musical Theatre Styles; 656, Musical Theatre Repertoire & Audition; 755, Advanced Musical Theatre; 756, Producing and Directing the Musical

Total: 20 cr.

Contact Carol Lucha-Burns, Paul Creative Arts, (603) 862-3288, LuchaBurns@atbi.com.

Dance Minor**Up to 16 credits from**

THDA 461, Modern Dance I; 462, Ballet I; 463, Theatre Dance I; 562, Ballet II; 563, Theatre Dance II; 576, Pointe; 597, Dance Theatre Performance; 662, Ballet III; 663, Theatre Dance III

At least 4 credits from

THDA 487, The Dance; 586, Dance Pedagogy; 632, Choreography; 633, Dance Composition; 684, Special Topics

Total: 20 cr.

Contact Gay Nardone, Paul Creative Arts, (603) 862-1728, hgn@cisunix.unh.edu.

Youth Drama Minor**16 credits required from**

THDA 520, Creative Drama; 583, Introduction to Puppetry; 622, Storytelling, Story Theatre, and Involvement Dramatics; 624, Theatre for Young Audiences

4 credits required from

THDA 621, Education through Dramatization; 653A,

Performance Project; 653B, Performance Project/Musical Theatre; 795, Independent Study

Total 20 credits

Contact Gay Nardone, Paul Creative Arts, (603) 862-1728, e-mail hgn@cisunix.unh.edu.

Women's Studies

(For descriptions of courses, see page 232.)

Women's studies provides students with an understanding of the status of women 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. Women's studies courses offer students critical perspectives on such basic questions of the social order as assumptions about gender roles and gender identity.

A major or minor in women's studies prepares students for careers where the changing roles of women are having 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 communications, education, affirmative action, 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 2.00 or better. These courses must include the following three: (1) WS 401, Introduction to Women's Studies, 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 595 (Special Topics in Women's Studies) and cross-listed departmental offerings.

Departmental offerings include the following regularly repeated cross-listed courses:

ARTS 487, Themes and Images in Art: Major Mythic Images of Women

ARTS 690, Women Artists of the Nineteenth and Twentieth Centuries

CMN 567, Images of Gender in the Media

CMN 583, Gender and Expression

ECON 698, Topics in Economics: Women in Economic Development

EDUC 507, Mentoring Adolescents

ENGL 585, Introduction to Women in Literature

ENGL 685, Women's Literary Traditions

ENGL 785, Major Women Writers
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 596, Introduction to Gay and Lesbian History
NURS 595, Women's Health
PHIL 510, Philosophy and Women
PSYC 711, Psychology in 20th Century Thought and Society
SOC/ANTH 625, Female, Male, and Society
SOC 630, Sociology of Gender

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.

Electives must show a balance between arts and humanities/social sciences and 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. Strongly recommended are a practicum or internship course and a course that focuses on women of color or cross-cultural perspectives.

Women's Studies Minor

The minor consists of 20 credits of women's studies courses. These must include WS 401, Introduction to Women's Studies, and WS 798, Colloquium in Women's Studies, normally taken at the beginning and end of the course sequence, respectively. In between, students should select other women's studies courses or cross-listed courses from departmental offerings. (For a more complete description of the women's studies minor, see page 30.)

Students who wish to major or minor in women's studies should consult with the coordinator, 203 Huddleston Hall, (603) 862-2194.

Queer Studies Emphasis

The Queer Studies emphasis provides students with opportunities to research and understand the history, status, challenges, contributions, and changes in the lives of gay, lesbian, bisexual, and transgendered individuals and movements. This emphasis enables students to explore the relationship between gender and sexual orientation, and to understand queer discourse across the intellectual landscape, in the humanities, the arts, and the social sciences. The increasingly public face of queer life has generated new fields of study in the academy. As this new area evolves it provides a framework to address the phenomena of queer life and intellectual developments through the exploration of the ideas, social pressures, historical circumstances, constraints, and powers that guide queer communities.

The emphasis consists of interdisciplinary coursework in Queer Studies and is open to all students. Students who wish to pursue the Queer Studies emphasis should consult with the Queer Studies adviser in the Women's Studies office, (603) 862-2194.

COLLEGE OF ENGINEERING AND PHYSICAL SCIENCES

Arthur Greenberg, Dean
Robert Henry, Associate Dean

Department of Chemical Engineering
Department of Chemistry
Department of Civil Engineering
Department of Computer Science
Department of Earth Sciences
Department of Electrical and Computer Engineering
Department of Mathematics and Statistics
Department of Mechanical Engineering
Department of Physics

Bachelor of Science

Chemical Engineering*
Energy
Environmental Engineering
Chemistry*
Civil Engineering*
Computer Engineering*
Computer Science*
Electrical Engineering*
Environmental Engineering*†
Industrial Processes
Municipal Processes
Geology*
Hydrology*
Mathematics*
Mathematics Education*
Elementary
Middle/Junior High
Secondary
Mathematics, Interdisciplinary
Computer Science
Economics
Electrical Science
Physics
Statistics
Mechanical Engineering*
Physics*
Biophysics
Chemical
Materials Science

Bachelor of Arts

Chemistry
Chemistry and Physics Teaching
Earth Science Teaching
Earth Sciences
Oceanography
Mathematics
Physics
Biophysics

*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.

The College of Engineering and Physical Sciences provides an opportunity for students to achieve educational objectives appropriate to their interests in engineering, mathematics, and the 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 number of options 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 for their majors. 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.

Mathematics Placement

First-year students arrive with a wide range of mathematical skills based on high school preparation. We want you to build skills, so you will enjoy an enriched first-semester experience. We will assess your mathematics development during Orientation and enroll you in the class that will allow you to continue that development. The initial entry course is Analysis and Applications of Functions (MATH 418). However, a placement test will be given to allow a student to place out of MATH 418 into MATH 425 (Calculus I). If you have received AP credit for Calculus I and/or Calculus II, you may elect to accept those credits and continue with a math course at the next level.

A semester course load usually consists of four 4-credit courses. First-year students usually take courses numbered in the 400s and 500s.

Accreditation

The baccalaureate-level programs in chemical, civil, electrical, and mechanical engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The baccalaureate-level program in computer science is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. The Department of Chemistry's undergraduate bachelor of science program is approved by the American Chemical Society.

Degrees

Bachelor of Science

The programs leading to the bachelor of science degree, offered in each of the departments of the college, emphasize the preparation of students for a professional career and continuing or graduate education.

The degree requirements for the bachelor of science include the University general education requirements (page 17) and the specific departmental requirements for graduation. A minimum grade-point average of 2.00 must be achieved. Graduation credit requirements established by the departments range from 128 to 134. There are enrollment limitations in some programs, and it is not possible to guarantee all change-of-major requests.

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. The University requirements for the bachelor of arts degree are on page 18.

Interdisciplinary Programs

Majors

Bachelor of Science in Environmental Engineering

The environmental engineering program consists of two emphases: industrial processes (IP) and municipal processes (MP) (see page 62).

Bachelor of Science in Hydrology

The hydrology major is an interdisciplinary major offered by the departments of earth sciences and civil engineering. The coordinator of the program is J. Matthew Davis of the Department of Earth Sciences (for more information, see page 58).

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:

Environmental engineering, see page 63.

Hydrology, see page 60.

Materials science, see page 66.

Ocean engineering, see page 104.

Oceanography, see page 104.

For University requirements as regards minors, see page 20.

Other Programs

Independent Study and Projects

All departments within the college offer courses in independent study or in projects, the content varying with the current scientific and technological needs and with student and faculty interest.

Permission of the instructor and/or the department chairperson is required. (See the course descriptions for the independent study and project courses and for specific requirements.) The initiative for independent study courses in any area rests with the student.

Special Provisions

The requirement of a given course in any prescribed curriculum may be waived by the faculty of a student's college. The student's petition must be approved by his/her major adviser and the dean of the college. This power will usually be delegated by the faculty to the dean or to a committee. (Senate Rule 05.21(s): Waiver of Requirements in a Prescribed Curriculum.)

This rule offers students the opportunity to develop a somewhat individualized plan of study with intellectual incentives and opportunities in addition to those in a regular curriculum.

In addition, upon the recommendation of the department chairperson, superior students 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 students have been admitted to the master's program.

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 of discovering and fostering their creative talents. In funded research projects, students may have an opportunity to receive pay while learning.

A multiplicity of research programs is reflected in special facilities: the Analog Computer Facility, Antenna Systems Laboratory, Bioelectronics Laboratory, Computation Science Center, Electronics Laboratory, Engineering Design and Analysis Laboratory, Fluid Mechanics Laboratory, Materials Laboratories, Mechanics Research Laboratory, Sanitary Engineering Laboratory, Solid State Laboratory, Space Science Center, Wind Tunnel and Water Tunnel Facility, and X-ray Laboratory.

Students have the opportunity to acquire applied experience in business and industry by working with faculty members who undertake client-sponsored professional projects in management and technical areas for business and industry, and for state and local governments.

Study Abroad Programs

Hungary

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 (BUTE) in Budapest, Hungary. Courses at BUTE are taught in English and receive prior approval for degree credit. Students studying in Budapest, therefore, will graduate on schedule at UNH. A general education course on the language, geography, and culture of Hungary, taken at BUTE, is required. The foreign student office at BUTE 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 Carol French, admin-

istrative coordinator of the program; CEPS Dean's Office, Marina Markot, Educational Program Coordinator, Center for International Education, Hood House; or the college's foreign exchange program coordinator, Professor Andrzej Rucinski.

Puerto Rico

Students may spend one or two semesters at the University of Puerto Rico (UPR) at Mayaguez, the second largest of the three major campuses in the UPR system. 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 and faculty members from all UNH majors. Since eighty percent of all courses at UPR are taught in Spanish, participants must be proficient in Spanish. Interested CEPS students should contact Carolyn Tacy, National Student Exchange Office, Hood House.

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 Robert Henry at (603) 862-3131 or Marina Markot, Educational Program Coordinator, Center for International Education, Hood House.

Preparing for Teaching

Students interested in mathematics education (elementary, middle/junior high, or secondary), chemistry and physics teaching, earth science teaching, or general science teaching should refer to the Department of Education section (page 33) and to the appropriate department for a description of the requirements.

Combined Programs of Study

In addition to pursuing a single major, students may combine programs of study as follows:

Minors: See page 20; see also pages 23 and 54 and Departmental Programs of Study in this section.

Second Majors: See page 20.

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 page 19.

Student-Designed Majors: See page 105.

Other combined and interdisciplinary opportunities: See page 102.

Programs of Study

In addition to the following departmental majors and options, departmental minors are offered in chemical engineering, chemistry, electrical engineering, geology, hydrology, mathematics, applied mathematics, mechanical engineering, physics, and statistics.

Chemical Engineering

(For descriptions of courses, see page 142.)

The Department of Chemical Engineering currently offers the undergraduate degree program in chemical engineering with options in 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. See page 61.

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.

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.

The curriculum trains students to enter the diverse areas of employment or graduate study. The considerable number of electives in the curriculum provides flexibility for individuals to design programs that fulfill their needs and interests. They also provide an opportunity for students to elect departmental options or interdisciplinary minors.

A minimum of 130 credits is required for graduation with the degree of bachelor of science in chemical engineering. There are nine electives in the chemical engineering curriculum. Five of these are for the general education requirements. The remaining four

electives should consist of three chemical engineering electives and one additional technical elective.

Students are required to obtain a minimum 2.00 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.

Freshman Year	Fall	Spring
ENGL 401, Freshman English	—	4
MATH 425-426, Calculus and II	4	4
PHYS 407, General Physics I	—	4
CHEM 405, General Chemistry	4	—
CHE 410, Survey of Current Energy and Pollution Control Technology	—	4
Electives (2)	8	—
Total	16	16

Sophomore Year	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	—
CS 410, Introduction to Scientific Programming	—	4
PHYS 408, General Physics II	4	—
CHE 501-502, Introduction to Chemical Engineering I and II	3	3
Elective	—	4
Total	16	16

Junior Year	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 603, Applied Mathematics for Chemical Engineers	4	—
CHE 604, Chemical Engineering Thermodynamics	—	4
CHE 612, Chemical Engineering Laboratory I	—	3
Electives (2)	4	4
Total	16	17

Senior Year	Fall	Spring
CHE 605, Mass Transfer and Stagewise Operations	3	—
CHE 606, Chemical Engineering Kinetics	3	—
CHE 608, Chemical Engineering Design	—	4
CHE 613, Chemical Engineering Laboratory II	3	—
CHE 752, Process Dynamics and Control	—	4
Electives (4)	8	8
Total	17	16

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 during the sophomore year to the department faculty. They may consult with Stephen S. T. Fan.

Required Courses	Credits
CHE 705, Natural and Synthetic Fossil Fuels	4
CHE 712, Introduction to Nuclear Engineering	4
ME 705, Thermal System Analysis and Design	4
Total	12

Elective Courses

CHE 695, Chemical Engineering Project	3-4
CHE 696, Independent Study	3-4
ENE 772, Physicochemical Processes for Water and Air Quality Control	4
Total	6-8

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 3 credits. Students interested in the environmental engineering option should declare their intention during the sophomore year to the department faculty. They may consult with Stephen S. T. Fan.

Required Courses	Credits
ENE 709, Fundamentals of Air Pollution and Its Control	4
ENE 772, Physicochemical Processes for Water and Air Quality Control	4
ENE 742, Solid and Hazardous Waste Engineering	3
Total	11

Elective Courses

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
Total	6-8

Chemistry

(For descriptions of courses, see page 143.)

"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).

Study in chemistry leads everywhere—to careers in education, law, forensics, medicine, biotechnology, environmental protection, pharmaceuticals, materials science including semiconductors, and industrial chemicals production.

Students interested in chemistry may major in one of three programs offered in the department, depending upon their plans for a career. Since the required chemistry courses in each degree program are the same in the first year, it is easy to change from one program to another.

In each of the programs, students should register for the following courses in the first year: CHEM 403 (first semester), General Chemistry; CHEM 404 (second semester), General Chemistry; MATH 425 (first semester), Calculus I; MATH 426 (second semester); Calculus II; and CHEM 400, Freshman Seminar (each semester). Students interested in a chemistry program should consult with the coordinator of undergraduate studies in the department.

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 general education requirements.
2. For specific course requirements, see the accompanying chart.

Bachelor of Arts, Chemistry Major

This curriculum offers students the opportunity to combine a chemistry major with other interests, for example, the prehealing arts, education, or business.

Requirements

1. Satisfy general education requirements.
2. Satisfy the bachelor of arts degree requirements (see page 18).
3. For specific course requirements, see the accompanying chart.

Chemistry Baccalaureate Degree Requirements**Chemistry Courses**

	B.S.	B.A.
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	
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		
778, Chemistry of Large Molecules		

Other Requirements

All majors: MATH 425 and 426, Calculus I and II.

B.S. degree: PHYS 407-408, General Physics I and II; two chemistry-related courses (only one of which may be a chemistry course).†

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.†

† Suggested courses: MATH 527, 528; PHYS 505; EE 620; BCHM 658, 751.

Bachelor of Arts, Chemistry and Physics Teaching

This major is designed for students who wish to teach chemistry and physics in secondary schools. The number of positions available for teaching only chemistry or only physics is limited, and there are more opportunities to teach both subjects on the secondary-school level. Chemistry and physics teaching

majors will have good preparation for teaching these subjects and will have the necessary mathematics and education background.

Requirements

1. Satisfy general education requirements.
2. Satisfy the bachelor of arts degree requirements (see page 18).
3. Chemistry requirements: 400, Freshman Seminar, 403-404; General Chemistry; 517, 518, Quantitative Analysis; 545, 546 or 547-548 and 549-550, Organic Chemistry; 683-684 and 685-686, Physical Chemistry I and II.
4. Physics requirements: 407, General Physics I; 408, General Physics II; 505, General Physics III; 605, Experimental Physics I. PHYS 406, Introduction to Modern Astronomy, is strongly recommended.
5. Math requirements: 425, Calculus I, and 426, Calculus II.
6. All education courses in the teacher preparation program (see page 33).

General Science Certification

See pages 33 and 78.

Civil Engineering

(For descriptions of courses, see pages 144 and 164.)

Civil engineering involves the planning, design, and construction of public works: transportation systems, water transmission systems, water treatment systems, tunnels, roads, dams, buildings, bridges, 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 environmentally responsible and safe 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 (e.g., transportation systems, water transmission lines, water treatment plants, power plants, bridges, and buildings).

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. 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. (See page 61.) (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 three semesters. Civil engineering majors may choose the subdiscipline in which to focus their studies during their senior year. 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, law, and medicine.

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 which conforms to the guidelines of, and is accredited by, the Accreditation Board for Engineering and Technology (ABET). The civil engineering program has been continuously accredited by ABET at the University of New Hampshire since 1936 when accreditation first began in the U.S.

The first two years of the program provide the necessary technical knowledge in mathematics, chemistry, and physics, while introducing and developing civil engineering problem solving techniques. The junior year provides courses in each of the civil engineering subdisciplines 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 seven writing intensive courses thereby not only satisfying but exceeding the University's Writing Requirement. (See page 16.)

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 general education electives required by the university and other electives required by the department in order to satisfy ABET requirements.

1. The General Education Program is described on page 17. Courses required by the civil engineering major fulfill the Group 1 through Group 3 general education requirements. Therefore, students select electives to satisfy the Group 4 through Group 8 courses—one elective per group.
2. The civil engineering major also requires students to select one mathematics elective, one professional development elective, and one engineering science elective. Lists of courses that fulfill these electives are available from the department.
3. In the senior year, students take four courses specific to civil engineering subdisciplines. 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 also qualify as a civil engineering design elective. Lists of courses that fulfill these electives are available from the department.

Additional program policies and requirements

1. 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 and may take no more than 20 credits of these courses.
2. To enter the required 600-level courses in the junior year, students:
 - a. must have completed CIE 525, CIE 526, CIE 527, MATH 425, MATH 426, PHYS 407, and PHYS 408, and
 - b. must have achieved an overall grade point average of 2.00 or greater for these courses.
3. To transfer into the civil engineering major, a student must:
 - a. have an overall grade point average of 2.30 or greater;
 - b. have completed 16 credits or more of MATH, PHYS, CHEM, CIE, and ENE courses;
 - c. have an overall grade point average of 2.00 or greater for all MATH, PHYS, CHEM, CIE, and ENE courses taken to date; and
 - d. have an overall grade point average of 2.50 or greater for 16 credits of the MATH, PHYS, CHEM, CIE, and ENE courses taken to date.
4. Students who are transferring into the civil engineering major may receive:
 - a. a maximum of 20 credits for CIE and ENE 600- and 700-level coursework taken prior to the transfer, and
 - b. credit only for CIE and ENE 600- and 700-level courses taken prior to the transfer in which the student has received a grade of C- or better.

5. To continue as a civil engineering major, a student may not:
 - a. repeat more than two CIE or ENE courses,
 - b. achieve a semester grade point average lower than 2.00 for each of three consecutive semesters, and
 - c. achieve a cumulative grade point average of less than 2.00 for CIE and ENE courses in any three semesters.
6. To graduate with a bachelor of science in civil engineering, a student must:
 - a. earn 133 or more credits,
 - b. achieve credit for the civil engineering program's major and elective courses,
 - c. satisfy the University's general education requirements,
 - d. satisfy the University's writing intensive course requirements,
 - e. earn a cumulative grade point average of 2.00 or better for all courses, and
 - f. earn a cumulative grade point average of 2.00 or better for all CIE and ENE courses.

First Year	Fall	Spring
CIE 400, 401, CIE Lectures, I, II	1	2
CHEM 403, 404, General Chemistry I, II	4	4
ENGL 401, Freshman English	4	—
MATH 425, 426, Calculus I, II	4	4
Elective (1), general education requirement*	4	—
CIE 505, Surveying	—	4
PHYS 407, General Physics I	—	4
Total	17	18

Sophomore Year	Fall	Spring
CIE 525, Statistics	3	—
MATH 527, Differential Equations with Linear Algebra	4	—
PHYS 408, General Physics II	4	—
Elective (1), Professional Development**	4	—
CIE 526, Strength of Materials	—	3
CIE 527, Dynamics	—	3
MATH 644, Statistics for Engineers and Scientists	—	4
Elective (1), MATH**	—	4
Elective (1), general education requirement*	—	4
Total	15	18

Junior Year	Fall	Spring
CIE 622, Engineering Materials	4	—
CIE 633, Project Engineering	3	—
CIE 642, Fluid Mechanics	4	—
ENE 520, Environmental Pollution and Protection	4	—
Elective (1), general education requirement*	4	—
CIE 665, Soil Mechanics	—	4
CIE 681, Classical Structural Analysis	—	3
ENE 645, Fundamental Aspects of Environmental Engineering	—	4
Elective (1), Engineering Science**	—	3
Total	19	14

Senior Year

CIE 760, Foundation Design I	4	-
CIE 774, Reinforced Concrete Design	4	-
Elective (1), Civil Engineering Design**	3	-
Electives (3), Civil Engineering**	3	6
Electives (2), general education requirement*	4	4
CIE or ENE 788, Project Planning and Design	-	4
Total	18	14

*See page 17 for general education requirements

**Approved list available in the CIE office

Computer Science

(For descriptions of courses, see page 149.)

Computer scientists are concerned with all aspects of the design and implementation of computer software. They are concerned with problem solving in general, with particular emphasis on the design of computer-efficient solutions. This involves detailed understanding of the nature of algorithms, the software implementation techniques necessary to utilize these algorithms on computers, and a knowledge of how algorithms can be combined in a structured manner to form highly complex software systems.

The program leads to a B.S. in computer science and is designed to prepare students for employment in the computer field or to pursue graduate study in computer science. The program emphasizes the application of computer science theory and principles but also includes a broad background in basic mathematics and an introduction to computer hardware. Most courses require heavy use of the computer, and the laboratories stress hands-on experience with computer equipment.

Computer science majors must obtain an overall grade-point average of 2.00 or better in all required computer science, mathematics, and electrical engineering courses in order to graduate. If at the end of any semester, including the first, a student's cumulative average in these courses falls below 2.00, the student may not be allowed to continue as a CS major.

All students wishing to transfer into a computer science major must have completed at least one full year of calculus (MATH 425 and MATH 426) and one full year of computer science (CS 415 and CS 416). The student must receive a grade of at least C+ in each of these four courses. In addition, the student must achieve a grade-point average of 3.00 in these two mathematics courses and a grade-point average of 3.00 in these two computer science courses. The student must also have an overall grade-

point average of 2.00 or better in all courses taken at UNH.

If a student wishing to transfer into a computer science major has taken any other courses that are applicable to the computer science major, the grades in those courses must satisfy the minimum requirements for the B.S. degree in computer science. (A student is not normally expected to have taken such courses prior to requesting the transfer.)

Requirements

1. Satisfy general education requirements. PHYS 407-408, MATH 425, and PHIL 424 are required and may be used to fulfill requirements in the appropriate general education group.

2. Two additional technology or science courses, one of which may satisfy a general education requirement, chosen from the following list:

Biology

- BIOL 411, Principles of Biology I
- BIOL 412, Principles of Biology II
- HMP 501, Epidemiology and Community Medicine
- MICR 501, Public Health Microbiology
- PBIO 412, Introductory Botany
- PBIO 421, Concepts of Plant Growth
- ZOOL 412, Principles of Zoology

Physical Science

- CHEM 401-402, Introduction to Chemistry
- CHEM 403-404, General Chemistry
- CHEM 405, General Chemistry
- ESCI 409, Environmental Geology
- ESCI 450, Introduction to the Earth Sciences
- ESCI 501, Introduction to Oceanography
- WARM 504, Freshwater Resources
- ESCI 405, Global Environmental Change

Technology

- PHIL 447, Computer Power and Human Reason

Also acceptable are sections of the INCO 404, Honors Seminar that the University designates as fulfilling a category 3 general education requirement.

3. Two additional approved courses chosen from the humanities, social sciences, and arts.
4. Ten core courses in each of which the student must obtain a grade of C or better. Before taking a course having any of these ten courses as a prerequisite, the prerequisite course(s) must be passed with a grade of C or better: CS 415 and 416, Introduction to Computer Science I and II; CS 515, Data Structures; CS 611, Assembly Language Programming and Machine Organization; CS 620, Operating System Fundamentals; CS 671, Programming Language Concepts and Features; MATH 425 and MATH 426, Calculus I and II; MATH 531, Mathematical Proof; MATH 532, Discrete Mathematics.
5. One computer science theory course chosen from: CS 658, Analysis of Algorithms, CS 659, Introduction to the Theory of Computation, or CS 745, Formal Specification and Verification of Software Systems.

6. Three approved computer science courses chosen from CS courses numbered above 650.
7. One approved writing intensive course chosen from CS courses numbered above 650.
8. One course in probability and statistics: MATH 644, Probability and Statistics for Applications.
9. Two electrical engineering courses: EE 543, Introduction to Digital Systems, and EE 612, Computer Organization.

Computer and Information Technology Minor

The computer information technology minor is described under Special University Programs on page 102.

Earth Sciences

(For descriptions of courses, see page 152.)

The courses offered in the Department of Earth Sciences cover the broad spectrum of earth sciences, 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 sciences has been increasing in response to society's growing concern with sound environmental and resource management, including the disposal of waste on land and in the atmosphere and oceans; the management of water resources; the development of energy and mineral resources; 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. hydrology (interdisciplinary with the Dept. of Civil Engineering), 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 interdisciplinary minors in hydrology and oceanography.

Descriptions and requirements for the majors and minors are arranged alphabetically in the following pages.

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.

This program also offers an option in oceanography for those students with broad ocean sciences interests.

Requirements

1. Satisfy the general education requirements.
2. Satisfy the bachelor of arts degree requirements (page 18).
3. Complete a minimum of eight courses in the department (with a C- or better), including ESCI 401, Principles of Geology, or ESCI 409, Environmental Geology; 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 general education requirements.
2. Satisfy the bachelor of arts degree requirements (page 18).
3. Complete a minimum of eight courses in the department (with a C- or better) including ESCI 401; ESCI 402, Earth History or ZOO 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 653, Estuaries and Coasts; 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 *Special University Programs, Interdisciplinary Programs, Marine Sciences section of the catalog, page 104.*

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 typically five-year program, students receive full teacher certification which is recognized in most states.

Requirements

1. Satisfy the general education requirements.
2. Satisfy the bachelor of arts degree requirements (page 18).
3. Complete the following: ESCI 401, Principles of Geology, or ESCI 409, Environmental Geology; 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 (see page 33).

General Science Certification

See pages 33 and 78.

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 general education requirements.
2. Satisfactorily complete MATH 425 and 426, CHEM 403-404 (or CHEM 405), and PHYS 407-408 and 505 or ESCI 658. Some of these courses may also satisfy Group 2 and part of Group 3 of the general education requirements.
3. Complete a minimum of twelve courses in earth sciences, which should include ESCI 401, Principles of Geology, or ESCI 409, Environmental Geology; ESCI 402, Earth History; ESCI 501, Introduction to Oceanography; ESCI 512, Principles of Mineralogy; ESCI 614, Optical Mineralogy and Petrography; ESCI 530, Field Methods; ESCI 631, Structural Geology; ESCI 561, Surficial Processes; ESCI 652, Paleontology; and three approved earth sciences 700-level electives.
4. Complete four approved electives. The following should be considered: one additional 700-level course in the earth sciences; additional courses in mathematics, chemistry, and physics; as well as courses in computer science, engineering, and the biological sciences; and an off-campus field camp.

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 8 credits may be used for both major and minor credit. Courses include both introductory and more advanced courses (as described on pages 152). 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.

Bachelor of Science in Hydrology

The Bachelor of Science in Hydrology is an interdisciplinary major coordinated in the Department of Earth Sciences, in association with the Department of Civil Engineering. The hydrology major provides a sound foundation for understanding and managing fresh-water resources. It prepares students for entry-level professional employment in firms and agencies and for graduate study.

Requirements

1. University General Education. Students are required to complete the University general education requirements. Completion of the hydrology core curriculum automatically satisfies the requirement for one course in quantitative reasoning (Group 2) and two physical science courses in Group 3. To complete the requirements in Group 3, hydrology majors must take one of the following biological science courses: PBIO 412, PBIO 421, NR 412, WILD 433, or ZOO 412.
2. Core Courses: MATH 425, 426, 527; STAT 644 or BIOL 528; PHYS 407-408; CHEM 403-404 (or CHEM 405); CS 410; ESCI 401 or 409, 512, 530, 561; CIE 642; ESCI 703 or CIE 741; ESCI 705, 710; two of the following: CIE 745, ENE 643, or ESCI 747.
3. Major Electives. Three approved electives are to be selected with the guidance of the adviser. Qualifying courses may be selected from a list of hydrogeology, biohydrology, water quality, fluid flow, water resources management, and weather and climate courses offered in various departments in the University.

For a list of the elective courses and for further information about the hydrology major, contact the coordinator, J. Matthew Davis, Department of Earth Sciences.

Hydrology Minor

The minor in hydrology is an interdisciplinary minor of the Departments of Earth Sciences and Civil Engineering. The minor is open to all students in the University. It consists of a minimum of six courses totaling at least 18 credits. Students must earn grades of C (2.00) or better and take no pass/fail courses. No more than 8 major requirement credits may be used. All courses in the program shall be selected by students in consultation with the hydrology minor adviser in the Department of Earth Sciences.

Requirements

Required courses are: ESCI 401, Principles of Geology; or ESCI 409, Environmental Geology; ESCI 705, Principles of Hydrology; ESCI 710, Groundwater Hydrology; at least three of the following courses: ESCI 561, 703, 708, 747; CIE 642, 741, 745; ENE 643, 742, 749; NR 757, 759, 760; WARM 504, 603, 700, 711, 713, 716, 718, 721; PBIO 717, 719.

Students are encouraged to declare their intention to enter the program before the end of the junior year. During the final semester, students must apply to the dean to have the minor appear on the transcript.

Electrical and Computer Engineering

(For descriptions of courses, see page 158.)

The Department of Electrical and Computer Engineering offers a B.S. in Electrical Engineering degree program that is accredited by the Accreditation Board for Engineering and Technology (ABET). The Department's B.S. in Computer Engineering degree program, which commenced in September 2002, has been designed in accordance with the rules and guidelines of ABET. Accreditation of the Computer Engineering degree program will be sought at the earliest opportunity afforded by ABET's rules, i.e., upon graduation of the first entering class in 2006.

Electrical Engineering Program

Electrical engineers are concerned with the design, development, and production of products and systems that involve electrical signals. Thus, broad areas of application are covered, such as monitoring the environment, outer space and the ocean floor, developing robots for factories and biomedical instruments for hospitals, and building microcomputers and power systems. They use such principles and techniques as computer-aided design, optics, acoustics, electronics, automatic control theory, and electromagnetics. Further, it is essential for electrical and computer engineers to include in their work a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics, social implications, and environmental impact.

Electrical engineering graduates readily move into design, product development, manufacturing, sales and marketing, customer application support, and business management roles within prominent computer and electronic system companies. They routinely secure professional positions with the nation's leading computer and network hardware and software firms, wireless communication and telecommunication pro-

viders, medical electronic industries, and custom integrated circuit developers. The strength of the electrical engineering program is such that many graduates successfully complete advanced degrees in engineering and business at top-ranked graduate schools, while others have gone on to obtain law or medical degrees.

At UNH, the cornerstone of the electrical engineering program is the involvement of students in the solution of real-world problems. During the freshman and sophomore years, students take basic courses in mathematics and science, learn how to use computers, and receive introductory experience in electric circuits, logic design, electronics, computer organization, and random processes. Building upon this foundation, students in the junior year develop core competencies in electronics, signal processing and control systems, computer engineering, and electromagnetics. In the senior year, students select professional elective courses to acquire both breadth and depth in specific areas of electrical engineering.

In addition to general University requirements, the department has a number of grade-point average and credit requirements.

1. For an electrical engineering major to enter the junior year and take any of the first-term junior courses (ECE 603, ECE 617, ECE 633, or ECE 651), he or she must have taken, and achieved a cumulative grade point average of 2.10 in all of the following freshman and sophomore courses: MATH 425, 426, 527; PHYS 407, 408; and ECE 541, 543, 544, 548, and 612.
2. Any electrical engineering major whose cumulative grade-point average in ECE courses is less than 2.00 during any three semesters will not be allowed to continue as an electrical engineering major.
3. Electrical engineering majors must achieve a 2.00 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 chart below for a total of at least 131 credits.

Curriculum for B.S. in Electrical Engineering

	Fall	Spring
Freshman Year		
MATH 425, Calculus I	4	—
CS 410, Introduction to Scientific Programming*	4	—
ECE 401, Perspectives in Electrical and Computer Engineering	4	—
TECH 696, Chemistry for Engineers	4	—
MATH 426, Calculus II	—	4
General Education Elective†	—	4
PHYS 407, Physics I	—	4
ENGL 401, General Education Writing	—	4
Total	16	16
Sophomore Year		
PHYS 408, Physics II	4	—
MATH 527, Differential Equations with Linear Algebra	4	—
ECE 541, Electrical Circuits	4	—
ECE 543, Introduction to Digital Systems	4	—
ME 523, Introduction to Statics and Dynamics	—	3
ECE 544, Engineering Analysis	—	4
ECE 548, Electronic Design I	—	4
ECE 612, Computer Organization	—	4
Total	16	15
Junior Year		
EE 617, Junior Lab I	4	—
EE 651, Electronic Design II	4	—
EE 633, Signals and Systems I	3	—
ECE 603, Electromagnetic Fields and Waves	3	—
General Education Elective	4	—
ECE 618, Junior Laboratory II	—	4
ECE 634, Signals and Systems II	—	3
ECE 647, Random Processes and Signals in Engineering	—	3
EE 668, Fundamentals of Computer Engineering	—	4
General Education Elective	—	4
Total	18	18
Senior Year		
Professional Elective*	4	—
Professional Elective*	4	—
General Education Elective	4	—
General Education Elective	4	—
ECE 791, Senior Project I	2	—
Professional Elective*	—	4
Professional Elective*	—	4
General Education Elective	—	4
ECE 792, Senior Project II	—	2
Total	18	14

*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 project course. An alternative is a student-designed plan approved by the ECE Undergraduate Committee.

†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 advisor 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.

Computer Engineering Program

Computers have become embedded in virtually every electrical 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.

In addition to general University requirements, the department has a number of grade-point average and credit requirements.

1. For a Computer Engineering major to enter the junior year and take any of the first-term junior courses, he or she must have taken, and achieved a cumulative grade point average of 2.10 in all of the following freshman and sophomore courses: MATH 425, 426, 527; PHYS 407, 408; CS 415, 416, 515; and ECE 543, ECE 544, ECE 612, and ECE 523.
2. 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.
3. Computer engineering majors must achieve a 2.00 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 chart below for a total of at least 130 credits.

Curriculum for B.S. in Computer Engineering

	Fall	Spring
Freshman Year		
MATH 425, Calculus I	4	—
CS 415, Intro to Computer Science I	4	—
ECE 401, Perspectives in Electrical and Computer Engineering	4	—
General Education Elective	4	—
Math 426, Calculus II	—	4
CS 416, Intro to Computer Science II	—	4
ECE 543, Intro to Digital Systems	—	4
Engl 401, General Education Writing	—	4
Total	16	16

	Fall	Spring
Sophomore Year		
PHYS 407, Physics I	4	—
Math 527, Differential Equations with Linear Algebra	4	—
CS 515, Data Structures	4	—
ECE 612, Computer Organization	4	—
PHYS 408, Physics II	—	4
ECE 544, Engineering Analysis	—	4
CS 620, Operating Systems Fundamentals	—	4
ECE 523, Design with Programmable Logic	—	4
Total	16	16

	Fall	Spring
Junior Year		
ECE 541, Electrical Circuits	4	—
ECE 633, Signals and Systems I	3	—
ECE 649, Embedded Microcomputer Based Design	4	—
General Education Elective	4	—
ECE 548, Electronic Design I	—	4
ECE 667, Introduction to Computer Engineering	—	4
ECE 647, Random Processes and Signals in Engineering	—	3
General Education Elective	—	4
Total	15	15

	Fall	Spring
Senior Year		
Professional Elective**	4	—
ECE 734, Network Data Communications	4	—
ECE 714, Intro to Digital Signal Processing	4	—
General Education Elective	4	—
ECE 791, Senior Project I	2	—
Professional Elective**	—	4
Professional Elective**	—	4
General Education Elective	—	4
General Education Elective	—	4
ECE 792, Senior Project II	—	2
Total	18	18

**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: DS 630, DS 650, DS 765
 ECE 603, ECE 634, ECE 651, ECE 7XX
 CS 658, CS 659, CS 671, CS 7XX

Environmental Engineering

(For descriptions of courses, see page 164.)

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 ENE degree program consists of two emphases (curricula): Industrial Processes (IP) and Municipal Processes (MP).

The objective of the program's strong analytical core and multidisciplinary focus combining engineering and the sciences is to prepare graduates for many career opportunities in public, private, or academic

career paths. Graduates from the program will possess strong analytical aptitude as well as exhibit creativity, imagination, and excellent written and oral communication skills. They will understand environmental problems and approaches to their solutions and how to organize the technical resources needed to implement remedies. Graduates will be able to apply knowledge of mathematics, science, and engineering to environmental engineering problems, analyze and interpret data and solve environmental engineering problems, design environmental engineering systems, function on multidisciplinary teams, communicate effectively, understand the impact of engineering solutions on society, and understand professional and ethical responsibility.

At the end of the sophomore year, students are required to have a minimum overall grade-point average of 2.00 and a grade-point average of 2.00 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 general education requirements, have a minimum cumulative grade-point average of 2.00, and have a minimum grade-point average of 2.00 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 608), 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 US EPA and NHDES. In the past nine years, the program has served more than forty facilities. Each year about 12 students have enrolled in the Pollution Prevention Internship Program which provides hands-on industrial employment for ten 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 134 credits for graduation and can be completed in four years. There are eight electives in the curriculum: five for the fulfillment of the University's general education requirements and the remaining three for technical electives to be chosen from the specified elective course list. 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 towards graduation.

First Year	Fall	Spring
CHEM 405, General Chemistry	4	—
MATH 425-426, Calculus I & II	4	4
PHYS 407, General Physics I	—	4
ENGL 401, Freshman English	4	—
ME 441, Engineering Design and Graphics	4	—
General Education Electives	—	8
Total	16	16

Second Year

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	—
CS 410, Introduction to Scientific Programming	—	4
General Education Electives	—	8
Total	16	18

Third Year

CHE 601, Fluid Mechanics and Unit Operations	3	—
CHE 604, Chemical Engineering Thermodynamics	—	4
ENE 612, Unit Operations Lab II	—	3
CHEM 651-652, Organic Chemistry I & II	3	3
CHEM 653, Organic Chemistry Lab I	2	—
ENE 742, Solid and Hazardous Waste Engineering	—	3
MATH 644, Statistics for Engineers & Scientists	4	—
General Education and Technical Electives	4	3-4
Total	16	16-17

Fourth Year

CHE 605, Mass Transfer and Stagewise Operations	3	—
ENE 608, Industrial Process Design	—	4
ENE 613, Unit Operations Lab II	3	—
ENE 709, Fundamentals of Air Pollution and Control	4	—
ENE 752, Process Dynamics and Control	—	4
ENE 772, Physicochemical Processes for Water and Air Quality Control	—	4
ESCI 710, Groundwater Hydrology	—	4
MICR 501, Microbes in Human Disease	4	—
Technical Electives	3-4	3-4
Total	17-18	19-20

Suggested Technical Electives

	Credits
CHE 602, Heat Transfer and Unit Operations	3
CHE 606, Chemical Engineering Kinetics	3
CHE 744, Corrosion	4
ENE 739, Industrial Wastewater Treatment	3
ENE 746, Bioenvironmental Engineering Design	4
ENE 747, Introduction to Marine Pollution	3
CIE 766, Introduction to Geo-Environmental Engineering	3
ESCI 409, Environmental Geology	4
ESCI 561, Surficial Processes	4
ESCI 705, Principles of Hydrology	4
ESCI 708, Hydrology	3
ESCI 715, Global Atmospheric Chemistry	3
EE 772, Control Systems	4
MICRO 503, General Microbiology	5

Bachelor of Science in Environmental Engineering-Municipal Processes (MP) Emphasis

Environmental engineers graduating from the municipal processes (MP) emphasis 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. The environmental engineer is trained to lead the multidisciplinary teams needed to solve complex environmental problems.

In ENE 400, 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 an environmental engineering project provided by a local engineering firm or municipality 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.

	Fall	Spring
ENE 400, 401, Environmental Engineering Lectures I, II	1	1
ENGL 401, Freshman English	4	-
MATH 425, 426, Calculus I, II	4	4
General Education Electives*	4	4
CHEM 403, 404, General Chemistry I, II	4	4
PHYS 407, General Physics I	-	4
Total	17	17

Second Year

ENE 520, Environmental Pollution and Protection	4	-
ENE 521, Environmental Engineering Seminar	-	1
CIE 525, 526, 527, Statics, Strength, Dynamics	3	6
MATH 527, Differential Equations with Linear Algebra	4	-
CHEM 545, Organic Chemistry Lecture	3	-
CHEM 546, Organic Chemistry Laboratory	2	-
TECH 564, Fundamentals of CAD	-	3
General Education Elective*	-	4
Total	16	14

Third Year

CIE 633, Project Engineering	3	-
CIE 642, Fluid Mechanics	4	-
CIE 665, Soil Mechanics	-	4
ENE 643, Environmental Sampling and Analysis	4	-
MATH 644, Statistics for Engineers and Scientists	4	-
ENE 645, Fundamental Aspects of Environmental Engineering	-	4
ENE 656, Environmental Engineering Microbiology	-	4
ENE 742, Solid and Hazardous Waste Engineering	-	3
General Education Elective*	4	-
Total	19	15

Summer

Environmental Engineering Experience† (ENE 696 or 697) 1-2 cr.

Fourth Year

ENE 746, Bioenvironmental Engineering Design	4	-
ENE 749, Water Chemistry	4	-
General Education Elective*	4	-
Environmental Engineering Elective**	6	4
ENE 744, Physicochemical Treatment Design	-	4
ENE 788, Project Planning and Design	-	4
ESCI 710, Groundwater Hydrology	-	4
Total	18	16

*See page 17 for general education requirements.

**Approved list is available in the Department of Civil Engineering office. Must take a minimum of three ENE electives totaling at least 10 credits. One ENE elective course must be from the design category.

†During one summer, it is strongly recommended that majors have a job at an approved level in the environmental engineering field, perform an approved internship in environmental engineering or conduct a research project under the supervision of a faculty member. A student may receive a one credit field experience or up to two credits for an environmental engineering internship. The internship could be used as an environmental engineering elective, but this would require approval of the faculty.

The municipal processes emphasis of the ENE program requires a minimum of 132 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; ENE 772, Physicochemical Processes for Water and Air Quality Control, or ENE 643, 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, James P. Malley Jr., civil engineering, or Dale P. Barkey, 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.

Mathematics and Statistics

(For descriptions of mathematics courses, see page 194.)

A variety of programs is offered by the Department of Mathematics and Statistics. 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 can usually be accommodated.

The first two years of all programs are similar. In the first year, students are expected to take MATH 425 and 426 as well as an introductory computer science course (either CS 410, Introduction to Scientific Programming, or CS 415, Introduction to Computer Science I). In the sophomore year

MATH 527, 528, 531, and/or 545, or the linearity sequence MATH 525-526 (that combines the material of MATH 527, 528, and 645), keep a student on schedule in most programs.

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 the Web site, www.math.unh.edu/pub/undergrad.

Standards for Graduation

To be certified for graduation with a degree from the Department of Mathematics and Statistics, a student must complete 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 2.00 in these courses. The student must remain in good standing within the defined requirements of the University.

Please note that neither CS 401 nor CS 403 may be taken for credit in any program in mathematics.

In extenuating circumstances a student may petition for a variance in academic policy, including changes in program requirements by submitting the appropriate form for this purpose with his/her adviser, who will then forward the petition to the appropriate committee or to the CEPS Dean's Office for further action.

Bachelor of Arts, Mathematics Major

This program offers a broader liberal arts education than the bachelor of science programs. By a careful selection of electives, students can shape this major into a preparation for graduate school, business, or industry.

Requirements

General education requirements

(MATH 425 satisfies the Group 2 requirement, quantitative reasoning.)

Foreign language requirement as defined by the University for the B.A. degree.

Required MATH/CS courses

CS 410, Introduction to Scientific Programming (or CS 415, Introduction to Computer Science I)
 MATH 425-426, Calculus I and II
 MATH 527*, Differential Equations with Linear Algebra
 MATH 528*, Multidimensional Calculus
 MATH 531, Mathematical Proof (or 545*, Introduction to Linear Algebra and Mathematical Proof)

MATH 639, Introduction to Statistical Analysis
 MATH 761, Abstract Algebra
 MATH 762, Linear Algebra
 MATH 767, One-Dimensional Real Analysis
 Two approved MATH or CS electives chosen in consultation with adviser

*These requirements can be satisfied by MATH 525-526, Linearity

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.

Requirements

General education requirements

(MATH 425 satisfies the Group 2 requirement, quantitative reasoning.)

Other required courses

PHYS 407-408, General Physics I and II (satisfies two of the three courses for general education in Group 3, biological science, physical science, and technology)

Required MATH/CS courses

CS 410, Introduction to Scientific Programming (or CS 415, Introduction to Computer Science I)
 MATH 425-426, Calculus I and II
 MATH 527*, Differential Equations with Linear Algebra
 MATH 528*, Multidimensional Calculus
 MATH 531, Mathematical Proof (or 545*, Introduction to Linear Algebra and Mathematical Proof)
 MATH 639, 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
 One approved MATH elective chosen in consultation with an adviser
 One approved MATH or CS elective chosen in consultation with an adviser

*These requirements can be satisfied by MATH 525-526, Linearity

Bachelor of Science: Interdisciplinary Programs in Mathematics and Its Applications

The interdisciplinary programs in 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, economics). The major may consist

of mathematics combined with computer science, economics, statistics, electrical science, or physics.

Each interdisciplinary major consists of ten mathematics courses plus at least six courses in the discipline of the option. Specific requirements follow.

Requirements

General education requirements

(MATH 425 satisfies the Group 2 requirement, quantitative reasoning.)

Required courses in all options

MATH 425-426, Calculus I and II
 MATH 527*, Differential Equations with Linear Algebra
 MATH 528*, Multidimensional Calculus
 MATH 531, Mathematical Proof (or 545*, Introduction to Linear Algebra and Mathematical Proof)

MATH 639, Introduction to Statistical Analysis
 MATH 645*, Linear Algebra for Applications
 CS 410, Introduction to Scientific Programming (or CS 415, Introduction to Computer Science I)
 If MATH 545 is taken, credit may not be received for MATH 645. Instead, students should take another mathematics course chosen in consultation with their adviser.

*These requirements can be satisfied by MATH 525-526, Linearity.

Other required courses by option:

Computer Science Option

MATH 532, Discrete Mathematics
 MATH 753, Introduction to Numerical Methods I
 One additional MATH course chosen from approved electives.

CS 415-416, Introduction to Computer Science I and II
 CS 515, Data Structures
 EE 543, Introduction to Digital Systems
 CS 610, Operating System Fundamentals
 CS 611, Assembly Language Programming and Machine Organization
 CS 658, Analysis of Algorithms (or CS 659, Introduction to the Theory of Computation)
 One additional CS course chosen in consultation with adviser.

Economics Option

MATH 739, Applied Regression Analysis
 One MATH course chosen from: MATH 740, 741, 742, 755
 One additional MATH course chosen from approved electives.

ECON 401, Principles of Economics (Macro)
 ECON 402, Principles of Economics (Micro)
 ECON 605, Intermediate Microeconomic Analysis
 ECON 611, Intermediate Macroeconomic Analysis
 EREC 715, Linear Programming and Quantitative Models
 One additional ECON or DS course.

Electrical Science Option

MATH 646, Introduction to Partial Differential Equations
 MATH 647, Complex Analysis for Applications
 MATH 753, Introduction to Numerical Methods I
 EE 541, Electrical Circuits
 EE 548, Electronics Design I
 EE 603, Electromagnetic Fields and Waves I
 EE 633, Signals and Systems I
 EE 634, Signals and Systems II
 EE 757, Fundamentals of Communication Systems

Physics Option

MATH 646, Introduction to Partial Differential Equations
 MATH 647, Complex Analysis for Applications
 MATH 753, Introduction to Numerical Methods I
 PHYS 407, 408, 505, Physics I-III

Three additional PHYS courses, chosen from the following seven courses

PHYS 508, Thermodynamics and Statistical Mechanics
 PHYS 616, Physical Mechanics
 PHYS 701, 702, Introduction to Quantum Mechanics I, II
 PHYS 703, 704, Electricity and Magnetism I, II
 PHYS 708, Optics

Statistics Option

MATH 739, Applied Regression Analysis
 MATH 755, Probability and Stochastic Processes with Applications
 MATH 756, Principles of Statistical Inference

Two additional courses chosen from

MATH 740, Design of Experiments I
 MATH 741, Biostatistics and Life Testing
 MATH 742, Multivariate Statistics Methods

Three additional MATH courses chosen in consultation with adviser.

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 should consult with the mathematics department program adviser concerning the schedule of mathematics courses. The five-year program involves a required year-long teaching internship in the fifth year. (The internship can be coupled

with other graduate work leading to a master's degree.) See education, College of Liberal Arts, page 33.

Elementary School Option Requirements*General education requirements*

(MATH 425 satisfies the Group 2 requirement, quantitative reasoning.)

Required mathematics courses

MATH 425-426, Calculus I and II
 MATH 531, Mathematical Proof
 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 639, Introduction to Statistical Analysis

MATH 657, Geometry

MATH 703, The Teaching of Mathematics, K-6

MATH 791, The Teaching of Mathematics, 7-12

One approved MATH or CS elective chosen in consultation with adviser

Other required courses

CS 410, Introduction to Scientific Programming (or CS 415, Introduction to Computer Science I)
 PHYS 406, Introduction to Modern Astronomy (satisfies one of three courses for general education in Group 3, biological science, physical science, and technology)

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 751 and EDUC 703F and EDUC 703M are requirements for certification and can be completed at either the undergraduate or graduate level.

Middle/Junior High School Option Requirements*General education requirements*

(MATH 425 satisfies the Group 2 requirement, quantitative reasoning.)

Required mathematics courses

MATH 425-426, Calculus I and II

MATH 531, Mathematical Proof

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 639, Introduction to Statistical Analysis

MATH 657, Geometry

MATH 698, Senior Seminar

MATH 761, Abstract Algebra

MATH 791, The Teaching of Mathematics, 7-12

One approved MATH or CS elective chosen in consultation with adviser.

Other required courses

CS 410, Introduction to Scientific Programming
 or CS 415, Introduction to Computer Science I

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 751 is a requirement for certification and can be completed at either the undergraduate or graduate level.

Secondary School Option Requirements*General education requirements*

(MATH 425 satisfies the Group 2 requirement, quantitative reasoning.)

Required mathematics courses

MATH 425-426, Calculus I and II

MATH 527*, Differential Equations with Linear Algebra

MATH 528*, Multidimensional Calculus

MATH 531, Mathematical Proof

MATH 545*, Introduction to Linear Algebra and Mathematical Proof

MATH 619, Historical Foundations of Mathematics

MATH 639, Introduction to Statistical Analysis

MATH 657, Geometry

MATH 698, Senior Seminar

MATH 761, Abstract Algebra

MATH 791, The Teaching of Mathematics, 7-12

*These requirements can be satisfied by MATH 525-526, Linearity

One approved MATH or CS elective chosen in consultation with adviser.

Other required courses

CS 410, Introduction to Scientific Programming
 or CS 415, Introduction to Computer Science I

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 751 is a requirement for certification and can be completed at either the undergraduate or graduate level.

Minoring in Mathematics

The Department of Mathematics and Statistics offers three options for minor programs: mathematics, applied mathematics, and statistics. These are open to all students enrolled at the University. Each option requires a minimum of five courses as detailed below. (These requirements assume that the student has credit for MATH 425 and MATH 426, or their equivalents.) Students whose major program requires by specific course number more than 8 credit hours in courses required by the departmental minor may substitute additional courses from the

list of optional courses in the minor to meet the five-course minimum.

Mathematics Minor

Required (3): MATH 528*, MATH 531 (or 545*), and MATH 761 (or 767)

Options (2): Two courses chosen from among MATH 527*, 656, 657, 658, 761, 762, 764, 767, 776, 783, 784, 788

*These requirements can be satisfied by MATH 525-526, Linearity

Applied Mathematics Minor

Required (4): MATH 527*, 528*, 545* (or 645*), and 753

Options (1): One course chosen from among MATH 639 (or 644), MATH 646, 647, 745, 746, 747, or 754

*These requirements can be satisfied by MATH 525-526, Linearity

Statistics Minor

Required (2): MATH 639 (or 644) and MATH 545 (or 645)

Options (3): Three courses chosen from among MATH 737, 739, 740, 741, 742, 744, 755, 756

Mechanical Engineering

(For descriptions of courses, see page 197.)

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 Web site: www.unh.edu/mechanical-engineering/index.html.

The mechanical engineering program develops the student's creative potential to meet the increasingly complex needs of industry, government, and education while giving an appreciation of the role of technology in a modern society.

The curriculum prepares prospective graduates either for more advanced studies or for beginning professional engineering careers. It provides a foundation of knowledge in the basic physical sciences, mechanics of solids and fluids, dynamic systems, thermal sciences, materials science, and design. Students develop abilities in analysis, experimentation, and design. Elective courses allow students to gain additional competence in any of these specific areas. Other elective courses in the arts, humanities, and the social sciences are included to provide a liberal education.

Students, with their advisers' assistance, should plan a program based on the following distribution of courses that totals not less than 128 credits. The outline that follows is to be considered as being typical only in format. Within the constraints of satisfying all of 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 curriculum has thirteen elective courses. These should be selected in consultation with a departmental adviser to lead to a balanced program that addresses chosen areas of interest. Five of the elective courses are selected from groups four through eight of the University's general education requirements, with the Group 7 general education course being either ECON 402 or EREC 411. One of the elective courses must be selected from the biological science listing of Group 3 of the general education requirements. Seven technical elective courses of at least 3 credits each are required. They may be selected from 600-700 level courses in College of Engineering and Physical Sciences, excluding BET, and from the following 500 level courses, ENE 520, ESCI 501 and ECE 543. Three of the seven technical electives must come from the prescribed lists: A. engineering practice; B. mathematics; C. advanced engineering topics. These lists are available in the mechanical engineering office. All students must take one course from each list. Two of the remaining four technical electives can be used for studying a focused area such as a foreign language, or a preprofessional program, or a minor, with mechanical engineering department approval. 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.

To enter the junior-year courses in the mechanical engineering major, students must have at least a 2.00 combined grade-point average for the following group of courses: PHYS 407-408, ME 503, ME 525, and ME 526.

In order to graduate in the mechanical engineering major, students must have at least a 2.00 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. The option of repeating required engineering, science, and technical elective courses normally taken after the start of the junior year may be exercised in only one of the following: (1) one course

may be repeated twice; and (2) a maximum of two courses may be repeated once.

	Fall	Spring
Freshman Year		
MATH 425, Calculus I	4	-
MATH 426, Calculus II	-	4
ME 441, Engineering Graphics	4	-
General Education Elective	-	4
General Education Elective	4	-
ENGL 401, Freshman English	-	4
CHEM 403, General Chemistry	4	-
PHYS 407, General Physics I	-	4
Total	16	16

Sophomore Year

†MATH 527, Differential Equations with Linear Algebra	-	4
†MATH 528, Multidimensional Calculus	4	-
ME 525, 526, Mechanics I and II	3	3
ME 503, Thermodynamics	-	3
ME 561, Introduction to Materials Science	-	4
PHYS 408, General Physics II	4	-
Technical elective	3-4	-
General education elective	4	4
Total	18-19	18

Junior Year

CS 410, Introduction to Scientific Programming	4	-
ME 608, Fluid Dynamics	3	-
ME 603, Heat Transfer	-	3
ME 627, Mechanics III	3	-
ME 643, Elements of Design	-	3
ME 646, Experimental Measurement and Data Analysis	-	4
ECE 537, Introduction to Electrical Engineering	4	-
ME 670, Systems Modeling, Simulation, and Control	-	4
Technical electives (2)	3-4	3-4
Total	17-18	17-18

Senior Year

ME 705, Thermal System Analysis and Design	4	-
‡ME 755, Senior Design Project I	2	-
ME 756, Senior Design Project II	-	2
ME 747, Experimental Measurement and Modeling of Complex Systems	4	-
Technical electives (4)	3-4	9-12
General education electives (2)	4	4
Total	17-18	15-18

†MATH 525 and MATH 526 (Linearity I and II) may be substituted for MATH 527 and MATH 528 and a MATH technical elective

‡TECH 797 Undergraduate Ocean Research Project may be substituted for ME 755 and ME 756

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); additional courses from the following: 731, 744, 761, 762, 763, and 795 (materials).

By midsemester of their junior year, interested students should consult the minor supervisor, James E. Krzanowski, Department of Mechanical Engineering.

Physics

(For descriptions of courses, see page 215.)

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 has its own library, which provides a comfortable, inviting atmosphere for study and relaxed reading.

The suggested programs that follow are indicative of the flexibility available to students, whether they are preparing for graduate work in physics, 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 option allows for 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 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 (see page 65). For those interested in a career as a middle or high school educator in both physics and chemistry, the Department of Chemistry offers a B.A. in chemistry and physics teaching.

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.

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.

Bachelor of Arts, Chemistry and Physics Teaching

For information, see page 56.

Physics Major, Bachelor of Arts

This degree provides an opportunity for a broad and liberal 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 general education and writing requirements
2. Satisfy bachelor of arts degree requirements (page 18)
3. PHYS 407-408, 505, 506, 508, 615, 616, 701, 703, 705. Note that MATH 425, 426, and MATH 527, 528 or MATH 525, 526 are prerequisites for some of the courses. A total of 40 credits is required.

In the following table, "Electives" include general education courses, writing intensive courses, language courses required for the B.A. (see page 18), and free choice electives.

Suggested Curriculum for B.A. in Physics

Freshman Year	Fall	Spring
PHYS 407-408, General Physics I and II	4	4
MATH 425, 426, Calculus I and II (Group 2)	4	4
ENGL 401, Freshman English	-	4
Elective	8	4
Physics 400, Freshman Seminar	1	-
Total	17	16

Sophomore Year

PHYS 505-506, General Physics III and Lab	4	-
PHYS 615, Introduction to Mathematical Physics	-	4
MATH 527, Differential Equations or MATH 525, Linearity I	4 or 6	-
MATH 528, Multidimensional Calculus or MATH 526, Linearity II	-	4 or 6
Elective	8	8
Total	16 or 18	16 or 18

Junior Year

PHYS 605, Experimental Physics I	5	-
PHYS 508, Thermodynamics and Statistical Mechanics	-	4
PHYS 616, Physical Mechanics	4	-
PHYS 701, Introduction to Quantum Mechanics I	-	4
Electives	8	8
Total	17	16

Senior Year

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 in the standard options are those typically necessary for admission to graduate study in physics. The new interdisciplinary options require fewer physics courses combined with a concentration in another area (chemistry, biology, or materials science).

Requirements

1. Satisfy general education and writing requirements.
2. Satisfy bachelor of science requirements (page 53).
3. Minimum physics requirements: 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 527-528 or 525-526
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 2.33 in these courses in order to continue in the B.S. program.

Physics electives

In the following table, "Electives" include general education 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.

Suggested Curriculum for B.S. in Physics

	Fall	Spring
Freshman Year		
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	—
Physics 400, Freshman Seminar	1	—
Total	17	16
Sophomore Year		
PHYS 505-506, General Physics III and Lab	4	—
PHYS 508, Thermodynamics and Statistical Mechanics	—	4
PHYS 615, Introduction to Mathematical Physics	—	4
MATH 527, Differential Equations or MATH 525, Linearity I	4 or 6	—
MATH 528, Multidimensional Calculus or MATH 526, Linearity II	—	4 or 6
CS 410, Introduction to Scientific Programming	4	—
Elective	4	4
Total	16 or 18	16 or 18
Junior Year		
PHYS 605, Experimental Physics I	5	—
PHYS 616, Physical Mechanics	4	—
PHYS 701, Introduction to Quantum Mechanics I	—	4
PHYS 703, Electricity and Magnetism I	—	4
Electives	8	8
Total	17	16
Senior Year		
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

Biophysics Option, Bachelor of Science in Physics

1. Satisfy general education and writing requirements.
2. Satisfy bachelor of science degree requirements.
3. One course in English is required in addition to the University requirement.
4. Physics requirements: PHYS 407-408; 505-506, 508, and 605
5. Chemistry: CHEM 403-404 or 405, 651-654 (organic)
6. Biology: BIOL 411, 412
7. Biochemistry: BCHM 658-659
8. Mathematics: MATH 425, 426, 527, 528
9. Computer Science: CS 410
10. 18 additional credits in approved physics, chemistry, biology or biochemistry courses; at least two of these courses must be in physics.

Chemical Physics Option, Bachelor of Science in Physics

1. Satisfy general education and writing requirements.
2. Satisfy bachelor of science requirements.
3. One course in English is required in addition to the University requirement.
4. Physics requirements: PHYS 407-408, 505-506, 605, 615, 616, 701, 703, 705, 718 (optional), 795 (senior thesis)
5. Chemistry: CHEM 405-407, 547, 548, 549, 574, 550, 683, 684, 685, 686, 762, 763, 776
6. Mathematics: MATH 425-426, 527, 528, 646
7. Computer Science: CS 410

Materials Science Option, Bachelor of Science in Physics

1. Satisfy general education and writing requirements.
2. Satisfy bachelor of science requirements.
3. One course in English is required in addition to the University requirement.
4. Physics requirements: PHYS 407-408, 505-506, 508, 605, 615-616, 701, 703, 705, 795 (8 credit hours).
5. Mechanical Engineering: 561, 730, 760
6. Math: 425-426, 527-528, or 525-526
7. Computer Science: CS 410
8. Electives in Option: Three courses selected from MATH 646, ME 731, 761, 763, 795, MS 760, PHYS 718
9. Chemistry: 403-404 or 405

SCHOOL OF HEALTH AND HUMAN SERVICES

James McCarthy, Dean
Neil B. Vroman, Associate Dean
Carole A. Pierce, Advising Coordinator

Department of Communication Sciences and Disorders
Department of Family Studies
Department of Health Management and Policy
Department of Kinesiology
Department of Nursing
Department of Occupational Therapy
Department of Recreation Management and Policy
Department of Social Work

Bachelor of Science

Communication Sciences and Disorders
Family Studies
 Child and Family Studies
Health Management and Policy
Kinesiology
 Athletic Training
 Exercise Science
 Outdoor Education
 Physical Education Pedagogy
 Sport Studies
Nursing
Occupational Therapy
Recreation Management and Policy
 Program Administration
 Therapeutic Recreation

Bachelor of Arts

Social Work

The School 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 school offers undergraduate instruction leading to the bachelor of science degree in communication sciences and disorders, family studies, health management and policy, kinesiology, nursing, occupational therapy, and recreation management and policy. It also offers undergraduate instruction leading to a bachelor of arts degree in 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.

Degree Requirements

Candidates for the B.S. and B.A. degree must satisfy all general education requirements for graduation (page 17), 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. Candidates for the B.A. degree must satisfy a language requirement (page 18). Generally, courses are to be completed in the sequence in which they are arranged.

Minors: See page 20; see also page 23.

Dual-Degree Programs: See page 19.

Student-Designed Majors: See page 105.

Second Majors: See page 20.

Undeclared Major

A limited number of well-qualified freshmen who have expressed an interest in a health-related career, but who are undecided about a specific major may enter the School of Health and Human Services as undeclared students. Undeclared students should explore possible majors by selecting courses from those listed below.

Required Courses

ENGL 401, Freshman English
PSYC 401, Introduction to Psychology
Z00L 507-508, Human Anatomy and Physiology

Recommended Courses

CHEM 403-404, General Chemistry
CSD 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
MLS 401, Introduction to Medical Laboratory Science

NUTR 475, Nutrition in Health and Disease
RMP 490, History and Philosophy of Leisure
SW 524, Introduction to Social Work

All SHHS 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.

Student Liability Insurance

All students whose programs require participation in clinical learning internships must purchase and maintain liability insurance for the entire clinical experience. The University has arranged for appropriate insurance coverage at a modest cost to students. Further information may be obtained at major department offices.

Programs of Study

Communication Sciences and Disorders

(For descriptions of courses, see page 148.)

Communication disorders is the profession devoted to helping people overcome disabilities of speech, language, or 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 then become 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.

The required courses in communication sciences and disorders which all students in the program must successfully complete are CSD 520, Survey of Communication Disorders; CSD 521, Anatomy and Physiology of the Speech and Hearing Mechanism; CSD 522, The Acquisition of Language; CSD 524, Clinical Phonetics; CSD 630, Organic Pathologies; CSD 631, Articulation and Language Disorders in Children; CSD 635, Professional Issues in Speech-Language Pathology; CSD 704, Basic Audiology; CSD 705, Introduction to Auditory Perception and Aural Rehabilitation; CSD 723, Observation Skills in Speech-Language Pathology; and CSD 777, Speech and Hearing Science. Students must also complete KIN 706, Neurology, and a course in statistics. Other elective courses are available.

Students must have a grade-point average of 2.75 at the end of their sophomore year to continue in the major. A 2.75 grade-point average is also required to transfer into the major. Students interested in this program should consult with the chairperson, Penelope E. Webster.

Family Studies

(For descriptions of courses, see page 166.)

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 of Family Studies offers a B.S. degree in family studies with four specializations which prepare students for unique career directions. Students prepare for positions in family service organizations, educational set-

tings and programs, corporations, and government agencies. Each specialization has entry-level criteria and specific course requirements. All require close consultation with a faculty adviser. Any changes or updates are posted on our Web site www.unh.edu/family-studies.

The Nursery/Kindergarten Teaching Certification and the Certified Family Life Educator 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.

Major Requirements

Core courses required of each family studies major are: FS 525, Human Development and FS 545, Family Relations. A minimum of nine family studies courses are required, at least two of which must be at the 700 level. Twenty credits of supporting coursework are selected in consultation with the adviser. These courses must be 500 level or above and must include at least 12 credits in courses outside the department. Each specialization has required or recommended supporting courses. Some departmental specializations may specify general education courses because they enhance the plan of study.

Child Advocacy and 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 specialization is designed to prepare students for entry-level positions as advocates or policy generalists, or to pursue a graduate degree.

Department Requirements

FS 525, Human Development
 FS 545, Family Relations
 FS 553, Personal and Family Finance for Family Life Educators
 or
 FS 653, Family Economics
 FS 623, Development Perspectives on Infancy and Early Childhood
 or
 FS 624, Developmental Perspectives on Adolescence and Early Adulthood
 FS 641, Parenting Across the Lifespan
 or
 FS 743, Families, Schools and Community
 or

FS 760, Family Programs and Policies

FS 746, Human Sexuality

or

FS 750, Contemporary Issues in Adolescent Development

or

FS 757, Race, Class, Gender and Families

FS 772, Child Advocacy

FS 773, International Perspectives on Families and Young Children

FS 794, Family and the Law Internship

Supporting Courses

ENGL 503 or ENGL 621, PSYC 502, or SOC 502,
 ANTH 516, CS 401 or CS 403, PHIL 412 or POLT
 407 or SW 705

General Education

Students should select from the courses listed.

Writing Skills: ENGL 401

Qualitative Reasoning: PHIL 412 or PSYC 402 or
 SOC 502

Biological Science, Physical Science, and
 Technology: BIOL 405 or 411; MICR 501; ZOOL
 412 or 507; CS 401; NUTR 400; PHIL 447 or 450

Foreign Culture: Any course except ENGL 581;
 WLCE 523G, 524G

Social Science: ANTH 412, 625; CD 415; CMN 402,
 455, 457; ECON 401, 402; HHS 510; HMP 401;
 HUMA 510D; NUTR 405; POLT 402, 505, 560, 564,
 565, 566, 567; RMP 550, 570; SW 525; SOC 400,
 500, 520, 530, 540, 625

Works of Literature, Philosophy and Ideas: AMST
 502; CMN 456; ENGL 517, 519, 681; FREN 500,
 521, 652; GERM 500, 520, 521; HUMA 500, 650;
 ITAL 500, 521, 522, 651, 652; PHIL 401, 424, 435,
 436, 520, 540; POLT 407, 520, 521, 522, 523; PORT
 500; RUSS 500, 521, 522, 593; SPAN 500, 521,
 522, 650, 651/652, 653/654

Young Child Specialization/Nursery-Kindergarten Teaching Certification

This concentration is for those who have a broad interest in working with young children ranging in age from birth to age eight. This specialization has four major foci that include child development, teaching methodology and curriculum development, developmentally appropriate learning environments for young children, and home-school-community relations.

The nursery-kindergarten certification (N/K) is a highly competitive program within the Young Child specialization. This means that it is unlikely that everyone who applies will be admitted. Applications to the N/K program are completed by students during the fall of the junior year.

Department Requirements

FS 525, Human Development*
 FS 545, Family Relations*
 623, Developmental Perspectives on Infancy and
 Early Childhood*

FS 635, Teaching and Learning in Early Childhood Settings*
 FS 708-709, Advanced Child Development Internship*
 or
 FS 710, Community Internship (minimum 4 credits)
 FS 733, Supervising Programs for Young Children*
 FS 734, Curriculum for Young Children*
 FS 743, Families, Schools and Community*
 FS 771, Observation and Assessment*

Students accepted into the certification program must also enroll in the following courses during their senior year:

FS 785, Seminar for Student Teachers*
 FS 786, Seminar for Student Teachers*
 FS 788, Student Teaching of Young Children*

*These courses are required for nursery/kindergarten certification.

Supporting Courses

EDUC 500* (may substitute FS 708 or FS 709); THDA 583* or 621; PSYC 581; KIN 600* or 675; MATH 601* or FS 797* Exploring Mathematics with Young Children; FS 760, 772, 773, 794, 797 (Families in Poverty); EDUC 706*, 733, 734, 750, 751, 760.

*These courses are required for nursery/kindergarten certification.

Family Support/Provisional Certification Family Life Education

This specialization is for students interested in working with children, adolescents, and adults either as individuals or as families. Students develop knowledge and skills to prepare them to provide family support, direct services, and family life education. This specialization prepares students to work in human service settings. Students in this specialization may choose a plan of study leading to a provisional certification as a family life educator.

The National Council on Family Relations has approved the Department of Family Studies undergraduate program as meeting the Standards and Criteria required for the Provisional Certified Family Life Educator (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 the broad range of issues that constitute family life education and increases credibility by validating the individual's education and experience.

Department Courses

FS 525, Human Development*
 FS 545, Family Relations*
 FS 641, Parenting Across the Life Span*
 FS 746, Human Sexuality*
 FS 757, Race, Class and Gender*
 FS 760, Family Programs and Policies*
 FS 794, Families and the Law*
 FS 553, Personal and Family Finance for Family Life Professionals*

or

FS 653, Family Economics*
 FS 623, Developmental Perspectives on Infancy and Early Childhood

or

FS 624, Developmental Perspectives on Adolescence and Early Adulthood
 FS 772, International Approaches to Child Advocacy

or

FS 773, International Perspectives on Children and Families

Students accepted into the CFLE Program must also take:

FS 782, Family Internship*
 FS 792, Seminar for Family Interns*

*These courses are required for the Certified Family Life Educator designation.

Supporting Courses

Gerontology Minor
 FS 750, Contemporary Issues in Adolescent Development
 Research Methods course (e.g., PSYC 502)
 NURS 535; PSYC 552, 582; SOC 525, 540, 675; SW 524, 525, 697A, 697B, 697C; CMN 530 or PSYC 762.

Individual and Family Development Specialization

This specialization is for students with a broad interest in working with families. This 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 lifespan development and family dynamics.

Department Requirements

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 and Gender
 FS 794, Families and the Law

Supporting Courses

FS 750, Contemporary Issues in Adolescent Development
 FS 760, Family Programs and Policies
 FS 782, Family Internship
 FS 792, Family Internship Seminar
 Research Methods course (e.g., PSYC 502, Research Methods in Psychology)
 PSYC 552, 581, 582
 NURS 535,
 SOC 540
 A foreign language
 Work with the Institute on Disabilities

General Education

CS 401, Introduction to Computers
 Statistics course: e.g., PSYC 402 or SOC 502 or HHS 540

Internships

Internship students will apply knowledge gained from their academic studies in a supervised environment. The internship involves a commitment of fifteen hours per week for two semesters, plus a three-hour seminar every other week. Students apply for the internship during the spring semester of their junior year. Internship applicants must have completed 20 credits of departmental coursework prior to their senior year with a minimum overall grade-point average of 3.00 and a departmental grade-point average of 3.20 or higher. Internship requirements vary depending on specialization. Internship courses will count toward the 20 credits required in supporting courses.

Minor

The department offers a minor to interested students in related majors. Minor requirements include FS 525, FS 545, and three additional courses chosen in consultation with a departmental adviser. Individual course grades must be C or above and the overall grade-point average for the 20 credits must be at least 2.00. Students desiring a minor in family studies are advised to consult with the departmental administrative manager as early as possible.

Health Management and Policy

(For descriptions of courses, see page 170.)

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 and the American College of Health Care Administrators, both of which are represented by student chapters at the University. There is also 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 general education requirements, HMP collateral courses, and the HMP core courses including a field practicum. Students work closely with their assigned faculty advisers to develop a plan of study to achieve completion of each of these components. Additionally, several upper-level HMP elective courses are available.

University General Education Requirements:

Advisers assist students in selecting courses that satisfy certain program expectations and simultaneously meet University general education requirements.

HMP-Required Collateral Courses:

A basic understanding is expected in each of the following areas related to health management and policy: (1) microeconomics, (2) finite math or calculus, (3) organizational behavior, (4) statistics, and (5) accounting. HMP faculty advisers work with students to select the appropriate courses to fulfill these requirements. In general, students are advised to complete their collateral coursework prior to their junior year in the major. Program-approved courses in organizational behavior and U.S. Health Care Systems (HMP 401) must have been completed successfully before a student may begin junior-level studies in the major.

HMP Core Courses:

Each of the following courses must be completed by HMP majors prior to graduation.

Introductory courses include HMP 400, Introduction to Health Management and Policy; HMP 401, U.S. Health Care Systems; HMP 402, Health Man-

agement and Policy Critical Issues; HMP 501, Epidemiology and Community Medicine; HMP 630, Health Issues Seminar I; HMP 631, Health Issues Seminar II.

Upper-division courses include HMP 711, Health Systems Research I; HMP 712, Health Systems Research II; HMP 721, Managing Health Care Organizations; HMP 723, Health Planning; HMP 740, Health Care Financial Management; HMP 742, Strategic Management for Health Care Organizations or HMP 748, Health Policy Analysis; HMP 744, Ethical Issues in Health Management and Medicine; and HMP 746, Health Policy. Upper-division courses are not offered every semester and students generally progress through these courses in a sequential order.

Field Practicum:

A full-time practicum (or administrative internship) that integrates class work with a supervised managerial work experience constitutes an essential part of the academic program. It allows students to explore an area of special interest in depth. Courses comprising this component of the major include: HMP 621, Prepracticum Seminar; HMP 622, Field Practicum; and HMP 623, Post Practicum Seminar. The practicum is divided into three concurrent components: A. Field Practicum Organizational Analysis; B. Field Practicum Management Skills Development; and C. 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 request, efforts will be made to arrange practica at distant sites based on special needs.

HMP field practica currently occur during the summer between the junior and senior year in the major. They begin in late May and end in late August and require a full-time commitment.

HMP Elective Courses:

Elective courses within the program may include: HMP 430, Alternative Medicine and Health; HMP 505, Public Health: History and Practice; HMP 569, Human Behavior and the Public Health; HMP 642 Health Economics; HMP 730, Managed Care; HMP 750, Comparative Health Care Systems; and HMP 755, Long Term Care Management and Policy. In addition, seniors may have the opportunity to elect independent studies (HMP 796) through individual arrangements with HMP faculty. Majors are encouraged to enroll in one or more of these courses before graduation.

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 2.50 by the end of the semester preceding their practicum. Students not maintaining an overall grade-point average of 2.50 are reevaluated by the faculty and may be counseled into another major area of study 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 are encouraged to contact the department's director of undergraduate studies. Students seeking internal transfer into the major must complete an internal transfer application form and meet with the 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 and efficient manner.

Honors in Major

The department offers an Honors in Major program. To qualify, students must meet the department's requirement of having an overall 3.20 grade-point average at UNH and a 3.30 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 as well as 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 Minor in Health Management

The department offers an integrated minor in health management designed for students majoring in clinically oriented professional programs offered through other departments in the School of Health and Human Services. Students not enrolled in the school who wish to minor in health management may inquire about doing so by contacting the department's director of undergraduate studies. Students accepted into the minor must complete: (1) three required courses (HMP 401, U.S. Health Care Systems; HMP 721, Managing Health Care Organizations; and HMP 710, Financial Management for Clinicians); (2) one HMP elective course (HMP 501, Epidemiology and Community Medicine; HMP 430, Alternative Medicine and Health; HMP 505, Public Health History and Practice; HMP 569, Human Behavior and the Public Health; HMP 642 Health Economics; HMP 744, Ethical Issues in Health Management and Medicine; or HMP 755, Long Term Care Management and Policy; HMP 746, Health Policy; and (3) one additional elective course

from a list approved by the department. Students seeking to minor in health management must complete the application available in the department office and meet with the department's director of undergraduate studies before commencing the minor.

Kinesiology

(For descriptions of courses, see page 180.)

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 five options described below. While options 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 option makes extensive use of field experiences and internships that blend theory with practice.

The department offers five areas of study for majors: (1) athletic training, (2) exercise science, (3) outdoor education, (4) sport studies, and (5) physical education pedagogy. Students who wish to minor in kinesiology must complete 20 credits of coursework that have been approved by a department minor adviser. No more than 6 of the 20 credits may be earned through activity or coaching courses.

Students interested in majoring or minor in kinesiology should consult with the specific option coordinator.

Athletic Training Option

An athletic trainer implements injury prevention programs and immediate treatment and rehabilitation procedures for injured individuals as directed by physicians. The Commission on Accreditation of Allied Health Education Programs (CAAHEP) - accredited athletic training option prepares professionals qualified to attend the athlete, the fitness-conscious jogger, or the skilled professional athlete.

Students take coursework in prevention, evaluation, management, care, and rehabilitation of athletic injuries as well as administration, education, and counseling. Students must earn a grade of C (2.00) or better in all KIN required courses and ZOOL 507-508.

Students gain clinical experience in University athletic training rooms and at off-campus clinical sites. Successful completion of the entire program, including 1,000 hours of supervised clinical experience, qualifies students to take the NATA-BOC Certification Exam. Students who wish to pursue both NATA-BOC certification and public school teacher certification should also see the pedagogy option. This double course of study will require between five and six years.

Students are admitted to the University in the athletic training option with conditional status. Specific criteria must be met during the student's first year before he/she may apply for full-time status in the option, which is awarded to those students demonstrating exemplary performance in classes and clinical observations. Additionally, option 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 accommodations, they can meet the standards. It is very important that interested students consult with option coordinator, Dan Sedory, regarding entry criteria and the technical standards.

Required Courses

Required Courses	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, Athletic Training for the Professional I	4
KIN 658 L01, Athletic Training for the Professional I Lab	1
KIN 659, Athletic Training for the Professional II	4
KIN 659 L01, Athletic Training for the Professional 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	2
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 710, Organization and Administration of Athletic Training Programs	4
KIN 715, Seminar in Athletic Training	4
KIN 718, Career Preparation in Athletic Training	4
KIN 780, Psychological Factors in Sport	4

University Required Courses

NUTR 400, Nutrition in Health and Well Being	4
PSYC 401, Introduction to Psychology	4
Statistics Course	4
ZOOL 507-508, Human Anatomy and Physiology	8

Exercise Science Option

This curriculum prepares individuals for career opportunities in fitness and health promotion programs in hospitals, industry, and communities. Exercise scientists work in physical activity programs of prevention, intervention, and rehabilitation. Students must earn a grade of C (2.00) or better in every required course. Students may repeat a required course only once. Failure to achieve a grade of C (2.00) or better on this repeat will result in separation from the Exercise Science Option. All required courses must be completed before enrolling in KIN 650. Interested students should consult with the option coordinator, Timothy Quinn.

Required Courses

Required Courses	Credits
KIN 585, Emergency First Responder	4
KIN 620, Physiology of Exercise	4
KIN 621, Exercise Laboratory Techniques	3
KIN 650, Exercise Science Internship	8
KIN 652, Clinical Kinesiology	3
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 & Prescription	4
KIN 737, Personal Training and Exercise Leadership	4
KIN 794, Practicum in Cardiac Rehabilitation	3

University Required Courses

One course chosen from SOC 502, PSYC 402, or HHS 540	4
CHEM 403-404, General Chemistry	8
CS 403, Online Network Applications	4
NUTR 400, Nutrition in Health and Well Being	4
PSYC 401, Introduction to Psychology	4
ZOOL 507-508, Human Anatomy and Physiology	8

Outdoor Education Option

The outdoor education option prepares individuals for careers in the educational, managerial, and/or therapeutic aspects of physical activity in natural and challenging environments. The option is interdisciplinary in scope, uses the various natural resources in seacoast and mountain areas, and provides students ample opportunity for practical application and field experience. Students must earn a grade of C (2.00) or better in every required course. In addition they must complete 100 days of documented leadership experience prior to be-

ginning an internship. Interested undergraduate students should consult with the undergraduate curriculum coordinator, Deb Sugerman.

Required Courses	Credits
KIN 540, Top Rope Rock Climbing	2
KIN 541, Management of Challenge Course	4
KIN 543, Winter Backpacking	2
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 681, Theory of Adventure Education	4
KIN 682, Outdoor Leadership	4
KIN 684, Emergency Medical Care: Principles and Practices	3
KIN 685, Emergency Medical Care: Principles and Practices Lab	2
KIN 686, Wilderness Emergency Medical Care	4
KIN 687, Leadership Practicum	4
KIN 786, Organization and Administration of Outdoor Education	4
KIN 650, Internship* (2-4) Cr/F	

*Note: Proof of 100 days of leadership experience is required prior to taking this course.

Elective Courses (must successfully complete at least one)	Credits
KIN 545, High Angle Rescue	2
KIN 546, Whitewater Canoeing	3
KIN 547, Lead Rock Climbing	3
KIN 548, High Altitude Mountaineering	4
KIN 549, Wilderness Programming Skills	4-8
KIN 782, Therapeutic Applications of Adventure Programming	4
KIN 693C, Teaching Assistantship 2	Cr/F

University Required Courses	Credits
ENGL 501, Introduction to Prose Writing	4
<i>Other: Core of courses emphasizing the particular area or population in outdoor education of interest to student, e.g., business, education, psychology-selected with assistance of an adviser</i>	
	20

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. Students 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. Students must earn a grade of C (2.0) or better in each required University and KIN course. Cognate courses are required in supporting areas such as business, psychology, or in any other approved areas. 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, Stephen Hardy.

Required Courses	Credits
KIN 562, Introduction to Sports Information	4
KIN 565, Principles of Coaching	4
KIN 580, The Sport Industry	4
KIN 750, Theories of Motivation in Sport	4
KIN 741, Social Issues in Contemporary Sports	4
KIN 761, Senior Seminar in Sport Studies	4

Electives
Sixteen credits of approved sport studies electives to include KIN 650 or KIN 696.

University Required Courses	Credits
CS 401, Computer Applications	4
SOC 400, Introductory Sociology	4
One approved statistics course	4

Cognate Requirement (outside of Department of Kinesiology)
Students must select a second major, a minor, or a package of cognate courses approved by the faculty (minimum 20 credits). Suggested areas are administration, communication, economics, English, history, psychology, and sociology.

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 movement and physical activity-based elementary, middle, 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 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 2.67 or above and 900 or above on the Graduate Record Examination) (see page 31). Students not seeking certification will find a bachelor's degree a solid basis for successful teaching or coaching in settings such as athletic or fitness clubs, YWCAs and YMCAs, boys' and girls' clubs, private schools, or resorts.

Internal transfer candidates must have a minimum grade-point average of 2.50. All physical education pedagogy option students must receive a "C" grade (2.00) or better in KIN 563, Middle School and Secondary PE Pedagogy; KIN 606, Middle School and

Secondary PE Practicum; KIN 692, Elementary PE Pedagogy; KIN 781, Special PE Pedagogy; and KIN 783, Elementary PE Practicum. Students who accumulate a total of three grades below C (2.00) in required departmental courses will be separated from the pedagogy major. A student may complete a required class only once.

Interested students should consult with the option coordinator, Steven Wright.

Required Courses	Credits
KIN 500, Historical and Contemporary Issues in Physical Education	4
KIN 504, Skill Analysis and Assessment	4
KIN 527, Scientific Foundations of Health and Fitness	4
KIN 563, Middle School and Secondary Physical Education Pedagogy	4
KIN 600, Movement Fundamentals	4
KIN 601, Lifetime Sports	3
KIN 602, Adventure Activities	3
KIN 603, Team Sports	3
KIN 604, Modern Dance	4
KIN 606, Middle School and Secondary Physical Education Practicum	4
KIN 608, Track and Field	1.5
KIN 609, Gymnastics	1.5
KIN 620, Physiology of Exercise	4
KIN 652, Clinical Kinesiology	3
KIN 653B, Biomechanical Analysis of Movement	2
KIN 675, Motor Development and Learning	4
KIN 692, Elementary Physical Education Pedagogy	4
KIN 780, Psychological Factors in Sport	4
KIN 781, Special Physical Education Pedagogy	4
KIN 783, Elementary Physical Education Practicum	4

University Required Courses	Credits
EDUC 500, Exploring Teaching	4
PSYC 401, Introduction to Psychology	4
ZOOL 507-508, Human Anatomy and Physiology	8

Nursing

(For descriptions of courses, see page 209.)
The nursing program is nationally accredited. 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 caring, critical thinking, problem solving, decision making, and developing clinical skills. Clinical experiences are offered in area hospitals and in community health agencies. The senior year culminates in a practicum in which students apply curriculum concepts to an interest area of their choice.

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 cumulative grade-point average of 3.20.

The following prerequisite courses must be completed successfully prior to the first clinical course, NURS 514, Techniques of Clinical Nursing: ENGL 401; ZOOL 507-508; NUTR 400; PSYC 401; MICR 501; and NURS 501. A course in statistics must be completed prior to, or taken concurrent with, NURS 645, Nursing Research. Prerequisite courses require grades of C or better and only one prerequisite course may be repeated one time in order to achieve successful completion.

Most of the prerequisite courses also meet general education requirements. A cumulative grade-point average of 2.50 must be attained prior to NURS 514 and maintained throughout the program. Major courses require a minimum grade of C.

Students are responsible for their own transportation to clinical agencies, uniforms, professional equipment, liability and health insurance coverage, and selected immunizations. Additional costs associated with the program include laboratory fees each semester beginning in sophomore year and fees associated with attendance at professional meetings. Students must be certified in cardiopulmonary resuscitation before the first clinical course and recertified as necessary until graduation.

Freshman Year	Fall	Spring
ZOOL 507-508, Human Anatomy and Physiology	4	4
NUTR 400, Nutrition in Health and Well Being	4	—
ENGL 401, Freshman English	4	—
PSYC 401, Introduction to Psychology	—	4
Electives (3)	4	8
Total	16	16

Sophomore Year

MICR 501, Microbes in Human Disease	4	—
NURS 501, Introduction to Nursing	4	—
One course in statistics*	4	—
NURS 502, Concepts of Pathophysiology/Pharmacology	—	4
NURS 508, Foundations of Nursing Judgment	—	4
NURS 514, Techniques of Clinical Nursing	—	4
Electives (2)	4	4
Total	16	16

Junior Year

NURS 615, Care of the Adult	8	—
NURS 619, Clinical Decision Making I	4	—
NURS 620, Caring for the Childbearing and Childrearing Family	—	8
or NURS 618, Caring for People with Alterations in Mental Health, and NURS 624, Nursing in the Community	—	4
NURS 622, Clinical Decision Making II	—	4
NURS 645, Nursing Research	4	—
Elective	—	4
Total	16	16

Senior Year

NURS 703, Nursing Leadership/Management and the Organizational Context	4	—
NURS 618, Caring for People with Alterations in Mental Health, and NURS 624, Nursing in the Community	4	—
or NURS 620, Caring for the Childbearing and Childrearing Family,	8	—
NURS 720, Professional Nursing Practice: Transitions	—	8
Electives 3	4	8
Total	16	16

*HHS 540, PSYC 402, SOC 502, etc.

R.N. Baccalaureate Program

Registered nurses with a valid 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 at UNH in Durham, Keene, or at Manchester.

Curriculum requirements may be met through transfer credits, course enrollments, and challenge examinations. An R.N. license and one year of practice experience are required for all nursing coursework.

The nursing component is based on the belief that R.N. 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.

The R.N. student must earn a minimum of 128 credits and have a 2.50 cumulative grade-point average in order to enroll in clinical nursing courses and maintain that grade-point average throughout their coursework. A minimum grade of C is required in each nursing course.

Interested R.N.s should consult with the R.N. program coordinator at Keene or Manchester.

Occupational Therapy

(For descriptions of courses, see page 211.)

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. ACOTE's phone number is (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

Effective January 1, 2007, 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 freshmen or transfer into the B.S./M.S. program during their sophomore or junior 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. After successful completion of 128 credits of

coursework, including required courses for the major in occupational therapy, students will be awarded a bachelor's degree in occupational therapy.

Students desiring to become registered occupational therapists will apply for admission to the graduate school during their senior year. Students will be admitted into the master's program based on admission requirements for the program and program capacity. Students admitted to the entry-level master's program will begin taking occupational therapy courses in their senior year that apply to both their bachelor's degree and master's degree. Students will then continue their professional education for an additional year and two summers, which includes academic coursework and six months of required level II fieldwork. After successful completion of all academic work and fieldwork, students will receive a Master of Science in Occupational Therapy. They will then be eligible to sit for the certification examination administered by the National Board of Certification of Occupational Therapists (NBCOT). Please refer to the *Graduate Catalog* for additional information about the master's program and the fifth year of the occupational therapy curriculum including fieldwork requirements.

To receive a bachelor's degree in occupational therapy in the B.S./M.S. program, students take the following core courses during their first three years:

ENGL 401, Freshman English
 PSYC 401, Introduction to Psychology
 ZOOL 507 and 508, Human Anatomy and Physiology
 Social Sciences courses: three courses
 OT 500, The Behavior and Development of Children
 OT 501, Development Tasks of Adulthood
 OT 510, Exploring Occupational Therapy
 OT 685, Psychosocial Disorders and Everyday Life
 KIN 706 and 707, Neurology and Neurology Lab
 Statistics

Additionally, elective courses need to include: (1) an experiential learning course for four credits, (2) a health or social policy course, and (3) a minor or self-designed concentration area that relates to health and human services for a total of 20 credits.

During the senior year, students begin the professional curriculum and complete the following courses:

OT 741, Human Occupation I
 OT 742, Human Occupation II
 OT 751, Mind Body Systems Neurologically-based Function and Dysfunction
 OT 752, Human Movement in Occupations
 OT 761, Occupational Therapy: Professional Roles and Principles of Practice

OT 762, Occupational Therapy Evaluation and Intervention I
 OT 771, Occupation-based Program Development in the Community I
 OT 772, Occupation-based Program Development in the Community II

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 of Occupational Therapy works closely with students during academic advising sessions and shares information about policy and requirement changes during registration periods as well as throughout the academic year. Students are also 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 published annually in the *OT Department Policy and Procedure Manual*, which is distributed to all new students. Students are expected to insure they have updated information on the department's current policies and procedures.

Recreation Management and Policy

(For descriptions of courses, see page 223.)

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, 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 by 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 National Recreation and Parks Association/American Association of Leisure and Recreation. 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: (1) program administration, which includes the professional core and required courses related to program administration, or (2) a specialized option in therapeutic recreation, which includes the professional core and required courses in therapeutic recreation.

International Study in Recreation and Leisure

A semester abroad sponsored by the American Universities International Program is available to students pursuing a degree in recreation management and policy. Programs in Scotland, Australia, New Zealand, South Africa, or Belize provide discipline-related exchange opportunities. Approval by the curriculum director is required approximately one year before departure. Eleven transfer credits can be granted. Other destinations can be negotiated through the Center for International Education on campus.

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 (A or B), Professional Internship; RMP 724, Grantsmanship, Evaluation, and Research; and RMP 772, Law and Public Policy in Leisure Services.

A supervised internship (RMP 664) is required of all majors. 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 minimum of 560 hours of supervised field study within fourteen weeks. 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 non-profit 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 ex-

perience 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 meeting planning, municipal park and recreation services, recreational youth 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; two RMP course electives; CS 401, Computer Applications, or an approved equivalent; HHS 540 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.

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- to 16-week full-time clinical internship under the supervision of a Certified Therapeutic Recreation Specialist (CTRS). Students must purchase personal liability insurance for coverage for the clinical components of the curriculum. The Bureau of Labor Statistics reports that therapeutic recreation is one of the fourteen fastest growing occupations in the country. The occupational outlook statistics reflect a "39 percent increase in demand for recreational therapists with strong clinical backgrounds" for the beginning of the twenty-first century. Upon successful completion of

this option, students are prepared to meet sitting requirements for the National Council for Therapeutic Recreation Certification Examination.

In addition to the 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 603, Assessment and Treatment Planning in Therapeutic Recreation; RMP 604, Therapeutic Communication and Facilitation Techniques in Therapeutic Recreation; CS 401, Computer Applications or approved equivalent; HHS 540, or equivalent; PSYC 561, Abnormal Behavior; FS 525, Human Development; ZOOL 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 year. Applications can be obtained from the Department of Recreation Management and Policy. Students within the major are required to maintain a minimum 2.50 semester grade-point average every semester to retain good academic standing within the major. In addition, student majors must obtain a grade of C (2.00) or better in RMP courses and a grade of C- (1.67) or better in all other courses specifically required by the department.

Social Work

(For descriptions of courses, see page 226.)

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 knowledge, skills, and value base of social work and the liberal arts. Social work graduates apply their education in working with individuals, groups, and social systems. In addition, the program prepares qualified students to pursue graduate education in schools of social work and other graduate programs in human services.

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 foundation of social welfare policy, social work practice, human behavior in the social environment, research, and field education. Course content on values and ethics, populations-at-risk, human diversity, and social and economic justice is integrated throughout the curriculum.

To enable students to gain direct experience and to integrate classroom content with the demands of professional social work practice, students complete an introductory-year field observation as well as a 450-hour social work internship over two semesters during the senior year. The senior field placement is a "capstone" experience in the final year of the baccalaureate program and is arranged between the student and the field education coordinator. Students are required to pay a liability insurance fee for their off-campus field education experience.

Social work majors earn the B.A. degree with a notation on their University records, "majored in social work." This is equivalent to a B.S.W. degree. Graduates are eligible for practice in a variety of social work settings throughout the United States and full membership in the National Association of Social Workers. In addition, qualified graduates may be eligible for advanced standing in M.S.W. programs which offer advanced standing.

Academic Program

Social work majors are required to take ZOOL 401; SW 524, 525, 550, 551, 601, 622, 623, 640, 640A, 641, 641A. In addition, students are expected to successfully complete four courses taken from the disciplines of anthropology/sociology, macroeconomics, philosophy, and psychology. Many of these may also fulfill general education requirements. Students wishing to minor in social work are required to take SW 524, 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) 862-1799.

COLLEGE OF LIFE SCIENCES AND AGRICULTURE

Andrew A. Rosenberg, Dean
Patricia D. Bedker, Associate Dean

Department of Animal and Nutritional Sciences
Department of Biochemistry and Molecular Biology
Department of Microbiology
Department of Natural Resources
Department of Plant Biology
Department of Resource Economics and Development
Department of Zoology

Bachelor of Arts

Plant Biology
Zoology

Bachelor of Science

Animal Sciences
Bioscience and Technology
Equine Sciences
Preveterinary Medicine
Biochemistry
Biology
Ecology, Evolution, and Behavior Biology
General Biology
Marine and Freshwater Biology
Molecular, Cellular, and Developmental Biology
Community Development
Dairy Management
Environmental and Resource Economics
Environmental Conservation
Environmental Affairs
Environmental Science
Environmental Horticulture
General Studies
Medical Laboratory Science
Microbiology
Nutritional Sciences
Plant Biology
Soil Science
Tourism Planning and Development
Water Resources Management
Wildlife Management
Zoology

Bachelor of Science in Forestry

Forestry
Forest Management
Forest Science

The objectives of the College of Life Sciences and Agriculture 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 career teaching to molecular biology and biotechnology.

A blend of the basic and applied aspects of life sciences and agriculture, coupled with careful selection of supportive courses, ensures graduates 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 communications experts.

Community governments employ graduates as service planners and land-use specialists, teachers in traditional and vocational 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, departments prepare students for advanced study in their chosen field of interest where graduate study is required for attaining their career goals.

Some of the courses prescribed in these degree programs partially fulfill the general education requirements. Students should see their adviser for specific information.

Bachelor of Arts

The bachelor of arts degree is available in plant biology and zoology. Students must accumulate 128 credits, attain a 2.00 cumulative grade-point average, satisfy general education requirements, and complete a foreign language requirement (see Degree Requirements for specific B.A. language requirements). Check individual departmental listings for specific major requirements and minimum acceptable grades in major courses.

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 in Forestry

The bachelor of science in forestry is a professional, designated degree available to students majoring in forestry. (See Forestry for major requirements.)

General Science Certification

Students majoring in animal sciences, biochemistry, biology, environmental conservation, forestry, microbiology, plant biology, soil science, water resources management, wildlife management, zoology, or general studies may seek certification to teach science at the middle, junior, or high school level.

For further information, contact the co-

Degrees

The college offers three undergraduate degrees: the bachelor of arts, the bachelor of science, and the bachelor of science in for-

ordinator 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, Taylor 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

CHEM 403

BIOL 411

General education requirement

LSA 400

An introductory course in any department in the college

Spring

CHEM 404

BIOL 412

MATH 424B

General education 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 (check University Academic Requirements for more information):

Minors: See page 20.

Second Majors: See page 20.

Dual-Degree Programs: See page 19.

Student-Designed Majors: See page 105.

Other combined and interdisciplinary opportunities: See page 102.

Interdisciplinary Minors

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 business 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

EREC 501, Agricultural and Natural Resource Product Marketing *or* MKTG 550, Survey of Marketing

EREC 504, Business Management for Natural Resource Firms

EREC 606, Land Economic Perspectives: Uses, Policies, and Taxes

EREC 715, Linear Programming and Quantitative Models

For additional information, contact Alberto B. Manalo, Environmental and Resource Economics Program Coordinator, 309 James Hall, (603) 862-3917.

Animal Behavior Minor

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 5 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 either Dr. Michelle Scott or Dr. Win Watson, in the Zoology Department.

Required Courses (2):

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 711, Sensation and Perception

PSYC 721, The Experimental Analysis of Behavior

PSYC 731, Brain and Behavior

PSYC 732, Evolution and Behavior

PSYC 733, Drugs and Behavior

PSYC 735, Neurobiology of Mood Disorders

PSYC 737, Behavioral Medicine

BCHM 702, Endocrinology

BCHM 761, Cellular Signaling Transduction in Health and Disease

KIN 652, Clinical Kinesiology

ZOOL 709, Environmental Physiology of Animals

ZOOL 714, The Ecology of Animal Behavior (Shoals)

ZOOL 733, Behavioral Ecology

ZOOL 778, Neuroscience Techniques

Community Planning

Land use and its impact on the quality of life has emerged as a major policy issue in New Hampshire, as well as at the national and global levels. Planning is a multidisciplinary profession that requires people who understand the technical tools and social concepts required to guide the selection and implementation of alternative schemes compatible with long term environmental and economic objectives. Students may supplement their major and general education course 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

Group I-Theory and practice of planning (both courses required)

CD 614, Fundamentals of Planning (prereq: EREC 411)

CD 777, Topics in Community Planning (prereq: CD 614)

Group II-Tools and applications in planning (choose two)

CIE 505, Surveying (coreq: MATH 426)

NR 757, Photo Interpretation and Photogrammetry

NR 760, Geographic Information Systems in Natural Resources

NR 609, Soils and Community Planning *or* NR 703, Watershed Water Quality Management (prereq: NR 504 or permission)

SOC 660, Community Sociology *or* GEOG 590, Introductory Cartography

Group III-Resource management theory (choose one)

CD 717, Law of Community Planning

ECON 641, Public Economics (prereq: ECON 401, ECON 605, or permission)

EREC 572, Introduction to Natural Resource Economics
 EREC 606, Land Economic Perspectives: Uses, Policies, and Taxes
 EREC 627, Community Economics (prereq: EREC 411 or equivalent)
 EREC 756, Rural and Regional Economic Development (prereq: ECON 605)
 TOUR 767, Social Impact Assessment

Group IV-Additional complementary electives (optional)

CD 794, Community Planning Internship
 GEOG 582, Economic Geography
 GEOG 583, Urban Geography

For additional information, contact Professor Alberto B. Manalo, Community Development Program coordinator, 309 James Hall.

Genetics

The interdepartmental program in genetics involves faculty from the departments of animal and nutritional sciences, biochemistry and molecular biology, microbiology, plant biology, and zoology. Course descriptions can be found in the genetics entry on page 168 of this catalog, as well as in the listings of the cooperating departments. M.S. and Ph.D. degrees in genetics are offered through the Graduate School. An undergraduate major in genetics is not currently offered. Undergraduates interested in genetics can pursue a minor (see requirements below). Students interested in preparing for graduate work in genetics should contact the chairperson of the genetics program early in their undergraduate careers for advice on courses.

Genetics Minor

Completion of 20 credits from the following courses is required for a minor in genetics. At least one course should be selected from each of the subdisciplines listed below. Three (or more) credits of GEN 795, Investigations in Genetics, may be counted as one course toward fulfillment of the minor.

Transmission Genetics

GEN 702, Genetics Lab (prereq: BIOL 604)
 GEN 706, Human Genetics (prereq: BIOL 604)
 GEN 753, Cytogenetics (prereq: BIOL 604)

Molecular Genetics

GEN 711, Genomics and Bioinformatics (prereq: BIOL 604)
 GEN 715, Molecular Evolution (prereq: BIOL 604)
 GEN 754, Laboratory in Biochemistry and Molecular Biology of Nucleic Acids (prereq: BCHM 658/659 or 751; or permission)
 GEN 771, Molecular Genetics (prereq: BCHM 658 or 751; BIOL 604)
 GEN 774, Plant Biotechnology and Genetic Engineering (prereq: BIOL 604)

GEN 782, Developmental Genetics (prereq: BIOL 604; BCHM 658 or 751)

Population and Quantitative Genetics

GEN 705, Population Genetics (prereq: BIOL 604)
 GEN 723, Quantitative Genetics (prereq: BIOL 604)

Marine Biology

The minor in marine biology, available to all students in the University, consists of 20 credits with grades of C- or better and no pass/fail courses.

Department Requirements

Introductory course (choose one)

ESCI 501, Introduction to Oceanography
 ZOO 503, Introduction to Marine Biology
 ZOO 674, Field Marine Science

Interest concentration courses (choose four)

BCHM 702, Endocrinology
 EREC 610, Coastal and Oceanic Law and Policy
 EREC 611, Marine Resource Economics
 ESCI 501, Introduction to Oceanography
 MICR 707, Marine Microbiology
 MICR 714, Water Pollution Microbiology
 NR 610, Coastal and Oceanic Law and Policy
 PBIO 625, Introduction to Marine Botany
 PBIO 721, The Microscopic Algae
 PBIO 722, Marine Phycology
 PBIO 725, Marine Ecology
 PBIO 727, Algal Physiology
 TECH 797, Undergraduate Ocean Research Program
 ZOO 610, Principles of Aquaculture
 ZOO 611, Principles of Aquaculture Lab
 ZOO 628, Marine Invertebrate Evolution and Ecology
 ZOO 674, Field Marine Science
 ZOO 710, Ichthyology
 ZOO 711, Zooplankton Ecology
 ZOO 712, Mammalogy
 ZOO 720, Marine Biology for Teachers
 ZOO 722, Ecology of Marine Fishes
 ZOO 725, Marine Ecology
 ZOO 730, Underwater Research
 ZOO 750, Biological Oceanography
 ZOO 751, Research in Marine Biology
 ZOO 753, Marine Vertebrates
 ZOO 772, Fisheries Biology
 ZOO 773, Physiology of Fish
 ZOO 775, Reproduction and Development of Marine Invertebrates
 ZOO 795, Underwater Research

Sustainable Living

Issues of sustainable living involve every aspect of life. To learn about sustainable living, a community and bioregional context is desirable. The student must be aware of environmental issues and problems, have an understanding of ecology, increase his or her capacity to think about complex problems, and have hands-on learning experiences to

approach effectiveness in sustainable living. Students taking the sustainable living minor will, at minimum, take the courses listed below. Courses should be taken in roughly the order listed.

Required

BIOL 541, General Ecology, or
 NR 527, Forest Ecology, or equivalent
 NR 535, Contemporary Conservation Issues and Environmental Awareness,
 or NR 502, The Endangered Forest,
 or equivalent
 NR 784, Sustainable Living
 NR 785, Systems Thinking for Sustainable Living

Choose one of the following

AOE 630, Development of Food and Fiber in Third-World Countries
 ECON 607, Ecological Economics
 GEOG 673, Environmental Geography
 PBIO 407, Sustainable Gardening (summers only)
 PBIO 682, Sustainable Food Systems
 NR 501, Introduction to Soil Sciences
 NR 504, Freshwater Resources
 NR 719, Wetlands Mitigation and Restoration
 NR 720, International Environmental Politics and Policies for the 21st Century
 NR 724, Resolving Environmental Conflicts
 NR 725, Environmental Communications and Advocacy

(Other course selections must be approved by Dr. Robert Eckert.)

Choose one of the following

NR 601, Environmental Conservation and Sustainable Living Internship
 NR 750, Applied Environmental Philosophy

For additional information please contact Dr. Robert Eckert, Natural Resources Department, James Hall.

Wetland Ecology

Students in biology, environmental conservation, forestry, plant biology, soil science, water resources management, wildlife management, and zoology 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 in wetland soils, vegetation, and hydraulic functions. Fulfilling the requirements of this minor in combination with one of the above bachelor programs will enhance employment opportunities.

Required

NR 504, Freshwater Resources,
 or NR 703, Watershed Water Quality Management
 NR 711, Wetland Resource Management
 NR 716, Wetland Delineation,
 or NR 719, Wetlands Mitigation and Restoration,
 or ZOO 708, Stream Ecology

Recommended

EOS 713, Biogeochemical Dynamics
 ESCI 653, Estuaries and Coasts
 PBIO 566, Systematic Botany
 PBIO 625, Introduction to Marine Botany
 PBIO 721, The Microscopic Algae
 PBIO 747, Aquatic Higher Plants
 NR 425, Field Dendrology
 NR 501, Introduction to Soil Sciences
 NR 602, Natural Resources and Environmental Policy
 NR 611, Soils and Environmental Quality
 NR 704, Soil Genesis and Classification
 ZOO 725, Marine Ecology

Programs of Study**Adult and Occupational Education**

(For program description, see page 36. For descriptions of courses, see page 157.)

Animal Sciences

(For descriptions of courses, see page 133. See also page 210, *Nutritional Sciences*.)

The undergraduate animal sciences program at UNH provides students with fundamental and applied education in nutrition, reproduction, genetics, physiology, pathology, cell biology, and large animal management. Courses are offered in all areas of dairy and light horse production.

The Department of Animal and Nutritional Sciences is housed in Kendall Hall, a five-story animal research facility. This building houses the New Hampshire Veterinary Diagnostic Lab; an electron microscopy facility; and nutrition, physiology, and cell culture labs, all of which provide opportunities for students interested in basic animal sciences. The department maintains a light horse center and offers an equine program with courses in management, equine diseases, equine discipline, physical performance, and horsemanship specializing in dressage and combined training. Dairy facilities include housing for more than one hundred milking-age cows in the new \$1.6-million Dairy Teaching and Research Center. Miniature swine are maintained at the Burley-Demerritt farm. Extensive poultry facilities also permit research and work experience in poultry science.

The animal sciences program offers two majors: animal science-with options in (1) equine sciences, (2) bioscience and technology, and (3) preveterinary medicine-and dairy management. In addition to satisfying the specific requirements of these majors or options, all animal science and dairy management majors must complete the Univer-

sity general education requirements. The department also offers a program in nutritional sciences.

The equine sciences option is intended to prepare students for a career in the equine industry. While the basic curriculum for this option provides students with the fundamental background in the equine sciences, preparation in a particular area of specialization is achieved by choosing courses from one of the following two areas of concentration: equine industry equestrian management or equine industry agribusiness management.

Students in the bioscience and technology option often specialize in nutrition, reproduction, genetics, or cell biology. This curriculum prepares students for advanced training in graduate school programs or in various medical professions; entry-level positions in biomedical, biotechnical, pharmaceutical, and other scientific companies; or technical positions in many research and medical units.

The preveterinary medicine option is designed to meet the academic requirements of most veterinary schools. Requirements may be met within three years, allowing students to apply to veterinary school during their senior year. However, most students finish their senior year, thus allowing more time for electives, concentration in areas of secondary interest, and completion of graduation requirements.

Employers in agriculture prefer to hire an agricultural graduate with extensive knowledge in a related field (e.g., computer science) rather than a graduate in one of these areas with no knowledge of agriculture. Hence, animal science students are encouraged to obtain training in a field that complements study in animal sciences. Such areas may include cell biology, biotechnical skills, communications, computer science, education, or business. This is generally accomplished by either taking a concentration of courses or obtaining a minor in a "specialty" area. Attainment of sufficient training in a "specialty" area enhances opportunity for employment. A careers course is offered to help students select and prepare for a particular career area.

Development of optional career goals is important for preveterinary students. Admission to schools of veterinary medicine is highly competitive. Therefore, students in this option are urged to prepare for alternative careers as they complete preveterinary requirements.

All animal science majors are required to complete ANSC 406; CHEM 403-404; and either ENGL 501, 502, 503, 519, or 529. In

addition, the requirements in one of the three following options must also be completed:

Equine Sciences Option

ANSC 511-512; EREC 411 or ECON 402; BIOL 528 or PSYC 402 or SOC 502; ANSC 404, 600, 605, 609, 612, 620, 622, 625, 697, or 796; two 700-level ANSC courses; and at least five courses from one of the following two groups: (A1.) Equine Industry Equestrian Management Group: ANSC 507, 604, 605, 653-654; KIN 501; CMN 500 or MGT 580; EREC 501 or MKTG 550, EREC 504; DCE 491-492 or CS 401. (A2.) Equine Industry Agribusiness Management Group: ANSC 605, 701, 724; EREC 501 or MKTG 550, EREC 504; DCE 491-492 or CS 401, MGT 580 and MGT 713.

Bioscience and Technology Option

BIOL 411-412; PHYS 401-402; MATH 424B; BIOL 528; MICR 503 or BIOL 541; ANSC 511-512 or ZOO 518 and 625/626; CHEM 545 or 651-652; BIOL 604; BCHM 658/659 or 751-752; ANSC 750 and one 700-level ANSC course.

Preveterinary Medicine Option

BIOL 411-412; PHYS 401-402; MATH 424B; BIOL 528; MICR 503; ANSC 511-512; BIOL 604; CHEM 651/653 and 652/654; BCHM 658/659; ANSC 750 and one 700-level ANSC course.

(For course requirements for the B.S. degree in dairy management, see Dairy Management, page 85.)

General Science Certification

See pages 33 and 78.

Biochemistry and Molecular Biology

(For descriptions of courses, see page 141.)

The field of biochemistry and molecular biology encompasses a broad range of the molecular life sciences, from biophysics and biochemistry to applied biology and medicine. The B.S. in biochemistry is based on a solid foundation in biology, chemistry, physics and math, along with advanced courses in molecular biology, biochemistry, cell biology, and genetics. The combined B.S.-M.S. degree program allows outstanding students with well-defined career plans to augment their bachelor's degree program with an intensive research program and graduate-level course work leading to the master's degree.

The department offers specialized training in the areas of molecular genetics, signal transduction, gene regulation, bioinformatics, molecular evolution, cancer biology, macromolecular interactions, glycobiology, lipid metabolism, endocrinology, genomics, and proteomics. Undergraduate students are encouraged to become involved in research projects sponsored by external granting agencies such as the National Institutes of Health, the National Science Foundation, and others.

Students interested in the biochemistry

major should consult with the department chairperson or a faculty member as early as possible to ensure the most effective curricular planning.

For first-year students with a strong high school preparation in both chemistry and mathematics (including calculus), the following schedule is recommended:

Fall

BIOL 411, Principles of Biology I
CHEM 403, General Chemistry I
MATH 425, Calculus I
ENGL 401, Freshman English

Spring

BIOL 412, Principles of Biology II
CHEM 404, General Chemistry II
MATH 426, Calculus II
General education course

For first-year students lacking a strong background in chemistry and mathematics, the following schedule is recommended:

Fall

BIOL 411, Principles of Biology I
CHEM 403, General Chemistry I
any course
ENGL 401, Freshman English

Spring

BIOL 412, Principles of Biology II
CHEM 404, General Chemistry II
MATH 424B, Calculus for Life Sciences
General education course

Bachelor of Science in Biochemistry

The bachelor's degree in biochemistry consists of a set of core requirements (Group I) and a set of required electives from several subject areas (Groups II-V):

I. All of the following

BIOL 411, 412, Principles of Biology I, II
CHEM 403, 404, General Chemistry I, II
MATH 425, 426, Calculus I, II, or
424B, Calculus for Life Sciences and
BIOL 528, Applied Biostatistics I
MICR 503, General Microbiology
BIOL 604, Principles of Genetics
BIOL 605, Eukaryotic Cell and Developmental
Biology
CHEM 547/549 and 548/550, Organic Chemistry,
or CHEM 651/653 and 652/654, Organic Chemistry,
or CHEM 545/546, Organic Chemistry
and BCHM 658/659, General Biochemistry
PHYS 401, 402, Introduction to Physics I, II,
or PHYS 407, 408, General Physics I, II
CHEM 517, Quantitative Analysis
BCHM 751-752, Principles of Biochemistry
BICHEM 755, Laboratory in Biochemistry and
Molecular Biology

II. One of the following molecular biology courses

BCHM 711, Genomics and Bioinformatics

BCHM 766, Environmental Genomics
BCHM 771, Molecular Genetics
BCHM 782, Developmental Genetics

III. One of the following biochemistry courses

BCHM 702, Endocrinology
BCHM 750, Physical Biochemistry,
or CHEM 683, 684, Physical Chemistry I, II
BCHM 761, Cellular Signaling Transduction in
Health and Disease
BCHM 794, Protein Structure and Function

IV. One of the following laboratory techniques courses

BCHM 754, Laboratory in Biochemistry and
Molecular Biology of Nucleic Acids,
or BCHM 799, Senior Thesis (4 cr.),
or BCHM 795, Investigations in Biochemistry and
Molecular Biology (4 cr.)
ANSC 714, Research Methods in Endocrinology,
or ANSC 746, Animal Cell Culture,
or ANSC 751, Cell Culture,
or ANSC 752, Mammalian Cell Culture
CHEM 756, Advanced Organic Chemistry
Laboratory,
or CHEM 763, Instrumental Methods of Chemical
Analysis Laboratory
GEN 702, Genetics Lab,
or GEN 753, Cytogenetics
MICR 602, Pathogenic Microbiology,
or MICR 704, Genetics of Prokaryotic Microbes,
or MICR 705, Immunology,
or MICR 706/708, Virology and Virology Lab,
or MICR 717, Microbial Physiology
PBIO 774/775, Plant Biotechnology and Genetic
Engineering
ZOO 778, Neuroscience Techniques

V. One additional course from groups II-IV

The biochemistry curriculum provides most of the required and recommended courses for students seeking admission to professional schools in medicine, dentistry, veterinary medicine, and pharmacy. Students who major in biochemistry can also use their training in conjunction with advanced degrees in law and business.

Approximately 50 percent of the students who graduate with a major in biochemistry seek advanced degrees. Many biochemistry majors go on to attend graduate school in all areas of the life and biomedical sciences, especially graduate programs in genetics, molecular biology, biochemistry, cell biology, and chemistry. Recipients of an M.S. degree are more attractive to employers and often obtain better positions, greater salaries, and more responsibility and independence. A Ph.D. degree is eventually required for those who wish to direct research programs, be involved in state-of-the-art scientific research, become a professor in a college or university, or obtain an executive position in a science-related area of industry or government.

Students obtaining the B.S. in biochemistry 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. Students graduating in biochemistry 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 also qualifies graduates to teach at the elementary, junior high, and high school levels.

Combined Bachelor of Science and Master of Science in Biochemistry

This accelerated five-year program leading to a combined bachelor and master's degree in biochemistry is designed for highly motivated and qualified students seeking additional training to further their career goals as a researcher in the life sciences.

Admission Policy

Admission to the combined degree program is highly competitive. Students wishing to pursue this option must have a grade-point average greater than 3.20 at the time of application. A thesis adviser must be identified during the junior year, and the approval of the adviser and department chairperson must be obtained. Prior to the first semester of the senior year, the student must formally apply to the Graduate School and receive early admission. The requirement for the Graduate Record Examinations is waived for combined degree applicants.

Requirements

Thirty credits of graduate level (800-900) coursework (including dual credit courses) must be completed. Six to 8 credits must be taken during the senior year, and are applied to both the B.S. and M.S. requirements. All other requirements for the M.S. degree (see Graduate School catalog) must be followed, including completion of preliminary exams, conducting a research project, and passing an oral examination based on the master's thesis project.

Suggested Program

Because of the intensive nature of the combined degree program, the thesis research project should be initiated as early as possible. A guidance committee should be established no later than the beginning of the fifth year to approve the student's proposed course of study. The following schedule is recommended:

Junior year

Identify thesis adviser and begin research project during the summer following junior year.

Senior year

Senior thesis (BCHM 799) during both semesters and the following summer, along with two dual-credit courses (800/900 level).

Fall semester, fifth year

Two 800/900 level courses (6-8 cr.)
BCHM 997 (1 cr.)
BCHM 899 (5 cr.)

Spring semester and summer, fifth year

One 800/900 level course (3-4 cr.)
BCHM 998 (1 cr.)
BCHM 899 (5 cr.)
Special topics (1-2 cr. as needed)

Research should be completed and the master's thesis defended during the summer.**Support**

Students in the B.S./M.S. program are eligible for support through University Financial Aid. Additional support may be available from the student's adviser.

General Science Certification

See pages 33 and 78.

Biology

(For descriptions of courses, see page 141.)

The interdepartmental program in biology is designed to provide a strong and a 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 to encourage the development of high-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 programs.

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. Student in the biology major take a common core curriculum involving introductory and upper level courses. They select one of three areas of concentration (options). These are: (1) ecology, evolution, and behavior biology; (2) marine and freshwater biology; and (3) molecular, cellular, and developmental biology. For students who prefer a broader background without specialization, or are interested in pursuing a career in teaching, the fourth option, *general biology* (with an additional choice of teaching certification), is available.

While students are advised to declare the biology major as incoming freshmen to assure adequate program planning, transfer into the program at a later stage is also possible. Students who wish to concentrate in a specific area of biological sciences other than the options within the biology program should consider a major in animal science, biochemistry, microbiology, plant biology, or zoology. The biology core curriculum is followed by students in all these programs. This makes changing majors a very simple process.

Biology Core Curriculum

All biology and several of the biological sciences majors begin with the biology core curriculum. The biology courses in the core curriculum constitute an integrated sequence of courses imparting basic knowledge of biology in order to expose the 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. While it is recommended that the core curriculum be substantially completed in the first two years, students are encouraged to consult with their academic

adviser to select one or more courses in their major during the sophomore year that may provide a gateway to the major. This may result in delaying one or more of the core courses in the junior year. By the end of the sophomore year, students are expected to have selected a departmental major or one of the four biology options leading to a B.S. degree. These options are: (1) *general biology*; (2) *ecology, evolution, and behavior biology*; (3) *marine and freshwater biology*; and (4) *molecular, cellular, and developmental biology*.

Biology Core Curriculum Courses

BIOL 400, Perspectives in Biology¹
BIOL 411 & 412, Introductory Biology²
BIOL 541, Ecology
MICR 503, Microbiology
BIOL 604, Genetics

CHEM 403 & 404, Introductory Chemistry
CHEM 545/546 and BCHM 658/659, Organic Chemistry³
or CHEM 651/653 and CHEM 652/654, Organic Chemistry³

MATH 424B or 425, Calculus
BIOL 528 or MATH 426, Statistics⁴

PHYS 401 and 402, Introduction to Physics
ENGL 501 (or equivalent), Introduction to Creative Nonfiction⁵
EDUC 500⁵

Typically, students take BIOL 400; BIOL 411 & 412; CHEM 403-404; and Calculus 424B in their freshman year, and then complete the remainder of their core requirements during the sophomore and junior years.

In addition to the core curriculum, the requirements for individual options are described separately.

¹BIOL 400 is required only for first year biology majors.

²BIOL 411 and 412 are not sequential and may be taken in reverse order.

³CHEM 651/653 and 652/654 and ENGL 501 are required for premedical or affiliated professional programs.

⁴MATH 425, Calculus II can be substituted for Statistics, but we recommend Statistics.

⁵Required only for those preparing for teacher certification.

Academic Requirements

To receive the B.S. degree in biology, students must complete 128 credit hours with a 2.0 cumulative grade-point average (GPA). Courses must include all UNH General Education requirements, biology core curriculum requirements, and the requirements for the selected option. A minimum grade of C- is required in all biological science courses that are counted towards the requirements for a degree in biology (all four

options). 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 complete 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 this level.

Students should consult with their academic adviser during their freshmen and sophomore years for assistance in determining the most appropriate option or major for their professional goals. Since biology core courses are required of all biological science majors, it is relatively easy to change majors within the biological sciences during this period.

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 Web site for details (www.shoals.unh.edu) or the Cornell Web site at 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 or the biology program office. Financial support is available for most of these programs.

Premedical and other pre-health professional students should visit the premedical office in Hood House for additional information on requirements for specific professional schools. 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: BCHM/ANSC 702, ZOOL 518, ZOOL 625/626, BIOL 605, BCHM 751/752, ANSC 511/512.

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's approval. A Petition for Academic Variance approved by the biology program director is required to count 795-796 experiences for more than one major required course. Students should check the UNH WEBCAT (webcat.unh.edu), the biology Web site (biology.unh.edu), and the UNH online catalog for updates and current course offerings.

Biology Options

In order to receive a B.S. in biology, a student may choose from one of the four biology options: (1) general biology; (2) ecology, evolution, and behavior biology; (3) marine and freshwater biology; and (4) molecular, cellular, and developmental biology. A complete list of approved courses in each option is available from the student's adviser, the biology program office (G-87 Rudman Hall), and the biology program Web site at biology.unh.edu.

The *general biology option* within the biology major provides broad-based training in the biological sciences for students who prefer not to specialize at the undergraduate level. Students must choose eight courses in addition to the biology core curriculum courses as specified in the categories listed in the option requirements (see Web site biology.unh.edu). Within the biology core, BIOL 528 is preferred to MATH 426; however, either is acceptable, and the sequence CHEM 545/546-BCHM658/659 is preferred to CHEM 651/653-652/654, for all students in the option, except for those who are pre-health professionals. Corequisite lecture and lab courses count as one course. Courses listed in more than one category will satisfy requirements in only one category.

The *marine and freshwater biology (MFB) option* provides broad-based training in the aquatic biological sciences for students who prefer to take additional courses in the area of marine and freshwater biology. Students interested in aquaculture and fisheries may also choose this option by taking appropriate courses in consultation with their adviser. Students must choose eight courses in addition to the biology core curriculum courses to fulfill the requirements of this option. All students must take General Limnology (PBIO/ZOOL 717) or Field Limnology (PBIO/ZOOL 719). For additional course requirements, the students should visit the biology Web site at biology.unh.edu.

The *molecular, cellular, and developmental biology (MCDB) option* provides an opportunity for broad training in molecular, cellular, and developmental biology, and the biotechnology area for students who would like to achieve limited specialization in this field. Students interested in the interdisciplinary fields of genetics, genomics, and bioinformatics may also choose this option by taking appropriate courses in consultation with their adviser. This is in addition to broad-based training in the basic areas of biology and related physical sciences covered in the core curriculum. Students

choose eight courses from list of approved courses (available on the Web at biology.unh.edu) in addition to biology core curriculum courses, in order to complete this option. The sequence CHEM 651/653-CHEM 652-654 is preferable to CHEM 545/546BCHM 658/659.

The *ecology, evolution, and behavior (EEB) option* within the biology program provides broad training in organismal and environmental biology, and provides an opportunity for limited specialization in the field of ecology, conservation, evolution, or behavior. Students must choose eight courses in addition to the biology core curriculum to complete this option. All students are required to take ZOOL 690. An additional seven courses should be selected as specified in the list of approved courses (biology.unh.edu). Within the biology core, BIOL 528 is preferred to MATH 426; however, either is acceptable.

Prehealth Professional Program

Students who wish to pursue postgraduate degrees in the health care professions should visit the premedical advising office in Room 9, Hood House. For more information, call (603) 862-3625 or visit the program's Web page at www.unh.edu/premed-advising.

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 page 33 in 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 ZOOL 412; (2) one course from each of the three major organism groups: (a) animals (ANSC or ZOOL courses), (b) microbes (MICR courses), and (c) plants (PBIO courses); (3) two additional biological sciences courses at the 600-700 level.

Students interested in a biology major or minor should contact the Biology Program Office, G-87 Rudman Hall, 862-3066.

Community Development

(For descriptions of courses, see page 148.)

The community development program prepares students for professional careers as local government administrators, town or regional land-use planners, and community facilitators and educators. It is an applied social science degree program that gives the student an understanding of the interrelated social, economic, political, environmental, and technical factors that influence a community and its residents. The curriculum takes an interdisciplinary approach and includes field experience and internships as vital components that complement classroom and independent research.

Students majoring in community development are encouraged to concentrate in one of three areas: (1) community change and development, (2) community public administration, and (3) community and regional planning. These areas of specialty provide the necessary background and training to prepare graduates for entry-level positions with local municipalities and agencies throughout the nation. The community development program also provides a firm base for graduate study in a variety of areas such as regional planning, public administration, rural sociology, economic development, and law.

A minor in community development or community planning provides opportunities for students in other areas to better understand the application of their knowledge to specific community issues. A community development minor complements majors in both technical fields and liberal arts.

Local municipalities in New England are turning to full-time professional administrators to assume responsibility for the day-to-day administration, management, and planning activities that were previously carried out by part-time town officials. Officials at the New Hampshire Municipal Association estimated that New Hampshire needs, each year, at least twenty-five new graduates in community and public administration to fill local government professional needs. In addition to professional administration or planning positions in local or regional government, employment opportunities are also available with public agencies and organizations at the state, national, and international levels.

Students interested in the challenges of community development should consult with Albert B. Manalo, program coordinator

and chairperson of the Department of Resource Economics and Development, 309 James Hall, (603) 862-3917.

Required Courses

CD 415, Community Development Perspectives
 CD 508, Applied Community Development
 CD 614, Fundamentals of Planning
 CD 777, Topics in Community Planning
 CD 794, Community Planning Internship,
 or CD 793, Community Administration Internship
 CMN 500, Public Speaking
 EREC 411, Environmental and Resource Economics Perspectives
 EREC 525, Statistical Methods and Applications
 EREC 606, Land Economic Perspectives: Uses, Policies, and Taxes
 EREC 627, Community Economics
 EREC 775, Research Methods
 TOUR 705, Ecotourism: Managing for the Environment
 or TOUR 767, Social Impact Assessment
 MATH 420, Finite Mathematics
 MGT 580, Introduction to Organizational Behavior
 MGT 712, Managing Change and Conflict in Organizations
 POLT 503, State and Local Government and Politics

Dairy Management

(For descriptions of courses, see page 133.)

The dairy management program, offered by the Department of Animal and Nutritional Sciences, 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, thereby acquiring actual management experience along with their basic subject matter training. The UNH Teaching and Research Center, a modern dairy facility, houses approximately one hundred milking cows plus a similar number of nonlactating animals.

In addition to the University's general education 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, 650; CS 401; PBIO 421; EREC 504

Summer Internship

ANSC 600

Third Year

ANSC 609, 612, 530, 650, 701, 715

Fourth Year

ANSC 698, 708, 710, 724, 727, 728, 743; MGT 580 or 713

Students interested in pursuing graduate studies take MATH 424B, CHEM 545-546, BCHM 658-659 and MICR 503 in lieu of PBIO 421 and CS 401.

Environmental and Resource Economics

(For descriptions of courses, see page 165.)

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. In addition, students must satisfy general education 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 biology departments.

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*

CD 614, Fundamentals of Planning
 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
 EREC 504, Business Management for Natural
 Resource Firms
 EREC 525, Statistical Methods and Applications
 EREC 775, Research Methods
 MATH 420, Finite Mathematics, or MATH 424B,
 Calculus for the Life Sciences

**At least five of the following, of which two must
 be 700 level**

EREC 501, Agricultural and Natural Resource
 Product Marketing
 EREC 572, Introduction to Natural Resource
 Economics
 EREC 606, Land Economic Perspectives: Uses,
 Policies, and Taxes
 EREC 611, Marine Resource Economics
 EREC 627, Community Economics
 EREC 633, Economics of Travel and Tourism
 EREC 676, Economics of Water Use and Quality
 Management
 EREC 708, Environmental Economics
 EREC 715, Linear Programming and Quantitative
 Methods
 EREC 756, Rural and Regional Economic
 Development

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 3.20 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 Alberto B. Manalo, 309 James Hall, (603) 862-3917.

Environmental Conservation*(For descriptions of courses, see page 204.)*

The program in environmental conservation provides a broad background for understanding environmental and resource problems and their solutions. Development of policies and planning are essential to resolving environmental problems and require a foundation in biology as well as government and economics.

Students must choose a 32-credit option (environmental affairs or environmental science) or develop a concentration that is related to specific career goals (for example, in the areas of environmental education, ecology, or conservation biology). Students choosing the latter route incorporate a minor or equivalent into their concentration. In addition to courses in the options or concentrations, a student must complete the 18 core courses. Courses in the EC program major must be completed with a grade of C- or better.

Students interested in the Environmental Conservation major should consult with Mimi Larsen Becker, program coordinator.

The following eighteen courses are required of all majors

NR 400, Professional Perspectives in Natural Resources
 NR 401, Introduction to Natural Resources
 PBIO 412, Introductory Botany
 ZOO 412, Principles of Zoology

Ecology Electives: Check all courses for prerequisites. Choose one of the following

BIOL 541, General Ecology
 NR 425, Field Dendrology
 NR 433, Wildlife Ecology
 NR 660, NZ: Biodiversity and Ecology
 PBIO 566, Systematic Botany
 ZOO/PBIO 503, Intro to Marine Biology

A second course should be selected from the following

EREC 411, Environmental and Resource Economics Perspectives
 NR 527, Forest Ecology
 NR 661, NZ: Ecosystem Management and Restoration Ecology
 NR 765, Community Ecology
 PBIO 724, Freshwater Algal Ecology
 PBIO/ZOO 725, Marine Ecology
 PBIO 742, Physiological Ecology
 CHEM 403, General Chemistry

Economics Elective: Choose one of the following

ECON 605, Intermediate Microeconomic Analysis
 ECON 607, Ecological Economics
 ECON 645, International Economics

ECON 668, Economic Development
 ECON 669, Women and Economic Development
 ECON 670, Economics of Energy
 ECON 707, Economic Growth and Environmental Quality

EREC 606, Land Economics Perspective: Uses, Policies, and Taxes
 EREC 611, Marine Resource Economics
 EREC 627, Community Economics and Finance
 EREC 676, Economics of Water Use and Quality Management
 EREC 708, Environmental Economics
 NR 643, Economics of Forestry

NR 602, Natural Resources and Environmental Policy

NR 701, Ecological Values and Ethics, or
 PHIL 755, Environmental Ethics, or
 HIST 618, American Environmental History
 NR 504, Freshwater Resources

NR 501, Introduction to Soil Sciences

One communication skills course

AOE 650, CMN 500, NR 725, THDA 520, 583, 621, 622, 624

One writing skills course

ENGL 501, 503, 519, 529

One statistical skills course

BIOL 528, PSYC 402, SOC 502, or equivalent

NR 637, Practicum in Environmental Conservation, 4 credits. The practicum is a student-initiated independent project involving field work on an actual conservation activity, off campus, during the senior year. There is a 100-hour minimum time commitment which may be public service or for pay.

NR 775, Natural Resources Senior Project

General Science Certification

See pages 33 and 78.

Minor in Environmental Conservation

A minor in environmental conservation is available to students outside of the environmental conservation major. This minor consists of five courses or 20 credits. The following are the categories and/or specific courses required:

Required

1. Any one of the following: PBIO 412, ZOO 412, BIOL 411, BIOL 412. Note that BIOL 411/412 is usually restricted to students in the College of Life Sciences and Agriculture. The recommended courses are PBIO 412 or ZOO 412.
2. NR 435, Contemporary Conservation Issues and Environmental Awareness.
3. One course in ecology. Some possibilities include, but are not limited to: BIOL 541, NR 433, NR 527, NR 660 (NZ)

4. One intermediate level course (600-level or higher) in ecological economics, resource economics, or environmental policy. Examples are NR 662, Environmental Policy, Planning and Economics in New Zealand's Political Context; NR 720, International Environmental Politics and Policies for the 21st Century; ECON 607, Ecological Economics; EREC 606/611/627 or 676. (The prerequisite for the EREC or ECON 607 courses is an introductory course in micro economics, such as EREC 411.)
5. One of the following: NR 504, Freshwater Resources; NR 501, Introduction to Soil Sciences; NR 502, The Endangered Forest; or NR 750, Applied Environmental Philosophy; NR 661, Ecosystem Management and Restoration Ecology in New Zealand.

For additional information please contact Dr. Mimi Laisen Becker, Department of Natural Resources, James Hall.

Environmental Conservation Off-Campus Programs

The environmental conservation program offers two programs which provide an option to spend a semester abroad. The *Geocommons Program* offers 12 credits in international sustainable communities (NR 680, 681, 682) by providing semester experiences in communities that are striving for sustainability in India and France. Emphasis is on the human dimensions of community-building, ecological design, and a sense of place (coordinator: Dr. Robert Eckert).

The *UNH-EcoQuest New Zealand Program* provides highly motivated students with the opportunity to engage in a unique multidisciplinary, research-oriented field study program. Four fully integrated courses (NR 660, 661, 662, and 663 for 16 credit hours) focus on the ecological, resource management, conservation and sustainability issues important to the natural environment, economy, and culture of New Zealand over a full semester. Alternatively, students can participate in a summer session five-week two-course intensive (NR 660, 662 for eight credit hours). Students engaged in this learning community will examine unique ecosystems, watershed scale restoration, and undertake a problem-solving, hands-on integrated approach to resource management investigations which incorporate cultural, economic, and policy dimensions of the New Zealand environment. The UNH EcoQuest New Zealand Program coordinator is Dr. Kimberly Babbitt.

Forestry

(For descriptions of courses, see page 204.)

Forestry is the art and science of managing and understanding the natural and human dimensions of forests and forest use. The forestry program is designed to provide graduating professionals with a sound technical preparation and a broad general education. The forest management and forest science options of the forestry major leading to the bachelor of science in forestry degree (B.S.F.) are 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.

Professional foresters are employed by private industry, public agencies, public interest firms, groups, educational institutions, research organizations, and consulting firms. Foresters manage forests, provide for wildlife habitat and forest recreation, protect water and soil resources, and assure a sustainable supply of forest products. Some graduates work toward natural resource protection and the improvement of environmental quality.

Forestry education at UNH focuses on ecosystem management for diversity, productivity and health, based on multidisciplinary collaboration. There are opportunities in international forestry. Many students enter graduate school for advanced training in forest biology or forest management.

Technical, administrative, and managerial skills are required of all professional foresters. This program provides a foundation in scientific knowledge, as well as technical and managerial skills, with elective freedom to cultivate special abilities and interests.

Students majoring in forestry must complete 130 credits of classroom work and 4 credits of field training. University general education requirements are included in this total.

Besides these formal courses, all forestry majors are required to have at least one summer of forestry work experience (NR 599). While students are responsible for their own summer work, placement assistance is available from the faculty.

In the junior year, students must choose to concentrate in either of the following options (and must earn 24 credits within that concentration to graduate):

Forest Management Option

This option is designed for students who intend to plan a career in forest resource

management. Requirements: NR 753, Decision Sciences in Natural Resource Management; NR 754, Wood Products Manufacture and Marketing; RMP 711, Recreation Resource Management; one course in administration, 500 level or higher; two courses (8 credits) in advanced forestry, wildlife, hydrology, soils, resource management, urban forestry, recreation, or administration.

Forest Science Option

In this option, students may specialize in specific forest sciences as background for graduate school or focus their interests in areas other than forest management. Areas of concentration include forest biology, ecology, soil science, watershed management, international forestry, and others. Students in this option are encouraged to minor in the area of their choice.

Minors

Nonforestry majors may minor in forestry by completing 20 to 22 credits of coursework approved by the forestry program faculty.

Freshman Year

BIOL 528, Applied Biostatistics I or equivalent
ENGL 401, Freshman English
MATH 424B, Calculus for Life Sciences
NR 400, Professional Perspectives of Natural Resources
NR 401, Introduction to Natural Resources
NR 425, Field Dendrology
NR 426, Wood Science and Technology
NR 542, Forestland Measurement and Mapping
PBIO 412, Introductory Botany
One oral communication skills course

Sophomore Year

CHEM 403, General Chemistry
EREC 411, Environmental and Resource Economics Perspectives, or
ECON 402, Principles of Economics (Micro)
NR 433, Wildlife Ecology
NR 501, Introduction to Soil Sciences
NR 506, Forest Entomology
NR 527, Forest Ecology
NR 544, Forest Biometrics
NR 599, Work Experience
General education elective 4, 5, 6, or 8
General education elective 4, 5, 6, or 8

Junior Year

NR 602, Natural Resources and Environmental Policy
NR 629, Silviculture
NR 643, Economics of Forestry
NR 652, Forest Resources Assessment
NR 670, Forest Fire Protection
PBIO 651, Plant Pathology
Professional option
General education elective 4, 5, 6, or 8
General education elective 4, 5, 6, or 8

Senior Year

NR 745, Forest Management

NR 775, Natural Resources Senior Project

NR 757, Photo Interpretation and Photogrammetry

Professional option

Professional option

Professional option

NR 703, Watershed Water Quality Management, or

NR 504, Freshwater Resources

General education elective 4, 5, 6, or 8

Students interested in the forestry program may consult with the program coordinator, Mark Ducey, James Hall.

General Science Certification

See pages 33 and 78.

General Studies

General studies provides a flexible curriculum for students with a broad, general interest in several areas of life sciences and agriculture. It cuts across departmental lines and in some respects resembles a self-designed major. General studies is not intended to be a catch-all for students from other colleges, but is designed to serve the needs of life sciences and agriculture students. Requirements for a general studies major are CHEM 403-404; BIOL 411-412 (or PBIO 412 and ZOOL 412); PHYS 401-402; and six additional courses in the college (or closely related courses approved by the adviser) two of which must be at the 600 level and two at the 700 level. These courses should be interrelated in such a way that they will help students meet their goals for employment or further study.

Freshmen who are unsure of a major should not declare general studies as a major but should remain undeclared for a semester or two (see Undeclared Status). The program is generally not available to students entering their senior year.

Genetics Program

The Genetics Program offers master's and Ph.D. degrees in genetics. Undergraduates interested in Genetics can pursue their interests within the context of any of the following B.S. degree programs: biology, animal sciences, biochemistry and molecular biology, microbiology, plant biology, and zoology. For course entries in genetics, see course descriptions under GEN, as well as relevant courses listed under the fore-listed departments and programs. Students interested in preparing for graduate work in genetics at UNH or elsewhere should contact the chairperson of the genetics program early in their undergraduate careers for advice on courses.

Medical Laboratory Science

(For descriptions of courses, see page 199.)

The Medical Laboratory Science (MLS) program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). The program is ideal for students who are interested in pursuing a challenging and rewarding career in analytical biomedicine. The curriculum for MLS majors provides students with a sound background knowledge in the biological and physical sciences and a quality education in specialized science theory and laboratory skills. In addition, the curriculum offers students an opportunity to become more knowledgeable in the arts, humanities, and social sciences. Students entering the MLS program can pursue a degree in one of two tracks: (1) a B.S. in MLS-Clinical Track; (2) a B.S. in MLS-Research Track. They will initially enroll in the MLS program without designating a specific MLS track. Students will be informed of the specifics of the MLS-Clinical Track and MLS-Research Track in their freshman year course, MLS 401, Introduction to Medical Laboratory Science. Also, students may obtain detailed information concerning the two MLS tracks from their academic advisers. A decision to pursue a specific MLS track must be made by the end of the junior year.

NAACLS requires that all MLS students understand the essential functions that will be required of a certified medical technologist. Requirements include: a sound intellect; good motor skills; eye-hand coordination and dexterity; effective communications skills; visual acuity to perform microscopic analyses, or read procedures, graphs, etc.; professional skills such as the ability to work independently, manage time efficiently, and comprehend, analyze and synthesize various materials, as well as have sound psychological health and stability. Contact the MLS program director for more information.

MLS-Clinical Track

Students selecting the MLS-Clinical Track spend their freshman, sophomore, and junior years and the fall semester of their senior year on the University campus. During the spring semester of the senior year, these students take clinical internship at one of the clinical affiliates. Clinical internship positions are limited. Selection to fill available positions will be based on established criteria published in the *MLS Student Handbook*, including professionalism, academic performance, interviews, and references.

Students enrolled in the MLS-Clinical Track may choose the generalist option to

become certified as a medical technologist or choose to specialize in either clinical microbiology, clinical cematology, clinical immunohematology, or clinical chemistry. Students choosing the generalist option will spend 24-26 weeks at a clinical affiliate where they complete clinical courses in Advanced Clinical Microbiology (MLS 751), Advanced Clinical Hematology (MLS 752), Advanced Clinical Immunohematology (MLS 753), and Advanced Clinical Chemistry (MLS 754). Upon successful completion of this program, students are awarded the B.S. degree and are eligible to take the American Society of Clinical Pathologists (ASCP) and National Certification Agency (NCA) certification examinations. Students choosing the categorical option will spend 20-24 weeks at a clinical internship site where they complete either Clinical Microbiology Internship (MLS 761), Clinical Hematology Internship (MLS 762), Clinical Immunohematology Internship (MLS 763), or Clinical Chemistry Internship (MLS 764). Upon successful completion, students are awarded the B.S. degree and are eligible to take the ASCP and NCA categorical examinations in their specialty area.

Graduates of the MLS-Clinical Track perform various medical laboratory tests and provide the diagnostic assistance required in modern patient care. These professionals are vital members of the health care team, performing various analytical procedures in a wide variety of biomedical laboratories. Graduates are employed in hospitals, biotechnology, research, industry, education, and a variety of other health care settings. A list of essential functions necessary for work in a clinical lab is available from the MLS office.

All students participating in clinical courses must purchase liability insurance and show evidence of selected immunizations. Internship fees will be charged by the clinical affiliate in some instances.

MLS-Research Track

The curriculum for this track focuses on providing students with a quality education in the fundamentals of biomedical laboratory science and laboratory skills in addition to a broad-based university general education. This track is appropriate for students desiring employment in a wide variety of biomedical research laboratories in universities, medical schools, diagnostic product companies, biotechnology companies, hospitals, government agencies, etc. Students seeking a degree in this track are qualified to pursue advanced education in the biomedical fields.

Students intending to pursue advanced degrees should consult with their academic advisers as early as possible so that appropriate academic plans can be established. Graduates of this track are qualified to seek postgraduation clinical internship if they wish to attain certification as a medical technologist or a specialist.

Students pursuing a degree in the MLS-Research Track follow the same curriculum as the curriculum required for the MLS-Clinical Track with the exception of taking a semester of additional courses in a related area, such as:

PBIO 754, Laboratory in Biochemistry and Molecular Biology of Nucleic Acids	5
MICR 702, Infectious Disease and Health	5
MICR 706, Virology	3
MICR 752, Mammalian Cell Culture	5
GEN 753, Cytogenetics	4
MLS 796, Biomedical Research Internship	Var
MLS and other courses (consult with academic advisers)	

Research track students do not take a clinical internship in their senior year.

MLS-Clinical Track: Academic Requirement

Students pursuing a degree in the MLS-Clinical Track must obtain a grade of C or better in all MLS courses. These students must also have achieved a minimum 2.50 cumulative grade-point average (GPA) at the time of application for clinical internship (junior year), and must maintain that minimum until the internship begins. A personal interview at the clinical affiliate is required. This interview evaluates a student's understanding of the profession, communication skills, maturity, self-confidence, and supervisory potential. Students must demonstrate these attributes to participate in the clinical courses.

MLS-Research Track: Academic Requirement

The students in the MLS-Research Track must meet the UNH requirements for the bachelor of science degree.

Career Mobility Program

This option is designed to make the B.S. degree in MLS available to certified laboratory assistants, medical laboratory technicians, military-trained laboratory personnel, and other individuals with at least two years of full-time recent experience in a clinical laboratory. This may be done on a full- or

part-time basis by taking required courses at UNH or other accredited institutions. Students may challenge MLS clinical course requirements through credit by examination. Written and practical examinations are available in the areas of clinical microbiology, clinical hematology, clinical immunohematology, clinical chemistry, and urinalysis/body fluids. Students interested in the option should contact the MLS program director.

MLS Minor

Students may obtain a minor in MLS by successfully completing three MLS core courses and two additional approved electives for a minimum of 20 credits. Students interested in the MLS minor should consult the MLS program director.

MLS Fast Track

This program is designed for students with a B.S. degree in a life science who wish to become eligible for certification as a medical technologist. The student must have a clinical sponsor, such as Path Lab, Inc., which will provide clinical training. Students will take MLS theory classes in hematology, clinical chemistry, immunohematology, urinalysis and body fluids, mycology and parasitology, and laboratory management, as well as any prerequisites or background courses required for the program. Courses are taken through the Division of Continuing Education, and no degree is conferred at completion. Contact the MLS program director for more information.

Required Courses

ANSC 511, Anatomy and Physiology
 BIOL 411/412, Principles of Biology I and II
 BIOL 604, Genetics
 CHEM 403-404, General Chemistry
 CHEM 545/6 Organic Chemistry
 BCHM 658/9 Biochemistry
 MICR 503, General Microbiology
 MICR 602, Pathogenic Microbiology
 MICR 705, Immunology
 MATH 424B, Calculus for Life Sciences, or BIOL 528, Applied Biostatistics I
 MLS 500 Introduction to Laboratory Methods
 MLS 602, MLS Seminars
 MLS 610, Laboratory Management
 MLS 650A, Phlebotomy
 MLS 650B, Phlebotomy Internship
 MLS 651, Clinical Serology
 MLS 652, Clinical Hematology
 MLS 653, Immunohematology
 MLS 654, Clinical Chemistry
 MLS 655, Urinalysis/Body Fluid
 MLS 720, Mycology/Parasitology

Microbiology

(For descriptions of courses, see page 200.)

Microbiology explores the world of organisms too small to be seen with the unaided eye. The primary emphasis in the Department of Microbiology is on prokaryotes (bacteria and archaea) and viruses. The curriculum provides basic familiarity with microorganisms, their interactions with other life forms (including humans), and their roles in natural systems and processes.

Baccalaureate degree holders in microbiology secure positions in industry (food and beverage, pharmaceutical, bioproducts, etc.); in city, state, and federal agencies (public health, environmental quality, regulatory, etc.); or in universities or research institutes.

The Department of Microbiology offers programs of study leading to the bachelor of science degree. Microbiology is widely recognized as being both a basic life science and a highly pragmatic applied science. The curriculum within the microbiology program is intended to accommodate the diverse needs of potential students. It provides solid training for individuals intending to enter the workforce or to pursue graduate education in the biological sciences, biomedicine, or biotechnology. It also provides for entry into professional programs such as dentistry, human medicine, or, with little additional preparation, veterinary medicine. The curriculum is appropriate for students planning to enter the workforce immediately upon graduation, as research technicians, applied scientists, or in sales or marketing positions in the life sciences or biotechnological industry. The curriculum is also appropriate for transfer students and those planning to pursue a degree in business, including the M.B.A., for careers in managing diagnostic laboratories or in hospital administration.

Other microbiology-related courses offered in the following departments may be taken with an adviser's permission: animal sciences, biochemistry and molecular biology, plant biology, civil engineering, zoology, or medical laboratory science. Courses in these areas are reviewed periodically by the microbiology faculty to ascertain their suitability for microbiology majors.

Special Projects in Microbiology (MICR 795) is available by special permission and allows students the opportunity to conduct semi-independent research projects in conjunction with departmental faculty. Up to 4 credits of Problems in Microbiology may be applied to major requirements, although students may enroll for additional hours. Students must receive a minimum grade of C in major requirements taught in the Col-

lege of Life Sciences and Agriculture (e.g., microbiology, biology, or biochemistry). A passing grade in major requirements taught outside the College of Life Sciences and Agriculture (e.g., chemistry, math, or physics) is acceptable.

Students planning to attend graduate or postgraduate professional school or to apply for certification as registered microbiologists through the American Society for Microbiology are strongly advised to take a course in quantitative analysis (CHEM 517-518).

Individuals considering a major in microbiology are strongly encouraged to enroll in MICR 503 and organic chemistry in their sophomore year. Requirements in the biology core curriculum may be deferred until the subsequent year, if necessary.

Students may obtain a minor in microbiology by successfully completing MICR 503 and four additional departmental courses totaling a minimum of 20 credits at the 600 or 700 level. Students must receive a minimum grade of C in major requirements taught in the College of Life Sciences and Agriculture (e.g., microbiology, biology, or biochemistry). BCHM 658/659 may be substituted for one of these courses. A maximum of 4 credits of Problems in Microbiology may be applied to the minor.

Microbiology Curriculum

The microbiology curriculum is satisfied by Group I and Group II course requirements. All Group I courses are required. One course from each of the three categories comprising Group II requirements is also required. The microbiology major B.S. degree requirement is eight microbiology courses totaling a minimum of 32 credit hours at a grade of C or above.

Group I Requirements

BIOL 411-412, Principles of Biology¹
 BCHM 658, with lab BCHM 659,
 or BCHM 751-752, Principles of BCHM with BCHM
 755 (lab)
 CHEM 403-404, General Chemistry
 CHEM 651, Organic Chemistry and co-requisite lab
 or CHEM 545²
 PHYS 401-402, Introduction to Physics³
 MATH, 424B, Calculus for Life Science,
 or MATH 425 and BIOL 528,
 or equivalent statistics³
 BIOL 604, Principles of Genetics³
 MICR 503, General Microbiology
 MICR 602, Pathogenic Microbiology
 MICR 704, Genetics of Prokaryotic Microbes
 MICR 717, Microbial Physiology
 A microbial ecology course (this requirement may
 be fulfilled by taking either MICR 707, MICR
 713, or MICR 719)

Group II Requirements

(One microbiology course from each of three categories: general, medical, and ecological.)

General

MICR 603, Bacteriology of Food (UNHM)
 MICR 710, Electron Microscopy and Microbial
 Cytology (and 712, Laboratory)
 MICR 711, Genomics and Bioinformatics
 MICR 718, Ethics and Issues in Microbiology
 MICR 751, Cell Culture

Medical

MICR 702, Infectious Disease and Health
 MICR 706, Virology (and 708, Laboratory)
 MICR 714, Water Pollution Microbiology
 MICR 705, Immunology

Ecological

MICR 707, Marine Microbiology
 MICR 713, Microbes and the Environment
 MICR 719, Prokaryote Biodiversity
 MICR 766, Plant-Microbe Interactions
 NR 706, Soil Microbiology

Electives

(These cannot be taken to fulfill the microbiology major requirement.)

MICR 504, Brewing and Industrial Microbiology
 Applications (UNHM)
 MICR 600, Field Experience
 MLS 720, Clinical Mycology-Parasitology
 PBIO 721, The Microscopic Algae
 PBIO 752, Mycology
 MICR 790, Laboratory Teaching Experiences
 MICR 795, Problems in Microbiology⁴

¹For students transferring into the Microbiology major, the equivalent of two semesters of a laboratory biological science may be accepted with microbiology faculty approval.

²Premedical and other pre-health should take one year of organic chemistry.

³Classes recommended for the major.

⁴A maximum of four credits of MICR 795 may be applied to the major.

Departmental Honors

Honors in microbiology will be awarded to students who complete 16 credits of honors courses in microbiology (including a minimum of four credits in a senior research project), and who maintain a minimum grade-point average of 3.20 in the major. Students interested in the microbiology honors program should apply to the department before their junior year.

Students wishing to declare a major or minor in microbiology or to be admitted to the microbiology honors program should consult the departmental chair.

Nutritional Sciences

(For descriptions of courses, see *Animal Sciences*, page 133 and page 210.)

The science of nutrition is the study of nutrients in food and the body's handling of these nutrients. As an applied science, nutrition is based on biochemistry and physiology but can also include anthropology, economics, genetics, microbiology, pathology, animal sciences, and zoology. Consequently, the nutritionist often cooperates with workers in many different fields. The nutrition program at UNH is designed to permit specialized study in human and/or animal nutrition.

Two curricula are offered to meet the educational needs of students with differing professional aspirations.

Basic Science Curriculum

This curriculum provides students with a solid science background in biology, chemistry, physiology, nutrition, biochemistry, and physics. Upon graduation, students are well prepared for technically oriented jobs in science. This curriculum is also excellent preparation for students planning further education in graduate school or professional schools of medicine and dentistry. Students in this curriculum are required to complete the biology core curriculum: NUTR 400, 750; ANSC 511 and 512; MICR 503; BCHM 658/659; and 12 additional credits from recommended courses in nutrition.

Dietetics Curriculum

Approved by the American Dietetics Association (ADA), the dietetics curriculum prepares students to apply for a post-graduate dietetic internship. Completing this internship and passing the ADA examination are essential for becoming a registered dietitian (RD), requisite for employment opportunities in clinical dietetics and community nutrition. Required courses for this curriculum are NUTR 400, 401, 405, 473, 476, 503, 504, 510, 550, 650, 720, 750, 773, 775, and 780; ANSC 511 and 512; CHEM 403-404, and 545-546; ENGL 401; DCE 491; MICR 501 or 503; BCHM 658/659; SOC 500 or PSYC 401; MGT 580; HMP 710; and either PSYC 402, SOC 502, BIOL 528, or HHS 540.

Plant Biology

(For descriptions of courses, see page 216.)

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 are facilitated by the Jackson Es-

tuarine Laboratory and two marine laboratories where the plant biology faculty maintains an active involvement in teaching and research. The Department of Plant Biology offers three baccalaureate degrees: bachelor of science in plant biology, bachelor of science in environmental horticulture, and bachelor of arts in plant biology. See also programs listed under biology major and marine sciences.

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.

Core Courses	Credits
BIOL 411, Principles of Biology I	4
BIOL 412, Principles of Biology II	4
CHEM 403, General Chemistry I	4
CHEM 404, General Chemistry II	4
MATH 424B, Calculus for Life Sciences	4
MICR 503, General Microbiology	5
BIOL 541, General Ecology	4
BIOL 528, Applied Biostatistics I	4
CHEM 545/546, Organic Chemistry and Laboratory	5
BCHM 658/659, General Biochemistry and Laboratory	5
PHYS 401, Introduction to Physics I	4
PHYS 402, Introduction to Physics II	4
BIOL 604, Principles of Genetics	4
PBIO 401, Plant Biology Orientation	1
PBIO 701/702, Plant Physiology and Laboratory	5
PBIO 758, Plant Anatomy	5
PBIO 774, Plant Biotechnology and Genetic Engineering	3
PBIO 566, Systematic Botany or PBIO 668, Summer Flora of New Hampshire	4

Plant Biology Electives

Five additional courses must be selected from those listed below 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 3 or more credits. PBIO 796, Special Top-

ics in Plant Biology can be used to fulfill elective requirements, if taken for 3 or more credits and preapproved by adviser.

Category 1: Systematics, Ecology, and Evolution
 PBIO 566, 625, 668, 717, 719, 721, 722, 723, 724, 747, 752, 761; INCO 595, Tropical Ecology and Conservation Biology; NR 713, 764, 765

Category 2: Marine and Freshwater Plant Biology
 PBIO 503, 625, 717, 719, 721, 722, 723, 724, 725, 727/729, 747

Category 3: Plant Structure and Physiology
 NR 713; PBIO 601, 709, 711, 713, 714/715, 727/729, 775

Category 4: Environmental Horticulture
 NR 506; PBIO 546, 547, 565, 572, 582, 650, 651, 652, 655, 678, 689, 706/708, 720, 726; ZOOL 530

Category 5: Plant Genetics, Cell Biology, and Biotechnology
 BCHM 771; GEN 702, 705; PBIO 751, 753, 754, 766, 772, 775

B.S. in Environmental Horticulture

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.

Students are required to take the core courses, support courses, and 20 credits of elective courses.

Core Courses	Credits
PBIO 401, Plant Biology Orientation	1
PBIO 412, Introductory Botany	4
PBIO 421, Concepts of Plant Growth	4
PBIO 501, Basic Biochemistry or BCHM 658/659 General Biochemistry	5
PBIO 546, Plants, Soils, and the Environment	4
PBIO 547, Environmental Horticulture	4
PBIO 572, 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 or BIOL 604, Principles of Genetics	4
PBIO 651, Plant Pathology	4
PBIO 726, Integrated Pest Management	4
PBIO 797, Senior Seminar	1

Electives

A minimum of 20 credits (including at least 12 credits at 600 or 700 level)

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 departments	Credits
BIOL 528, Applied Biostatistics I	4
CHEM 403, General Chemistry I	4
CHEM 404, General Chemistry II	4
ZOOL 530, Principles of Applied Entomology	4
Economics Perspectives	4

B.A. in Plant Biology

Students must complete a minimum of 40 semester credits in the major. The curriculum provides a broad background in the liberal arts and plant biology. Students may enter this program as freshmen 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.

Requirements	Credits
PBIO 401, Plant Biology Orientation	1
PBIO 412, Introductory Botany (waived if previous credit received for BIOL 411-412 or equivalent)	4
ZOOL 412, Principles of Zoology	4
PBIO 501, Basic Biochemistry or CHEM 545/546, Organic Chemistry and Laboratory	5
BIOL 541, General Ecology	4
PBIO 566, Systematic Botany or PBIO 668, Summer Flora of New Hampshire or PBIO 721, Microscopic Algae or PBIO 722, Marine Phycology	4
BIOL 604, Principles of Genetics or PBIO 612, Plant Genetics and Reproduction	4
PBIO 701/702, Plant Physiology and Laboratory	5

Upper Level Plant Biology Categories Electives

12 credits minimum
 Select courses from several of the five plant biology categories (see B.S. program). PBIO 758 and 774 are also recommended.

General Education

Required: Group 3, CHEM 403-404, General Chemistry
 Recommended: Group 2, BIOL 528, Applied Biostatistics I
 Group 8, 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).

General Science Certification

See pages 33 and 78.

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 specific requirements of the minor in plant biology include PBIO 401, PBIO 412 or equivalent, and a minimum of 15 credits from the following list of courses: PBIO 566, 601, 625, 651, 668, 701/702, 709, 711, 713, 717, 719, 721, 722, 723, 724, 725, 727, 729, 747, 751, 752, 753, 754, 758, 761, 766, 772, 774/775, 795 (maximum of 4 cr.), 796.

The requirements for the environmental horticulture minor are PBIO 401, PBIO 421, and a minimum of 15 credits from the following list of courses: PBIO 546, 547, 557, 565, 566, 572, 582, 612, 650, 651, 652, 655, 678, 689, 701/702, 720; HT 263.

For selection of specific courses, students should see the department chair or their adviser.

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 3.20 (overall average and in major coursework). Students wishing to apply to the departmental honors program should consult with Professor Garrett Crow.

Soil Science

(For descriptions of courses, see page 204.)

Soil scientists are concerned with proper management of our soil resources, in rural and urban environments, and with the essential role of soil in sustainable resource management. Soil scientists are needed as members of interdisciplinary teams engaged in a variety of natural resource and environmental quality issues.

Career opportunities are excellent for graduates of the soil science program. There is a growing awareness that planning, design, and construction of public and private facilities must be compatible with the soil upon which these facilities are placed. Thus, urbanization of the Northeast has created a demand for soil scientists competent to advise on soil considerations during planning and development stages. Soils expertise is in demand for identification of areas in need of

protection. Soil scientists often play important roles in toxic waste remediation, aquifer protection, and site selection for hazardous waste disposal or storage. There is also a growing role for soil scientists with supplemental training in environmental chemistry who wish to work with plant scientists and foresters in developing sustainable systems for food and fiber production, or with planners in developing landscape management plans.

Students in the soil science program are given a strong analytical background for studying physical, chemical, and biological properties of soils, as well as their classification and management. Graduates are well prepared for further study in graduate school, and professional certification is available through the ARCPACS, a federal certifying board.

Core Courses**A. Soil Science courses**

NR 501, Introduction to Soil Sciences
NR 609, Soils and Community Planning
NR 611, Soils and Environmental Quality
NR 706, Soil Microbiology
NR 716, Wetland Delineation
NR 732, Chemistry of Soils
NR 733, Chemical Analysis of Soil

B. Natural Resources courses

NR 400, Prof. Perspectives in Natural Resources
NR 401, Introduction to Natural Resources
NR 527, Forest Ecology,
or BIOL 541, General Ecology
NR 602, Natural Resources and Environmental Policy
NR 775, Natural Resources Senior Project

C. Support courses

PBIO 412, Introductory Botany
BIOL 528, Applied Biostatistics I
CHEM 403-404, General Chemistry
ESCI 512, Principles of Mineralogy
ESCI 561, Surficial Processes
EREC 411, Environmental and Resource Economics Perspectives
PHYS 401 (or 407), Introduction to Physics I
One course in chemistry beyond CHEM 403-404.
One course in mathematics (MATH 424B, or 425)
One writing course beyond ENGL 401 (ENGL 501, 502, 503, 519, 529, DCE 596)

Students interested in the soil science major should consult with Elizabeth Rochette.

General Science Certification

See pages 33 and 78.

Tourism Planning and Development

(For descriptions of courses, see page 231.)

Tourism creates immense economic activity, totaling more than \$4 trillion dollars of

world spending activity. 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 Resource Economics and Development offers a bachelor of science degree in tourism planning and development from 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 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, 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 practical application of planning and economic theory to the planning for the development of tourism resources.

Curriculum Structure

All majors must complete a core curriculum and choose one of two concentrations: international development or regional tourism planning.

Core Courses

The core curriculum is composed of the following courses:

CD 415, Community Development Perspectives
CD 614, Fundamentals of Planning
CD 777, Topics in Community Planning
EREC 411, Environmental and Resource Economics Perspectives
EREC 501, Agricultural and Natural Resource Product Marketing
EREC 525, Statistical Methods and Applications
EREC 775, Research Methods
TOUR 400, Introduction to Tourism
TOUR 615, Tourism Planning and Development
TOUR 633, Economics of Travel and Tourism
TOUR 560, Special Topics (8 credits)
TOUR 700, Marketing Places
TOUR 705, Ecotourism: Managing for the Environment,
or TOUR 767, Social Impact Assessment
TOUR 794, Tourism Internship

TOUR 794 involves a 14-to-16 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 consults, 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 a minor in community planning.

New England Regional Student Program

The B.S. in tourism planning and development program 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 Rhode Island, Connecticut, Massachusetts, Vermont, and Maine receive some preferential admission consideration and, if admitted, pay the UNH in-state tuition rate plus 50

percent. Students who are interested in the Tourism Planning and Development Program should contact Robert A. Robertson, 309 James Hall, (603) 862-2711.

Water Resources Management

(For descriptions of courses, see page 231.)

There is a critical need for individuals who understand how changes in land use affect water quantity and quality. The B.S. degree program in water resources management is designed to educate students in the principles of land management, biology, chemistry, water quality, and hydrology specifically as they relate to the management of water resources. The program stresses an interdisciplinary approach to resource management, including environmental, economic, social, and political considerations. Hands-on field experience is expected and research projects are encouraged.

This degree program is designed for students who intend to pursue advanced degree work in environmental studies or careers in government, in public or private utilities that manage land and water resources, in private consulting firms that offer water resource management services, and in any of a wide variety of not-for-profit organizations that address land and water resource issues.

The program is divided into three interacting parts: general education, core requirements, and an area of specialization or exploration. The core program provides a foundation in both physical and social sciences. The area of specialization or exploration allows students to pursue a minor or double major, or to survey a variety of courses relevant to water resources management. This allows students to tailor their education to meet individual areas of interest.

In addition to formal courses, all water resources management majors are required to participate in a relevant work experience or internship (NR 599) and a senior project (NR 775). Students are responsible for identifying appropriate work experiences, although assistance is available from the faculty. Students may also choose to do a senior thesis (NR 799).

For additional information, please contact Carl H. Bolster, Department of Natural Resources, (603) 862-5006.

Water Resources Management Degree Requirements

BIOL 411/412, Principles of Biology
BIOL 528, Applied Biostatistics I
BIOL 541, General Ecology
CD 614, Fundamentals of Planning
CHEM 403-404, General Chemistry
ENGL 401, Freshman English

ENGL 501, Introduction to Creative Nonfiction
ESCI 401, Principles of Geology I
ESCI 705, Principles of Hydrology
EREC 411, Environmental and Resource Economics Perspective
EREC 676, Economics of Water Use and Quality Management
MATH 424B, Calculus for Life Sciences
NR 400, Professional Perspectives in Natural Resources
NR 401, Introduction to Natural Resources
NR 602, Natural Resources and Environmental Policy
NR 775, Natural Resources Senior Project
PHYS 401, Introduction to Physics I
or PHYS 407, General Physics I
PHYS 402, Introduction to Physics II
or PHYS 408, General Physics II
NR 501, Introduction to Soil Sciences
NR 504, Freshwater Resources
NR 599, Work Experience
NR 604, Watershed Hydrology
NR 700, Critical Analysis of Water Resources Literature
NR 703, Watershed Water Quality Management
NR 721, Ecology of Polluted Waters

One additional course in writing and public speaking.

Each student must take a combination of courses, devised by the student and his or her adviser, that suitably defines a coherent area of professional specialization. Each student must accumulate a total of at least 128 credit hours.

Wildlife Management

(For descriptions of courses, see page 204.)

The wildlife curriculum is for students interested in the ecology, conservation, and management of wild animals. It is designed to provide a knowledge of wildlife species and their various forest, field, and wetland habitats. Students are prepared for employment with public and private agencies in wildlife management, or for continued study at the graduate level.

Fieldwork is carried out during the academic year on local and regional wildlife areas. Each year, a two-week field session is held during June for all students who have completed the sophomore year. Majors are assisted and encouraged to obtain summer employment related to their career objectives.

The degree earned is a bachelor of science with a major in wildlife management. The program is administered in the Department of Natural Resources.

In addition to the normal University fees and tuition, wildlife students are required to meet special fee charges in connection with regularly planned field laboratory sessions.

Freshman Year

BIOL 411, Principles of Biology I
 BIOL 412, Principles of Biology II
 ENGL 401, Freshman English
 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, physical science or General Education
 elective

Sophomore Year

BIOL 528, Applied Biostatistics I
 CHEM 403, General Chemistry
 CHEM 404, General Chemistry
 ENGL 501, Introduction to Creative Nonfiction,
 or ENGL 503, or 519
 EREC 411, Environmental and Resource
 Economics Perspectives
 NR 527, Forest Ecology,
 or BIOL 541, General Ecology
 NR 542, Forestland Measurement and Mapping
 (2-week summer course)
 NR 655, Vertebrate Biology
 ZOO 542, Ornithology,
 or ZOO 712, Mammalogy,
 or Elective

Junior Year

NR 602, Natural Resources and Environmental
 Policy
 NR 615, Wildlife Habitats
 NR 737, Wildlife Population Dynamics
 ZOO 625, Principles of Animal Physiology
 ZOO 690, Evolution
 ZOO 710, Ichthyology,
 or ZOO 713, Animal Behavior,
 or ZOO 733, Behavioral Ecology
 Elective

Senior Year

NR 629, Silviculture or equivalent
 NR 636, Wildlife Techniques
 NR 738, Wildlife Policy and Management
 NR 775, Natural Resources Senior Project
 Elective
 Elective
 Elective

*Electives should be used to satisfy remaining general education requirements and the wildlife major requirements in the areas of policy and administration, communication skills, and physical sciences (one course in each area-pertinent courses are listed in the detailed wildlife curricular guidelines available from the department).

Students interested in the wildlife management major may consult with the program coordinator, Peter Pekins, James Hall.

General Science Certification

See pages 33 and 78.

Zoology

(For descriptions of courses, see page 232.)

The Department of Zoology has a primary responsibility for undergraduate and graduate instruction in fundamental aspects of animal biology, including the principles of form, function, development, and diversity produced by animal evolution. The teaching program provides a broad coverage of basic biological processes in invertebrate and vertebrate animals at the cellular, organismic, population, and community levels. Students receive background for a variety of professional positions in the public and private sector, and for graduate programs in the biological sciences including health-related fields. The department offers the bachelor of arts, bachelor of science, master of science, and doctor of philosophy degrees. Zoology faculty contribute significantly to the biology core curriculum, marine biology minor, genetics program, University Honors Program, Ocean Projects and Undergraduate Research Opportunity programs, and courses at the Shoals Marine Laboratory.

There is a strong teaching and research emphasis on ecological and physiological processes in aquatic animals or ecosystems. This focus is enhanced by the geographical location of the University and the availability of facilities for aquatic research. 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, and the presence of two coastal marine laboratories, as well as estuarine and freshwater laboratories.

The zoology major builds from the common background of the biology core curriculum, with ample time for third- and fourth-year students to concentrate in specialized disciplines such as marine and freshwater biology, behavior, cell and developmental biology, ecology, evolution, fisheries, physiology, and neurobiology. Zoology majors must complete 32 credits from courses in the biological sciences approved by the department with a 2.00 average. Students must receive a minimum grade of C- in major requirements taught in the College of Life Sciences and Agriculture (e.g., zoology,

microbiology, biology, biochemistry). A passing grade in major requirements taught outside the College of Life Sciences and Agriculture (e.g., chemistry, mathematics, physics) is acceptable. Minimum requirements for the B.S. in zoology are as follows: completion of the biology core courses and required courses in animal morphology, physiology and development, plus advanced electives in zoology and other biological sciences. The B.A. in Zoology has a foreign language requirement in lieu of one advanced elective. B.A. students also have somewhat more flexibility when choosing courses from the biology core.

Students who are interested in a zoology major should consult the department's undergraduate adviser or chair.

General Science Certification

See pages 33 and 78.

WHITTEMORE SCHOOL OF BUSINESS AND ECONOMICS

Steven F. Bolander, Dean
James R. Wible, Associate Dean
Cari A. Moorhead, Director of Undergraduate Programs
Gail Stepina, Assistant Director of Undergraduate Programs
Pamela Najarian, Academic Counselor

Department of Accounting and Finance
Department of Decision Sciences
Department of Economics
Department of Hospitality Management
Department of Management
Department of Marketing

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
International Business and Economics
Management
Marketing
Student-designed
Economics
Hospitality Management
Bachelor of Science-Master of Science in Accounting

The Whitttemore School of Business and Economics 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 community 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 Whitttemore School students. The educational process encourages the integration of practice and theory through student interaction with businesses, public agencies, and faculty research.

The Whitttemore 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 the Whitttemore School programs take a substantial part of their coursework, normally over 50 percent, in other colleges in the University in order to fulfill the general education 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 Whitttemore School programs in business administration, economics, and hospitality management are prepared for employment and graduate study in both these and adjacent fields.

The Whitttemore School offers a minor in business administration, economics and in hospitality management. Within the limits of its resources, the Whitttemore 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 Whitttemore School courses are open to nonmajors who have the prerequisite preparation.

A maximum of 32 credits in courses offered by the Whitttemore School of Business and Economics may be taken by non-Whitttemore School students.

Degree Requirements

The Whitttemore School offers a bachelor of arts degree program in economics and bachelor of science degree programs in business administration, economics, and hospitality management. 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 page 97, Accounting Program of Study, for details). Application for admission to this highly selective program is made in the junior 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 general education requirements for graduation as well as the particular requirements of their individual major programs. In addition, candidates must complete a math course (400 level). Economics majors must also satisfy specific requirements associated with the bachelor of arts degree (see page 18). No Whitttemore 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 2.30 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 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 one time. Business administration and hospitality management majors must take at least thirteen courses outside the Whittemore School.

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.

For information concerning advanced degrees, see the Graduate School 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, pre-registration, understanding and meeting general academic requirements, and general academic and career decision making. In addition, the advisers coordinate study abroad, domestic exchange and honors programs, as well as the Washington Internship Program. 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 freshmen to the college experience. Selected upperclass students provide a positive resource to guide freshmen. The program's goals are, through a mandatory yearlong program, to familiarize students with their major, college, and University; to support students in their personal growth; to develop personal responsibility; and to encourage freshmen 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 whatever source, 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 the Whittemore School may elect the internship or independent study options for variable credit. For either option, 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 nonroutine 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 is necessary. Students may earn no more than 16 credits 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. See page 226.

International and Exchange Programs

The Whittemore School encourages qualified students to participate in programs of international work and study. The Whittemore School has international exchanges including Grenoble, France, and Maastricht, the Netherlands.

Students may also elect to take a dual major in international affairs, offered in conjunction with the program for international perspectives (see page 103).

Information on all other international programs can be obtained from the sponsoring department or the Center for International Education, Hood House, Room 204.

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 junior year. Details are provided in the Programs of Study sections of the UNH undergraduate and graduate catalogs.

Nonmajors

The Whittemore School also offers courses for nonmajors. Students interested in these courses should contact the undergraduate programs office.

Minor

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. A list of minor requirements is available at the Whittemore School Undergraduate Programs Office, Room 120, McConnell Hall.

Programs of Study

Accounting and Finance

(For descriptions of courses, see page 130.)

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.

Business Administration

(For descriptions of courses, see Accounting and Finance, page 130; Administration, page 131; Decision Sciences, page 151; Management, page 193; and Marketing, page 193.)

The business administration program provides training for individuals interested in managerial or administrative careers in business or in public or private institutions.

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, 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 some of the important 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 four-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 four-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 general education requirements and other non-WSBE classes are generally taken throughout a student's time at UNH.

While taking the ten 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 during pre-registration 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 Venture Creation
- Finance
- Information Systems

- *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 is given below. 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)
 ECON 401, Macro Economics or 402, Micro Economics
 MATH 420, Finite Math or 424A, Calculus for Social Sciences

Freshman: Spring

ADMN 410, Management Information Systems or
 ADMN 420, Business Statistics
 ADMN 502, Introductory Financial Accounting
 ECON 401 or 402
 ENGL 401

Sophomore: Fall

ADMN 410 or 420
 ADMN 503, Managerial Accounting

Sophomore: Spring

Two of the following four courses
 ADMN 601, Financial Management
 ADMN 611, Behavior in Organizations
 ADMN 640, Quantitative Decision Making
 ADMN 651, Marketing

Junior: Fall

Must declare an option during this semester.
 Take the remaining two 600-level courses from the Sophomore Spring list.

Junior: Spring

*Two courses in option area

Senior: Fall

*Two courses in option area
 ADMN 703, Strategic Management (or take in Senior Spring term)

Senior: Spring

*Two courses in option area
 ADMN 703, Strategic Management (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 Management Accountant (CMA), Certified Internal Auditor (CIA), and Certified Fraud Examiner (CFE). The accounting option also prepares students to enter the Master of Science 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.

Traditional Track

ACFI 621, Intermediate Financial Accounting I
 ACFI 622, Intermediate Financial Accounting II

Required

ACFI 723, Advanced Managerial Concepts and Applications
 ACFI 724, Auditing
 ACFI 726, Taxation and Management Strategy
 MGT 647, Business Law I

In addition, an integrative experience 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, Honor's Thesis in Accounting

Financial Analysis Track

ACFI 621, Intermediate Financial Accounting I
 ACFI 622, Intermediate Financial Accounting II

Required

ACFI 701, Financial Policy
 ACFI 702, Investments Analysis
 ACFI 725, Financial Statement Analysis

In addition, choose one of the following

ACFI 703, International Financial Management
 ACFI 704, Derivative Securities and Markets
 ACFI 720, Management of Financial Institutions
 ECON 726, Introduction to Econometrics

The *Option in Entrepreneurial Venture Creation (EVC)* is designed for students who intend to start a high growth business, work for a new venture or become involved in a new venture creation within an established organization. The EVC Option fosters an entrepreneurial culture throughout the program. The priority is real-world learning in the high growth environment of entrepreneurial ventures. The program includes active student participation, a seminar format, field trips to entrepreneurial ventures and

guest speakers. Each student participates in a senior project and an internship at a high tech start-up.

Required

MKTG 798, New Product Development
 DS/MGT 798, High Tech Entrepreneurship Internship
 MGT 732, Exploration in Entrepreneurial Management
 DS 798, Private Equity and Venture Capital
 DS/MGT 798, WSBE/CEPS Commercialization of New Technology

The *Option in Finance* provides students with opportunities in a variety of disciplines including banking, insurance, corporate finance, investment management, and risk management. Finance majors are in excellent demand. The goal of the finance option is to expose the student to all three major branches of finance: investments, corporate, and financial institutions. At the same time, the option allows the student some flexibility in choosing courses. The option helps students planning to sit for the Chartered Financial Analyst (CFA) Level I exam, the Certified Financial Manager (CFM) exam, and the Certified Financial Planner (CFP) exam.

Required

ACFI 701, Financial Policy
 ACFI 702, Investments Analysis
 ACFI 720, Management of Financial Institutions

In addition, two of the following

ACFI 704, Derivative Securities and Markets
 ACFI 703, International Financial Management
 ACFI 640, Topics in Finance
 ACFI 751, Internship
 ACFI 753, Independent Study

One other WSBE course (prior approval needed from finance option coordinator and ACFI department chair).

The *Option in Information Systems* provides students with both business problem-solving skills and in-depth technical knowledge. This unique combination of skills is in short supply, and the employment outlook is outstanding. The program concentrates on two areas: (1) organizations, with an emphasis on business processes, and (2) technology, with an emphasis on analysis, design, implementation, and management of an organization's information systems. Students take courses from the computer science department and WSBE in completing the option, and a senior-level industry project is a core component of the program.

Required

CS 405, Visual Basic I
 CS 407, Introduction to Computer Programming with Java
 DS 798, Electronic Commerce Systems
 DS 798, Database Management Systems
 DS 798, Client-Server Database Systems
 DS 798, Information Systems Project
 DS 798, Systems Analysis and Design
 DS 772, Decision Support Systems

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
 ECON 611, Intermediate Macroeconomics
 ECON 746, International Finance

One of the following

One of the remaining courses from list "B," above.
 4-credit graded Internship at an International Organization
 1-semester Study Abroad Experience. At least one course (3-4 UNH credits) must be pre-approved by the IBE Option Coordinator and responsible department chair and satisfactorily completed, in order for this to count toward the option.

ACFI 704, Derivative Securities and Markets
 MKTG 760, International Marketing
 ECON 668, Economic Development
 ECON 692, International Economic Integration
 ECON 745, International Trade
 ECON 747, Multinational Enterprises

The *Option in Management* provides students opportunities to develop a substantial foundation in the principles of managing the human, organizational, and capital resources of the firm in a strategic manner to enhance organizational competitiveness. Courses emphasize problem-solving, planning, and interpersonal skills related to leadership in the new economy, managing innovation and change, and international and cross-cultural issues in business. Future

career paths include consulting, supervision, program management, or pursuit of graduate education in management or law.

Required

MGT 614, Organizational Leadership
 MGT 647, Business Law I
 MGT 701, Business, Government, and Society
 MGT 713, Management Skills
 MGT 755, International Management
 MGT 798, Topics in Management

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 execution approaches.

Required

MKTG 753, Consumer/Buyer Behavior
 MKTG 762, Marketing Workshop
 MKTG 798, Market and Opportunity Analysis

In addition, choose at least one of the following

MKTG 751, Advertising and Promotion
 MKTG 752, Marketing Research
 MKTG 798, Brand Management

The *Student-Designed Option* is available for those students whose interests are not fully satisfied by any of the other currently available options. Students pursuing this option must have a compelling rationale, articulated in a written proposal. A faculty sponsor is required for this option. 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 is available for 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 identify a faculty sponsor and submit to that sponsor a standard written proposal describing their objectives and intended program of study. After faculty sponsor approval, the proposal must receive approval from the WSBE Curriculum Committee and the business administration undergraduate program director.

Students pursuing this option must have a compelling rationale that will be articulated in a standard written proposal. For example,

a student whose prior work or family history leads him or her to be interested in combining courses from several of the standard business administration options is encouraged to apply. In addition, students applying for this option will normally be expected to have a grade point average of at least 3.0.

The student's written proposal shall follow a standard format, including an introduction to the option, the specific rationale for pursuing this program of study (including academic and career interests, and why none of the existing options are appropriate), and the specific program of study proposed (courses and schedule). The proposal will also include a current copy of the student's UNH transcript.

Program

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).

Decision Sciences

(For descriptions of courses, see page 151.)

The Department of Decision Sciences brings together faculty with special expertise in business statistics, decision support systems, management information systems, management science, production/operations management, operations research, and manufacturing strategy. This department coordinates the option in information systems.

Technology and Operations Management (TOM), currently available as a concentration, is designed to prepare students for professional careers in the management of manufacturing and service operations. Typical opportunities for TOM graduates are in production management, purchasing, technical sales, material resource management, new product development, quality management, and supply chain management.

Required

- DS 754, Resource Management
- DS 755, Manufacturing Management
- DS 758, Strategic Management of Operations

Note: Students taking these three courses will earn a "concentration" in TOM. A concentration is a defined collection of three courses in a particular area. A Concentration is recognized by the Whittemore School but does not appear on the transcript.

Economics

(For descriptions of courses, see page 154.)

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 program is 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; these include 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 to 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.

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 605 and 611. In addition, majors must complete either MATH 420 or 424A. Coursework in accounting is recommended but not required.

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 605, 611, 726, and 775. In addition, majors must complete MATH 424A, ADMN 403, 410, 420, 502, and 503.

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.

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 (page 18).

The economics department offers three specialized options within the bachelor of art. By selecting economics electives from an approved list, a student majoring in economics can graduate with an option in financial and managerial economics, international and development economics, or public policy economics.

A suggested plan of study for B.A. economics majors follows:

Freshman Year

- ECON 401, 402, Principles of Economics (Macro and Micro); MATH 420 or MATH 424A
- ADMN 403, Computing Essentials for Business

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)

A suggested plan of study for B.S. economics majors follows:

Freshman Year

ECON 401, 402, Principles of Economics (Macro and Micro); MATH424A
 ADMN 403, Computer Essentials for Business;
 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; Economics electives (at least 3)

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.

Hospitality Management

(For descriptions of courses, see page 176.)

The program in hospitality management is an integral part of the offerings of the Whittemore School. It is one of only four programs worldwide that is accredited by both the American Assembly of Colleges and Schools of Business-AACSB and the Accreditation Commission for Programs in Hospitality Administration-ACPHA. Graduates are prepared to assume management positions in all sectors of the service sector, with primary emphasis on the hospitality industry.

Graduates have accepted positions in lodging and food service (and their allied businesses and wholesalers), retirement facilities, software companies, tourism, travel and recreation industries, and institutions such as hospitals, nursing homes, colleges, and schools.

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. Each course includes an international component.

With our on-campus learning laboratory, the New England Center Hotel and Conference Center, 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 approved work experience or practicum; and by involvement in the food service and lodging operations at the New England Center.

The Department of Hospitality Management offers eighteen required courses and four hospitality electives in three groupings. Group A consists of eight core courses taken in the freshman and sophomore years. Group B includes most of the functional hospitality and business disciplines required to develop into a successful manager. A wide range of elective courses, independent studies, and internships can complement the required curriculum. In addition, the program requires completion of one semester of a 400-level math course

Students must successfully complete Group A courses, achieving a minimum grade-point average of at least 2.00, before Group B courses may be taken. Group B courses must be completed before taking any Group C courses.

To graduate, students must obtain a 2.30 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, institutional, or health administration. Students may earn up to 12 total credits in internships, independent studies, field experience, and supervised student teaching experiences.

A required plan of study is given below.

Freshman Year

(*denotes Group A courses)
 HMGT 401, The Hospitality Industry: An Historical Perspective and Distinguished Lecture Series*
 HMGT 403, Introduction to Food and Beverage Management*
 HMGT 567, Food and Beverage Operations Management*
 ADMN 403, Computing Essentials for Business
 ADMN 502, Introductory Financial Accounting*
 ECON 401, Principles of Economics (Macro) and
 ECON 402, Principles of Economics (Micro)*

Sophomore Year

(*denotes Group A courses)
 HMGT 554, Lodging Operations Management*, or
 ADMN 420, Business Statistics*
 HMGT 618, Uniform Systems for the Hospitality Industry
 Four University general education courses

Junior Year (Group B)

HMGT 600, Hospitality Marketing Management
 HMGT 603, Service Industries Management
 HMGT 625, Hospitality and Employment Law
 HMGT 635, Hospitality Human Resource Management
 ADMN 611, Behavior in Organizations
 Three hospitality, business, or University general education courses

Senior Year (Group C)

HMGT 655, Hospitality Finance and Development
 HMGT 703, Strategic Management in the Hospitality Industry
 Two Hospitality management electives and 3 business or University general education courses

A minor in hospitality management comprises six courses. The five listed below are required.

HMGT 401, Hospitality Industry: Historical Perspectives and Distinguished Lecture Series
 HMGT 403, Introduction to Food and Beverage Management
 HMGT 554, Lodging Operations Management
 HMGT 567, Food and Beverage Operations Management
 ADMN 502, Introductory Financial Accounting

Choose one of the following

HMGT 661, Meetings and Conventions Management
 HMGT 681, Resort Management
 HMGT 771, Beverage Management
 HMGT 777, Casino Management
 HMGT 772, Senior Living Industries Management
 HMGT 750, Senior Operations Seminar

Management

(For descriptions of courses, see page 193.)

The study of management focuses on how organization members develop and use strategies, structures, and the accompanying social, political, legal, economic, and technical processes needed to compete in national and global markets. Courses cover such topics as leadership, decision making, ethics, adaptation, innovation, organizational learning and change, human resource management, governmental policy making, and industrial economics. The department's approach to teaching involves educational methods that promote conceptual, behavioral, and analytic competence through experiential learning, self-awareness, theoretical mastery, and case studies. A major emphasis is on action learning through group projects. This department coordinates the option in management.

Marketing

(For descriptions of courses, see page 193.)

The marketing curriculum is designed to help students explore the exchange process between a business or institution and its customers or memberships. A marketing exchange occurs when a person gives up something he or she values (e.g., money, time, or effort) for something he or she wants or needs from the business or institution (e.g., goods or services). Marketing is the function in the organization which is responsible for determining what those needs and wants are, how they might be met, and how to communicate with prospective customers about how the organization can meet their needs.

Careers for students interested in marketing include jobs in marketing and product management, sales, advertising, retailing, and marketing research. Opportunities exist in consumer and industrial products at all levels of the marketing channel from manufacturer to wholesaler to retailer; for goods as well as services; and within for-profit and not-for-profit organizations. This department coordinates the option in marketing.

SPECIAL UNIVERSITY PROGRAMS

Interdisciplinary Programs

Earth, Oceans, and Space
Computer and Information Technology Minor
Gerontology
Intercollege Courses
International Affairs
Marine Sciences
Race, Culture, and Power
Student-Designed Majors
Technology, Society, and Values
War and Peace Studies

Preprofessional Programs

Prelaw
Premedical/Prehealth Care Professional

Off-Campus Programs

UNH/UNHM Cross Registration
Consortium (NHCUC) Student Exchange Program
New England Subdegree Exchange Program
Exchange Programs within the U.S.

Study Abroad Programs

Other Programs

Honors Program
Reserve Officer Training Corps Programs
Undergraduate Research Opportunities
International Research Opportunities

Interdisciplinary Programs

(Found under their separate colleges and schools.)

African American studies minor, page 25
American studies minor, page 26
Asian studies minor, page 27
Biology, page 83
Canadian studies minor, page 27
Community development, page 85
Dual degrees, page 19
Environmental and resource economics, page 85
Environmental conservation, page 86
Environmental engineering minor, page 63
Five-year B.A.-M.B.A. program, page 25, 42, 46, 96
Five-year B.A.-M.Ed. program, page 34
Five-year B.S.-M.B.A. program, page 96
Five-year B.S.-M.Ed. program, page 34
Five-year B.S.-B.S.A. program, page 96
General studies, page 88
Genetics minor, page 80
History and philosophy of science minor, page 28
Humanities major and minor, page 40
Hydrology, page 56
Independent study and projects in the College of
Engineering and Physical Sciences, page 54
Interdisciplinary mathematics (5 options), page 64
Justice studies minor, page 29
Latin American studies minor, page 29
Linguistics major, page 43
Materials science minor, page 66
Nutritional sciences, page 90
Religious studies minor, page 30
Second majors, page 20
Soil science, page 92
Student-designed majors, page 105
Wildlife management, page 93
Women's studies major and minor, pages 30 and 51

This section describes interdisciplinary study opportunities; preprofessional programs (prelaw, premed/prehealth); off-campus, foreign study, and exchange programs; and other special academic programs at UNH.

Interdisciplinary Programs

Earth, Oceans, and Space

The Institute for the Study of Earth, Oceans, and Space (EOS) is devoted to obtaining a scientific understanding of the entire Earth system and its environment in space. Research in EOS ranges from the most distant and energetic phenomena in the universe, to the deepest regions of the ocean. EOS scientists are also 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 the complex impacts on and by humans.

The institute brings together under a common theme several established research groups on campus: the Space Science Center, the Climate Change Research Center, the Complex Systems Research Center, and the Ocean Process Analysis Laboratory. The primary educational theme of the institute is to support and expand graduate degree programs, training future scientists with a global view. However, EOS faculty teach and mentor undergraduate students as well, and there are numerous opportunities for undergraduates to participate with them in the research activities of the institute.

Computer and Information Technology Minor

The computer and information technology (CIT) minor provides students from a variety of nontechnical fields the opportunity to develop an understanding of, and competency in, using computer and information technology. Graduates from many different fields find the need to have (and demonstrate) computer competency, and this minor is intended to fill that need.

The student who minors in CIT must complete a minimum of 20 credits of CIT courses. All students must take CS 402, Survey of Computer Science, as well as a two-course programming sequence. The other two courses can be chosen from the options.

Credit toward the minor will only be given for courses passed with C- or better,

and a 2.00 grade-point average must be attained 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 must be made to the student's dean to have the minor shown on the academic record. Students must consult with their major adviser and also the minor supervisor.

Requirements

1. CS 402, Survey of Computer Science
2. A two-course programming sequence consisting of either:
 - a. CS 405, Applications Programming Using Visual Basic I, and CS 506, Applications Programming Using Visual Basic II; or
 - b. CS 410, Introduction to Scientific Programming or CS 407, Introduction to Computer Programming with Java and CS 508, Introduction to Data Structures with C++.

Options *(For students entering the minor after December 2000, at least one of the Options courses must be 500-level.)*

CS 401, Computer Applications
CS 403, On-line Network Exploration
CS 504, Web Design and Development
CS 509, Network/System Administration
One additional approved programming course from the above list.

Gerontology

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). The courses must include three core gerontology courses plus two electives from a list of courses approved by the Gerontology Interdisciplinary Minor Advisory Committee.

Required Core Courses

GERO 600, Introduction to Gerontology
 GERO 795, Independent Study (a practicum arranged by the coordinator of the minor, or by the appropriate designee)

Plus one of the starred courses in this list of approved electives

FS 525, Human Development
 HMP 755, Aging and Long-Term Care Policy
 *KIN 607, Biology of Aging
 NURS 535, Death and Dying
 NUTR 760, Geriatric Nutrition
 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 700, Social Gerontology
 SW 701, Women and Aging
 *SOC 720, Current Developments in the Family: Aging and Late-Life Family

Other courses on special topics may complete the electives if approval is obtained from the advisory committee.

Students who wish to minor in gerontology should consult Elizabeth Stine-Morrow, Department of Psychology, Conant Hall, (603) 862-3806.

Intercollege Courses

Intercollege courses are listed on page 178. INCO courses include INCO 401, War; INCO 402, Peace; INCO 404, Honors: Freshman Seminar; INCO 410, College; INCO 450, Introduction to Race, Culture, and Power; INCO 480, Art in Society; INCO 585, 586, Foreign Exchange; INCO 604, Honors: Senior Thesis/Project; INCO 655-656, London Program; INCO 685, 686, Study Abroad; and INCO 698, Summer Research Project, and others.

International Affairs

(For descriptions of courses, see page 179.)

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.

Required Core Courses

IA 401, International Perspectives: Science, Business, and Politics
 IA 501, Global Issues in International Affairs
 IA 701, Seminar in International Affairs

Four Electives

Choose one from each of the program's four elective groups

Foreign area (to be taken prior to foreign experience)
 Science, technology, and the private sector
 Public policy
 Theory in international affairs

Competency in Geography

Satisfactory score on geography exam given at the end of IA 401

Competency in a Foreign Language

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

Foreign Experience

A minimum of eight weeks in a foreign country

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 *2.50 cumulative grade-point average*. After declaration, students are expected to maintain at least a *2.50 grade-point average*, which is the minimum required for study abroad at UNH.

IA 401, a prerequisite for IA 501, should be taken during the freshman year, and IA 501 no later than spring of the sophomore year. The geography exam will be offered every year at the end of IA 401. Students may take the exam three times, but must pass it before taking IA 701.

The foreign experience (usually completed during the junior year), the foreign experience report, 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 preapproved by the IA major adviser 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 stu-

dents. 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.

Marine Sciences

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 campuswide umbrella for marine activities and maintains specialized facilities to support efforts of faculty in individual departments and organized research units. The Center for Marine Biology, the Center for Ocean Sciences and the Center for Ocean Engineering—the Marine Program's three major components—provide education and research activities in their particular areas.

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 New Castle. 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*, which has docking facilities at the Jackson Lab and at the State Fish Pier in Portsmouth Harbor. 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 ma-

rine sciences in a summer field laboratory setting. Each of the marine program facilities features modern specialized equipment, including navigational and sampling aids aboard the research vessel.

Curricula in the Marine Sciences

There are currently two undergraduate majors and three minors in the marine sciences. The College of Life Sciences and Agriculture offers a major in biology with an option in marine and freshwater biology (see biology under COLSA) and the Department of Earth Sciences offers an option in oceanography as part of its B.A. Earth Sciences program (see page 59). 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, or oceanography.

Students are encouraged to declare their intention to follow this program as soon as possible.

Marine Biology Minor

The minor in marine biology, available to all students in the University, consists of 20 credits with grades of C- 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 a minor adviser. Contact Larry Harris, Department of Zoology, for more information.

Students who want to minor in marine biology must take one introductory course (ESCI 501, Introduction to Oceanography; ZOOL/PBIO 503, Introduction to Marine Biology; or ZOOL 674, Field Marine Science) and four courses concentrating on an area of interest. For example, a student interested in marine mammals might take Mammalogy (ZOOL 712), Marine Invertebrate Evolution and Ecology (ZOOL 628), Marine Vertebrates (ZOOL 753), and Fisheries Biology (ZOOL 772). Courses commonly taken as part of the minor include PBIO 625, 721, 722, 725; ENE 747; MICR 714, 707; ZOOL/PBIO 503; ZOOL 628, 674, 751, 753, 772, 775. 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 Program (TECH 797).

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.

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 753, Ocean Hydrodynamics; OE 754, Ocean Waves and Tides; OE 756, Principles of Naval Architecture and Model Testing; OE 770, Introduction to Ocean Mapping; OE 771, Geodesy and Positioning for Ocean Mapping; OE 781, Physical Instrumentation; OE 785, Underwater Acoustics; 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 (kcb@cisunix.unh.edu), Department of Mechanical Engineering (603) 862-1898, 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, available to all students in the University through the Department of Earth Sciences, consists of a minimum of five courses with grades of C (2.00) 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, T. C. Loder, in the 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; 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):

PBIO 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; 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 University of New Hampshire, in cooperation with Cornell University, offers a summer field program in marine sciences on Appledore Island of the Isles of Shoals. Undergraduate courses introduce students to a broad array of marine sciences, including oceanography, marine biology, fisheries, and marine resources. Introduction to Field Marine Science (ZOOL 474), a three-week, 4-credit course, is offered every other summer at the Shoals Marine Lab. It has no prerequisites and satisfies the general education requirement in the biological sciences. The four-week, 6-credit general courses, Field Marine Science (ZOOL 674) and Field Marine Biology and Ecology (ZOOL 675), are offered in June and August, respectively, each summer. They draw upon the backgrounds of numerous faculty and others associated with marine science and fisheries. There are daily lectures and work in laboratory and field. The courses are graded on a letter-grade basis; at least one full year of college biology or the equivalent is a prerequisite.

Other credit courses are offered in marine botany, invertebrate zoology, experimental ecology, ornithology, animal behavior, fish ecology, coastal ecology and bioclimatology, wetlands, marine vertebrates, coastal policy, underwater research, and biological illustration.

Undergraduate research for credit is an option where students carry out part or all of an independent project at Shoals under the guidance of Shoals faculty. Shoals offers generous financial aid to UNH students outside of the normal UNH financial aid packages. For further information, contact Dr. Jessica Bolker at (603) 862-0071.

Diving Program

The UNH diving program offers instruction in SCUBA diving and research diving techniques. It also provides professional diving support for underwater research. The Shoals Marine Laboratory offers courses in marine archaeology and underwater research during the summer, under the guidelines of UNH

diving regulations. For further information, contact Liz Kintzing, diving safety officer, through the Diving Program Office in the Field House, (603) 862-3896.

Marine Research

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

The University of New Hampshire has a Sea Grant College Program that supports research, teaching, and service projects through funding from the National Oceanic and Atmospheric Administration of the Department of Commerce. Marine research projects also receive support through the National Science Foundation, the Department of the Interior, the Office of Naval Research, and other 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.

Race, Culture, and Power

How does the category of race shape our lives, our politics, and our possibilities? Events in this country and internationally constantly remind us that race is an explosive issue. To be able to function as citizens of the world, one must understand the dynamics of race, culture, and power.

This minor reflects intellectual currents now being felt around the world. It prepares students to live in the twenty-first century.

Courses for the minor enable students to develop critical perspectives on the ways in which cultural differentiation and racial explanations have been used to maintain social, economic, and political power.

To complete the minor, students are required to take an introductory course (INCO 450) and 16 credits of electives. Students must earn a C- or better in each course, and must maintain a 2.00 grade-point average in courses taken for the minor. 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. Electives may include a senior seminar. A selected list of electives follows. Many of these courses are special topics and require student petition. Students should consult the minor coordinator before registration.

A partial list of potentially acceptable electives follows

- AMST 502, Introduction to African American Studies
- AMST 696, Latin American Literature Translation
- ANTH 697, Economic Development Theory
- ANTH 500C,D,F,Z, Peoples and Cultures of the World
- ANTH 520, Anthropology of Migration
- ANTH 601, Popular Culture/Native Americans
- ANTH 627, Urbanization in Africa
- ANTH 697, Special Topics
- ANTH 714, Caste, Class and Colonialism
- CMN 515, Analysis of News
- CMN 567, Images of Gender in the Media
- CMN 572, Language and Behavior
- CMN 657, Antislavery and Abolition Rhetoric
- CMN 680, Perspectives on Culture and Communication
- ECON 668, Economic Development Theory
- ENGL 517, Introduction to African American Literature and Culture
- ENGL 581, Introduction to Post-Colonial Literature in England
- ENGL 595, Native American Studies
- ENGL 616, Asian American Film
- ENGL 690, Introduction to African American Literature in America
- ENGL 739, American Indian Literature
- ENGL 758, Shakespeare and Racial Difference
- FS 757, Race, Class, Gender, and Families
- HIST 405, History of Early America
- HIST 410, Survey of American Civilization
- HIST 497, Crime and Punishment in History
- HIST 505, African American History
- HIST 506, African American History
- HIST 507, Native Peoples of America
- HIST 509, Law in American Life
- HIST 531, Americans: Introduction to Latin America
- HIST 532, Modern Latin America
- HIST 587, History of Africa
- HIST 600, The British Empire
- HIST 603, European Conquest of America
- HIST 615, Twentieth Century America
- HIST 631, History of Brazil
- HIST 684, Southern Africa since 1820
- IA 501, Gender, Race, and War in the Modern Era
- INCO 450, Introduction to Race, Culture, and Power
- PHIL 540, Philosophy of Race and Racism
- POLT 513, Civil Rights and Liberties
- POLT 525, Multicultural Theory
- POLT 620, Multicultural Theory
- SOC 530, Race and Ethnic Relations
- SOC 645, Class, Status, and Gender
- SW 525, Introduction to Social Welfare and Policy
- SW 551, Human Behavior and Social Environment II
- SPAN 526, Latin American Civilization and Culture
- SPAN 622, Latin American and Brazilian Literature in Translation
- WS 401, Introduction to Women's Studies (select sections)

For more information and to be assigned an adviser for the race, culture, and power minor, contact a co-coordinator: Nina Glick Schiller, Department of Anthropology, (603)

862-1848, Huddleston 315, or the office of the minor at (603) 862-3753, Huddleston 336A.

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/vpaa/ located under "Students."

Technology, Society, and Values

The technology, society, and values (TSV) minor integrates studies of modern technology, its social and environmental impact, and its ethical implications. It allows students in technological majors to understand their disciplines in a broader context, and those in nontechnological majors to become better informed about technology and its effects. It provides courses which illuminate technological achievements and dilemmas spawned by technology, arranges public programs at which policy and ethical issues on technology are addressed, and seeks career contacts for students in fields that cut across liberal arts and technological topics.

The student minoring in TSV completes a minimum of 20 credits of TSV approved courses, including TSV internships. All students in the minor must take PHIL 424, Science, Technology, and Society. TECH 583, Technology: Cultural Aspects is required of all non-engineering students. Other students may petition out of the TECH 583 re-

quirement with the approval of the TSV coordinator.

The remaining courses to constitute the minor are selected from the following list, or upon approval by the TSV program in case of relevant courses not listed below.

CHE 410, Survey of Current Energy and Pollution Control Technology
 CMN 455, Introduction to Mass Communication
 CMN 647, Rhetoric of Science
 ENE 520, Environmental Pollution and Protection-A Global Context
 ENGL 521, The Nature Writers
 HMP 401, U.S. Health Care Systems
 HIST 521, The Origins of Modern Science
 HIST 522, Science in the Modern Period
 HIST 523, Introduction to the History of Science
 HIST 654, Topics in the History of Science
 INCO 401, War
 NURS 670, Issues in Health Care of the Aged
 NR 535, Contemporary Conservation Issues
 NR 750, Applied Environmental Philosophy
 PHIL 424, Science, Technology, and Society
 PHIL 450, Ecology and Values
 PHIL 447, Computer Power and Human Reason
 PHIL 630, Philosophy of the Natural Sciences
 PHIL 660, Law, Medicine, and Morals
 TECH 583, Technology: Cultural Aspects
 TOUR 767, Social Impact Assessment

A senior thesis option to replace 4–8 credits is possible with permission of the interdisciplinary TSV Steering Committee.

A student normally may apply up to four credits within his or her major, and at most eight credits within any one department toward the TSV minor.

Students interested in minoring in TSV should contact the Department of Philosophy, (603) 862-1040.

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. At least one core course must be completed before any elective can be counted toward the minor. 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 520, The Vietnam War
 HIST 537, Espionage and History
 MILT 413, The Defense Establishment and National Security (1 cr.)
 MILT 502, American Military History (2 cr.)
 NR 535, Contemporary Conservation Issues
 POLT 562, Strategy and National Security Policy
 POLT 761, International Law
 POLT 778, International Organization
 RECO 506, Population, Food, and Resource Use in Developing Countries
 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 in History (e.g., Comparative Revolutions)
 HUMA 690, Special Studies in the Humanities (e.g., Nonviolence, Thinking about War and Peace)

INCO 404P, Understanding War
 POLT 660, Special Topics in International Politics (e.g., Arms Control and Disarmament)

For more information, contact either Ken Fuld, Department of Psychology, or Michael Ferber, Department of English.

Preprofessional Programs

Prelaw

Many graduates of UNH attend law school. The faculty and staff advisers of the Prelaw Advising Committee are interested in working closely with students to identify interests and explore opportunities within legal education. The committee wishes to help 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 www.abanet.org/legaled/prelaw/prep.html).

In that statement, the ABA takes pains to explain 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. Those skills 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.

Academically, prelaw advising implements the ABA statement by working with student interests and strengths to select UNH courses that will develop those “Skills and Values.” Programmatically, the committee provides a prelaw library, sponsors discussions with law school admission and financial aid representatives, and members of the legal community. Procedurally, the committee also provides support for LSAT preparation and law school search, application, and selection processes.

Interested students should register with the Committee by contacting the University Advising Center at (603) 862-2064. Useful information is available on the Web at www.unh.edu/prelaw-advising/.

Premedical/Prehealth Care Professional Study

The Premedical/Pre dental Advising Office in Hood House provides advising for all students preparing for postgraduate careers in medicine, dentistry, optometry, chiropractics, podiatry, physical therapy, and physician assistant programs (for information on the Pre veterinary Medicine Option in Animal Sciences, see page 81). There is no premedical or pre dental major at UNH, so students are encouraged to major in the subject of most interest to them. A student's major is not considered in the 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 Premedical/Pre dental Advising Office in Hood House as soon as possible so as to be kept informed of important events, opportunities, and deadlines.

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. An additional semester of biochemistry is required by some schools and is, therefore, highly recommended. A year of English, preferably composition or critical analysis, 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 General Education 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 are required to take the GRE, a more general exam similar to the SAT in structure and content.

Application process

The Premedical/Pre dental 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 recommendation 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 off 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 Premedical/Pre dental 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 Premedical/Pre dental Advising Office is located in Hood House and can be contacted by phone at (603) 862-3418 or by e-mail at Premed.Advising@unh.edu. The Office also has a Web site at www.unh.edu/premed-advising.

Off-Campus Programs

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. For more information and special registration forms, students should contact James Wolf, associate registrar, Stoke Hall, or Regina McCarthy, director of academic counseling, UNHM. See page 246 for UNHM course listings.

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 or two courses, one semester of courses, or a full year of coursework at a member school, on a space-available basis. The consortium exchange allows matriculated undergraduates to use educational resources that are not available at the home campus and are considered appropriate for their degree programs. The consortium exchange will be used only when academic reasons or other special circumstances warrant it. Approval of the UNH adviser and college dean is required. Schools in the NHCUC consortium include Colby-Sawyer College, Daniel Webster College, Franklin Pierce College, New England College, Southern New Hampshire University, Rivier College, St. Anselm College, UNH, 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 Carolyn Tacy in the National Student Exchange Office in Hood House, (603) 862-3485.

New England Subdegree 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 2.50 grade-point average, be at least first-semester sophomores, and receive permission from the appropriate university exchange authorities at both the sending and receiving institutions. Interested students should contact Carolyn Tacy in the National Student Exchange Office in Hood House, (603) 862-3485.

Exchange Programs within the U.S.

The University offers many possibilities for exchange study with other American institutions. Exchange programs provide an educational experience in a different environment within the United States. It is hoped that students will develop new ways of viewing the country and expand their knowledge of our complex society.

A one-semester or full-year exchange program is available with the University of California, Santa Cruz. In addition, through the National Student Exchange, UNH students can study at more than 170 colleges and universities throughout the U.S. and its territories (including, but not limited to, Montana, New Mexico, Utah, Colorado, Florida, Alaska, and Puerto Rico). Several historically black colleges and universities are exchange members and several are members of the Hispanic Association of Colleges and Universities.

To qualify for exchange study, students must be full-time undergraduate degree candidates with at least a 2.50 grade-point average, have declared a major, receive permission from their college dean and adviser, and receive permission from the exchange 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 thus 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 Carolyn Tacy in the National Student Exchange Office in Hood House, (603) 862-3485.

Study Abroad Programs

The University offers opportunities for full-time, degree candidates with declared majors, 32 credits, and minimum 2.50 cumulative grade-point average (GPA) to study in many foreign institutions. For the purposes of calculating the GPA, bachelor's degree candidates may not include grades earned for Thompson School courses. Opportunities in Canada, England, France, German-speaking countries, Hungary, Japan, the Netherlands, New Zealand, Puerto Rico, Scotland, and Spain are described below. Students may

study abroad in other locations through UNH-approved programs by using the intercollege 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 (Hood House) or the departments identified in the following UNH-managed program descriptions.

Canada

New England/Québec Student Exchange Program

Students may spend one or two semesters during their junior or senior year at one of twenty French- or English-speaking universities in the province of Québec. Eligibility requirements include a command of the language of the host campus, U.S. citizenship, and at least sophomore standing. Contact the Center for International Education, Hood House, (603) 862-2398.

New England/Nova Scotia Student Exchange Program

Students may spend one or two semesters during their junior or senior year at one of eleven participating Nova Scotia institutions offering programs in the liberal arts, agriculture, business, engineering, art, and other fields. Eligibility requirements include U.S. citizenship and at least sophomore standing. Contact the Center for International Education, Hood House, (603) 862-2398.

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, history, and the humanities, taught by faculty from Cambridge University and UNH. Students live, dine, study, and socialize together 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 (Group 5) foreign culture, General Education Requirement. For more information, contact the director at the Department of English, Cambridge Program Office, 53 Hamilton Smith Hall, 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.

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 one year of college, declared a major, and achieved an overall grade-point average of at least 2.50. Interested students should contact the program coordinator, London Program Office, 53 Hamilton Smith Hall, www.unh.edu/london.

France

Summer French Language Program in Brest

Qualified students may take the equivalent of FREN 503 and/or 504, the UNH Intermediate French sequence, or FREN 631 and/or 632, the UNH advanced French sequence, in Brest. A port city in the province of Brittany in western France, Brest is a sister city of Portsmouth, New Hampshire.

The courses are offered summer only in intensive four-week summer sessions at the Centre International d'Études des Langues (CIEL). Students generally live with local families and attend classes a total of 24 hours per week. Credit for courses completed successfully will be automatically transferred to UNH. For more information, contact Barbara Cooper, Department of Language, Literatures, and Cultures, Murkland Hall.

Junior Year Program in Dijon

The Department of Languages, Literatures, and Cultures sponsors a junior year abroad 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 program is open to those who have completed FREN 631-632 and FREN 651-652, with a grade of B or better. For more information, see Claire

Malarte Feldman, Department of Languages, Literatures, and Cultures, Murkland Hall, (603) 862-1303.

Business Administration Program in Grenoble

The New England State Universities offer a spring semester of study in international marketing at the Group ESC Grenoble. This is an opportunity for students interested in international business, economics, and trade to participate in an English-speaking program while gaining exposure to French culture. The semester will begin early in January with a one-week orientation and introduction to France, followed by two weeks of intensive French language. Students will be assessed and placed in the appropriate level. Students will be enrolled in five courses: four taught by Grenoble faculty and one taught by the U.S. faculty member accompanying the group as resident director. The language of instruction is English. Students will earn 16 credits for the program. The program will continue until the end of May. During the semester there will be two one-week breaks and a one-week study trip.

French Program in Paris

A spring semester program for intermediate-level students in Paris, France (see FREN 582/682). The program is open to all qualified students at UNH who have completed FREN 501 or higher. Courses include one French language course and four additional courses taught in English; general education and French minor credit are available. The deadline for applications is October 15, therefore students interested in this program should consult with the UNH on-campus director in the late spring or early in the fall semester. Contact Juliette Rogers, Department of Languages, Literatures, and Cultures, Murkland Hall, (603) 862-1068.

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 3.00 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 general education 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.

Junior Year Program in Salzburg, Austria

Students who have completed GERM 504 or equivalent may enroll for one or both semesters at the University of Salzburg through the New England Universities Consortium. UNH faculty contact person is Professor Ed Larkin, (603) 862-3549.

Summer Review Course in Rosenheim, Germany

Conducted in early summer in Rosenheim, Germany, this course offers an intensive, three-week review of the basic structures and vocabulary of the German language. Particular emphasis is placed on speaking German in everyday situations. The course is open to students of any major who have successfully completed one year of college German at the elementary level (GERM 401-402) or its equivalent. Contact Professor Ed Larkin, (603) 862-3549 or CIE, 862-2398.

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 Professor Nancy Lukens, (603) 862-3450 or CIE, 862-2398.

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. Faculty contact person is Professor Nancy Lukens, (603) 862-3450.

Hungary

Budapest Program in Justice Studies

The UNH Budapest Program in Justice Studies 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. 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, BUES 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. 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 Justice Studies office at 862-1957.

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 (BUTE) in Budapest, Hungary. Courses at BUTE are taught in English and receive prior approval for degree credit. Students studying at Budapest, therefore, will graduate on schedule at UNH. A general education course on the language, geography, and culture of Hungary, taken at BUTE, is required. The foreign student office at BUTE 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, Carol French, and the college's foreign exchange administrative coordinator; Marina Markot, Educational Coordinator, CIE, Hood House, or Professor Andrzej Rucinski, Foreign Exchange Program Coordinator, (603) 862-1381. For more information, visit the Web site for the program at www.ceps.unh.edu/academics/budapest/.

India

Living Routes—Ecovillage Education/Geo Communities Semester

Available to students in all majors, the Geo Communities Semester is an intensive immersion program in sustainable community development. Students create a learning community within the living community of Auroville, an international township of 1,900 people from more than 35 nations which aims to sustainably support 50,000 people. The community is a pioneer in many emerging fields such as reforestation and habitat restoration, appropriate technology, alternative building, organic farming, educational projects, and more. Internships and extended field visits to environmental and cultural sites throughout south India are included. Contact Daniel Greenberg, Ph.D. (888) 515-7333.

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 (see ITAL 685-686). Students generally live with Italian families or in apartments in the heart of this medieval city and take UNH courses taught by UNH faculty. Students with advanced language skills may also enroll in courses at the University of Ascoli Piceno. Internships are available. There is no language prerequisite. Students must have a cumulative grade-point average of 2.50 and at least sophomore standing. For further information, contact Piero Garofalo, Department of Languages, Literatures, and Cultures, Murkland Hall, (603) 862-3769.

Japan

Kansai Gaidai University, Osaka

Students may spend one or two semesters at Kansai Gaidai University in Osaka, Japan. Program participants study the Japanese lan-

guage, business, politics, literature, fine arts, and other courses. Eligibility requirements include a 3.00 grade-point average and sophomore, junior, or senior standing. Contact the Center for International Education, Hood House, (603) 862-2398.

Kanto Gakuin University, Yokohama

Students may spend the fall semester at Kanto Gakuin University. Program participants study Japanese language, literature, and culture. Contact the Center for International Education, Hood House, (603) 862-2398.

The Netherlands

Program at the Institute of Higher European Studies in The Hague

The Center for International Education administers a semester abroad at the Institute of Higher European Studies in The Hague, The Netherlands. All classes are in English. This program is available to sophomores, juniors, and seniors. The Netherlands provides easy access to all of Western Europe and is a wonderful and easy country in which to live and travel. The curriculum at the institute offers a rich international perspective to students. Interested students should contact the Center for International Education, Hood House, (603) 862-2398.

Business Administration Program in Maastricht

The New England Universities offer a fall semester of study in International Business and Economics at the University of Limburg in Maastricht. This program provides students who are interested in multinational business and economics the opportunity to participate in an English-speaking European studies program.

Situated at the extreme southern tip of The Netherlands midway between the cities of Brussels and Bonn, a modern Maastricht provides ready access to the major institutions of the European Community. The city, which has become an important European Community center, is unparalleled in its beauty and historic value. The ancient walled city of Maastricht, founded by the Romans in 50 B.C. at the junction of the rivers Meuse and Jeker, is Holland's oldest city. Today, Maastricht (population: 115,000) is a university city with facilities including academics of art and theater, a college of translation studies, a music conservatory, a hotel college, and a university with more than 6,000 students.

The University of Limburg is a relatively young university with facilities of law, economics, and business administra-

tion, humanities, medicine and the health sciences.

Academic Programs. Students admitted to the program will *only earn 15 credits*. The semester begins in late August with an orientation program and ends in mid-December. Participants will enroll in four or five 3-credit courses: three required courses, and one or two electives. All instruction is in English. Interested students should contact the program coordinator, WSBE Undergraduate Advising, (603) 862-3308.

New Zealand

EcoQuest, New Zealand

In partnership with the UNH Department of Natural Resources, EcoQuest Waharau, New Zealand, 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 features a four-acre, subtropical, organic orchard and vegetable garden and 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. Contact Donna Dowal, (603) 862-2036.

Puerto Rico

University of Puerto Rico at Mayaguez

Students may spend one or two semesters at the University of Puerto Rico (UPR) at Mayaguez, the second largest of the three major campuses in the UPR system. 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 and faculty members from all UNH majors. Since 80 percent of all courses at UPR are taught in Spanish, participants must be proficient in Spanish. Students must contact Carolyn Tacy, National Student Exchange Office, Hood House, (603) 862-3485.

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 Robert Henry at (603) 862-3131, e-mail Robert.Henry@unh.edu.

Spain**Granada Program**

The Granada program is administered jointly by the Spanish programs of the Universities of New Hampshire, and Connecticut. Students may spend one or two semesters 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 2.50, 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. Deadlines for fall applicants is March 1; for spring applicants, October 1. For further information, contact the Spanish Program, Murkland Hall. (See also SPAN 685, 686 on page 191.)

Other Programs**Honors Program**

The University of New Hampshire has a tradition of encouraging academic achievement through its 21 honorary societies, including active chapters of Phi Beta Kappa and Phi Kappa Phi. In 1984, the University took another step toward the recognition of outstanding students by establishing an undergraduate honors program. The University Honors Committee, made up of representatives from all colleges of the University, the Office of Admissions, the Division of Student Affairs, and the Registrar's Office, supervises the operation and requirements of the program.

There are two ways to enter the University Honors Program:

1. The Office of Admissions identifies a number of qualified incoming freshmen who are then invited to submit an application to the honors program. The honors committee reviews these applications and determines admission to the program.

2. Freshmen who achieve a grade-point average of 3.20 or better during their first semester are also invited to join the program.

Participation in the University Honors Program does not add courses to those required to graduate. The first two years of the program focus on general education requirements. Students take a minimum of four honors-designated general education courses, one of which is an honors seminar based on a special topic. All students must attain a cumulative grade-point average of 3.20 by the end of their sophomore year in order to continue in the honors program.

The upperclass part of the honors program consists of honors work in the majors. A booklet describing these programs is available in department and college advising offices as well as in the Honors Program Office. Programs with "honors in major" work are animal sciences, anthropology, arts, biochemistry, biology, business administration, chemistry, chemical engineering, civil engineering, classics, communication, communication disorders, computer science, earth sciences, economics, English, electrical and computer engineering, environmental conservation, environmental horticulture, environmental and resource economics, family studies, forestry, French, geography, German, health management and policy, history, hospitality management, humanities, kinesiology (exercise specialist option), linguistics, mathematics, mechanical engineering, medical laboratory science, microbiology, music, nursing, nutritional sciences, occupational therapy, outdoor education, philosophy, physics, plant biology, political science, psychology, Russian, social work, sociology, Spanish, theatre, wildlife management, women's studies, and zoology. Successful completion of University Honors Program requirements entitles the student to receive the designation "University honors in major" on his or her academic record and diploma. Completion of "honors in major" only is similarly denoted. The University Honors Committee has developed a "University honors" option for students in majors that do not offer honors work.

To satisfy honors program requirements, students must have a final cumulative grade-point average of 3.20 and meet the grade-point average requirements of their honors-in-major program. All courses used to achieve "University honors," "University honors in major," or "honors in major" must have a minimum grade of B-.

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, please contact Robert Mennel, director, University Honors Program, Hood House.

Reserve Officer Training Corps Programs

The Army and Air Force offer Reserve Officer Training Corps (ROTC) programs leading to a commission as a second lieutenant in their respective services. Both programs are open to men and women. 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 who began ROTC at another institution. In addition to on-campus ROTC course requirements, students must attend an officer preparatory training session for a part of one summer.

ROTC is open to students pursuing a baccalaureate degree who have a minimum of two academic years or more remaining within their degree program. Entering freshmen may preregister for MILT 413 (AROTC) or AERO 415 (AFROTC). Sophomores desiring to enter ROTC should check with either the Army or Air Force enrollment advisers located in Zais Hall.

Two-year ROTC programs are open to students who have two academic years of study remaining at the University. Applicants for the two-year program must attend a six-week training session during the summer immediately before their entry into ROTC.

ROTC scholarships are offered on a competitive basis by both the Army and Air Force. Entering freshmen may compete for four-year scholarships during the last year of high school. Additionally, incoming students with either a four-year or three-year ROTC scholarship will receive a room and board grant for the entire time that they are on an ROTC scholarship. Students in a four-year ROTC program and two-year program applicants compete for scholarships covering their remaining academic years. Scholarships pay for tuition, mandatory University fees, and required textbooks for all courses. Limits may be placed on these scholarships dependent upon the type and amount of expenses incurred. In addition, all scholarship recipients receive a tax-free monthly subsistence allowance. Nonscholarship students in the last two years of the ROTC program also receive

the tax-free monthly subsistence allowance.

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

More specific information about ROTC programs may be obtained by contacting the professor of military science (Army ROTC) or the professor of aerospace studies (Air Force ROTC).

Undergraduate Research Opportunities Program (UROP)

Students can enhance their undergraduate education through collaborative research projects with faculty members. The Undergraduate Research Opportunities Program offers participants the chance to improve research skills and to acquire an understanding of the nature of research in an academic field. Students may apply to the program to receive awards and fellowships in support of their research projects. They may conduct their research on campus or at appropriate research sites in the United States and abroad. Participation in the program can also aid students in making choices and developing plans concerning careers and graduate schools. For information, please contact Donna Brown, director, UROP Office, Hood House, (603) 862-4323.

International Research Opportunities Program (IROP)

IROP offers students opportunities for advanced research at the undergraduate level and in an international setting. It enables students to collaborate with both UNH faculty members and foreign researchers. And it integrates an international experience and global awareness within the students' program of study. Students may apply for fellowships to support nine weeks of research during the summer working with the foreign research partners of UNH faculty. Students accepted into the program will complete language, culture, and research training before leaving and will share their research and cultural experience upon returning. Projects may include library/archival research, laboratory research, or field research. Research opportunities are available throughout the world including Latin America, Canada, Europe, Africa, and Asia. For more information, please contact Georgeann Murphy, program coordinator, IROP Office, Hood House, (603) 862-1933.

THOMPSON SCHOOL OF APPLIED SCIENCE

Regina A. Smick-Attisano, Director
Cynthia Giguère, Assistant Director

Associate in Applied Science
Applied Animal Science
Dairy Management
Equine Management
Small Animal Care
Applied Business Management
Business Computing
Business Management
Civil Technology
Architectural Technology
Construction Management
Surveying and Mapping
Community Service and Leadership
Food Services Management
Dietetic Technician
Restaurant Management
Forest Technology
Forest Technician
Horticultural Technology
Landscape Operations
Floriculture Operations
General Ornamental Horticulture

The Thompson School of Applied Science, established in 1895, is a division of the College of Life Sciences and Agriculture within the University offering the associate in applied science degree. The Thompson School of Applied Science offers 15 program specializations. They comprise a balance of professional, science-related, and general education courses in applied curriculums that prepare students to meet the specific demands of a technical or applied profession, continuing education, and the general demands of life.

The faculty at the Thompson School of Applied Science 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 education; and a commitment to practical, science-based education. They work closely with students, providing academic advising, career counseling, and special assistance when needed.

Located at the western edge of 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, and faculty offices.

Cole Hall includes a 150-seat lecture auditorium, a quantity-foods kitchen and cafeteria, a student study and lounge area, a computer laboratory, a computer-aided design (CAD) laboratory, a small classroom, and administrative offices.

Putnam Hall houses an architecture lab, a surveying and mapping lab, a Geographic Information System (GIS) lab, an agricultural mechanization shop, classrooms, and faculty offices.

Students enrolled in Restaurant Management gain practical experience in three campus restaurants: the Dairy Bar; Stacey's, and the Balcony Bistro, both located in Cole Hall.

Forestry students use a sawmill facility near campus to integrate the process of harvesting trees from a managed forest with the production of quality forest products. Students assist in the management of the UNH woodlands (a Certified Tree Farm) by participating in mapping and inventory, and in reforestation and forest protection projects.

Students have the use of the Thompson School horticultural facility, with a low- and

high-temperature greenhouse, propagating facilities, refrigerated compartments, and nursery plots.

- *Business* students focus on small-to-medium size enterprises and gain real world experience through internships and course experience such as Applied Sales. The capstone course, Business Policy, is designed so students can create their own business to market a product and generate revenues used to support scholarships and special projects.

- * Whether the specialty is dairy, equine or small animals, students in *Applied Animal Science* utilize state-of-the-art facilities on campus, such as the Dairy Center or new Grooming Lab. The University's herd of Morgans, Thoroughbreds, and Warmbloods are ridden on nearby trails, and in the outside or indoor arenas during class sessions.

- *Civil Technology* students access the state-of-the-art CAD (computer aided design) lab 24 hours per day, seven days per week. Along with the laboratory, they may also access a National AUTODESK training facility in Cole Hall. These facilities are complemented by the use of GPS (global positioning system) surveying equipment used in the field.

- *Dietetic Technician* students learn to assess the dietary needs of patients or clients. These students earn valuable experience through 450 hours of a clinical practicum in nearby hospitals, nursing homes, community health centers and assisted living facilities.

- Students majoring in *Community Service and Leadership* gain enriching experiences working with organizations such as Families First, NH Housing Partnership, Red Cross, New Hampshire Public Television's station and on-campus groups. Students are involved with creating, operating and evaluating these service-learning activities.

Associate in Applied Science Degree

To graduate with an associate in applied science degree, a student must complete specified coursework in the three academic areas of study defined below, with an overall grade-point average of no less than 2.00 (out of 4.00). In addition, students must earn the minimum number of total credits required for each specialization.

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 the student 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;
- one course (3–4 credits) in mathematics;
- two courses (6 credits) in communications, to include COM 209, Expository Writing and Reading, plus an elective;
- two courses (6 credits) in social sciences, the arts, or the humanities, to include either SSCI 201 Human Relations, or SSCI 202 Social Issues, plus an elective.

For course descriptions, see the Thompson School's General Education Section, page 244.

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 Program 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 any courses offered by the Thompson School or from selected University undergraduate courses with adviser approval.

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 broader period, elect the option of part-time study. This allows students to work toward completion of the degree over an extended period, typically two to five years. The schedule can be shortened or lengthened to meet the needs of individual students. Part-time degree students register for courses through the UNH Division of Continuing Education and are treated in all respects as full-time students. For further information and a brochure on the part-time program, please contact the Thompson School at (603) 862-1025 or (603) 862-3115.

Admissions

The Thompson School welcomes applications from both high school and adult students.

High school students who plan to enter the Thompson School after graduation will be considered on the basis of high school course selection, academic achievement, class rank, and high school recommendations. Emphasis is placed on the applicant's personal motivation, demonstrated interest in a career field, and preparation for Thompson School programs.

All traditional-age students must submit the results of the Scholastic Assessment Test (SAT-I). Adult students who have been out of high school for a number of years may request that the Office of Admissions waive the SAT-I requirement.

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 will 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), Scholastic Assessment Test (SAT-I), and College Level Examination Program (CLEP); letters of reference; previous college study; and military record (if applicable).

A number of Thompson School specializations require satisfactory work in specific

high school preparatory courses. These admission requirements are listed under each career specialization in this catalog.

How to Apply

You may request an application for admission and additional information from either of the following offices: UNH Office of Admissions, Grant House, 4 Garrison Avenue, Durham, NH 03824-3510, (603) 862-1360; or Thompson School of Applied Science, Cole Hall, 291 Mast Road, Durham, NH 03824-3562, (603) 862-1025.

Applications may be submitted at any time during the calendar year. Notice of admission to the Thompson School will normally be sent within 30 days following receipt of all required information.

Please note: Priority deadlines for those students requesting UNH residential housing is February 1 for the fall semester and November 1 for spring semester. Housing assignments will be handled on a space-available basis after February 1. The UNH financial aid deadline is March 1 for the fall semester.

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. Open houses are conducted in the fall and spring. Interviews are recommended but not required. Interviews are conducted by a student admissions representative, who will give you a sense of the Thompson School from a student's perspective or the Thompson School's Admissions Coordinator. To attend an open house or to arrange your visit, please contact the Thompson School at (603) 862-1025 or visit our Web site at www.unh.edu/thompson-school.

Expenses, Financial Aid, and Scholarships

Costs for students include tuition, 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, page 14) and students majoring at the Thompson School have access to the same student services. (See also Campus Life, page 6; Programs and Services for Students, page 8; Health Services, page 13.) Required curriculum and lab fees for Thompson School programs are listed with each specialization.

For information about scholarships, loans, and work-study, write the Financial Aid Office, Stoke Hall, 11 Garrison Avenue, Durham, NH 03824-3511; or call (603) 862-3600. A financial aid form must be on file to be considered for many scholarships. (See also Financial Aid, page 6.)

The Thompson School and the College of Life Sciences and Agriculture also provide scholarship opportunities for Thompson School students. Call (603) 862-1025 for a list of these possibilities or check our Web site at www.unh.edu/tsas/scholarships.

New England Regional Student Program

The Thompson School of UNH participates in the New England Regional Student Program of the New England Board of Higher Education, in 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 50 percent. See the table below for Thompson School programs that are eligible in 2003-2004. 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.

*Thompson School of Applied Science
New England Regional Student Program*

2003-2004 Academic Year

Associate Degree Program:	Available to Residents of
<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>Food Services Management</i>	
Dietetic Technician	MA, RI, VT
Restaurant Management	MA, RI, VT
<i>Forest Technology</i>	
Forest Technology	CT, MA, RI, VT
<i>Horticultural Technology</i>	
Floriculture Operations	RI
Landscape Operations	RI
General Ornamental Horticulture	RI

Transfer Opportunities

UNH invites Thompson School graduates to continue their education at the University. Many of the technical associate degree programs offered by the School have baccalaureate degree counterparts. Specifically, these counterparts include civil engineering, forestry, environmental horticulture, animal sciences, dairy management, nutritional sciences, business administration, and hospital-ity management. Many other baccalaureate majors are also available. A final grade-point average of at least 2.50 is required for transfer to most programs; some UNH baccalaureate programs require a higher grade-point average. Successful completion of a baccalaureate degree usually requires at least two-and-one-half years of additional study at the University. Other colleges and universities also welcome graduates from the Thompson School, especially those within the University System of New Hampshire.

Program Abbreviations

The following abbreviations are used to identify Thompson School of Applied Science courses.

AM	Agricultural Mechanization
AAS	Applied Animal Science
ABM	Applied Business Management
ANSC	Animal and Nutritional Science
CT	Civil Technology
COM	Communications
CSL	Community Service and Leadership
CD	Community Development
FSM	Food Services Management
FORT	Forest Technology
HT	Horticultural Technology
MTH	Mathematics
NUTR	Nutrition
PHYS	Physics
PBIO	Plant Biology
SSCI	Social Science
ZOOL	Zoology

Programs of Study

Applied Animal Science

(For descriptions of courses, see page 236.) Applied Animal Science 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 specialization in

either equine management, dairy management, or small animal care. Each specialization also allows for choices of elective courses in other areas.

Practical learning experience is provided at the UNH equine facilities and the UNH Dairy Center. The Thompson School also operates its own grooming shop and biology laboratories. The curriculum has a number of animal-related educational programs, including an educational partnership with the NHSPCA in Stratham, NH, and field trips to many animal-related businesses.

Curriculum Fee

Applied animal science, all specializations: \$485*

Applied Animal Science Curriculum Standards

Applied Animal Science students must maintain a 2.00 average in AAS classes after 2 semesters (32 credits) to take additional AAS classes. Student with AAS averages lower than 2.00 must repeat classes with lower grades and raise their average to 2.00 before taking additional AAS classes. Students must have a cumulative 2.00 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 many of the skills learned in the classroom into practice immediately. 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 state-of-the-art teaching and research center, where students work with each other to manage the CREAM (Cooperative for Real Education in Agriculture) herd.

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 continued practical experience with cattle. The program prepares students to work both on the farm or in related businesses.

*This one-time, nonrefundable fee is required to cover laboratory materials, specialized equipment maintenance, and transportation that is unique to the applied nature of each specialization. The curriculum fee covers the entire two-year course of study. The special fees listed in the course description are for nonmatriculating students only.

Career Opportunities: Herds 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
Course, Credits**

First Year, Fall Semester

- AAS 228, Anatomy and Physiology of Domestic Animals, 4 cr.
- AAS 231, Introduction to Animal Science, 4 cr.
- AAS 244, Introduction to Dairy Management, 4 cr.
- AAS 278, AAS Computer Applications, 1 cr.
- COM 209, Expository Writing and Reading, 4 cr.

First Year, Spring Semester

- AAS 223, Dairy Selection, 2 cr.
- AAS 234, Equipment and Facilities Management, 3 cr.
- AAS 239, Fundamentals of Animal Health, 3 cr.
- AAS 242, Introduction to Business, 2 cr.
- COM 212, Technical Writing, 2 cr.
- MTH 202, Math II, 3 cr.

Second Year, Fall Semester

- AAS 232, Animal Forages, 3 cr.
- AAS 235, Animal Nutrition, 3 cr.
- AAS 246, Management Applications, 4 cr.
- AAS 275, CREAM (Cooperative for Real Education in Agriculture) Program, 4 cr.
- AAS 297, Work Experience (summer), 0 cr.
- SSCI class, 2-4 cr.

Second Year, Spring Semester

- AAS 240, Animal Breeding, 3 cr.
- AAS 258, Comparative Dairy Operations, 1 cr.
- AAS 264, Dairy Nutrition Practicum, 1 cr.
- AAS 275, CREAM Program, 4 cr.
- SSCI 201, Human Relations *or*
- SSCI 202, Social Issues, 4 cr.

Recommended electives include

- AAS 221, Dairy Production Techniques
- AM Agricultural Mechanization courses

Total: 68-70 credits

Equine Management

As part of new leisure industries, the equine industry in New England encompasses many different facilities and disciplines. Students in the equine management specialization 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 basis for direct employment opportunities yet enough flexibility to further their education.

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.

Career Opportunities: Riding instructor, barn manager, breeding farm manager, sales (tack shops, grain stores), horse show manager, veterinary assistant/equine practice.

**Equine Management Program of Study
Course, Credits**

First Year, Fall Semester

- AAS 228, Anatomy and Physiology of Domestic Animals, 4 cr.
- AAS 231, Introduction to Animal Science, 4 cr.
- AAS 237, Equine Management Techniques, 4 cr.
- AAS 278, AAS Computer Applications, 1 cr.
- COM 209, Expository Writing and Reading, 4 cr.

First Year, Spring Semester

- AAS 226, Equine Conformation and Lameness, 4 cr.
- AAS 234, Equipment and Facilities Management, 3 cr.
- AAS 239, Fundamentals of Animal Health, 3 cr.
- AAS 242, Introduction to Business, AAS, 2 cr.
- COM 212, Technical Writing, 2 cr.
- MTH 202, Math II, 3 cr.

Second Year, Fall Semester

- AAS 232, Animal Forages, 3 cr.
- AAS 235, Animal Nutrition, 3 cr.
- AAS 246, Management Applications, 4 cr.
- AAS 247, Applied Equine Management, 3 cr.
- AAS 297, Work Experience (summer), 0 cr.
- SSCI class, 2-4 cr.
- ANSC 402, Horsemanship, 3 cr.

Second Year, Spring Semester

- AAS 240, Animal Breeding, 3 cr.
- AAS 252, Advanced Equine Management, 4 cr.
- AAS 253, Equine Competition Management, 2 cr.
- SSCI 202, Social Issues, 4 cr.
- Electives 2-5 cr.

Recommended electives

- AAS 272, Comparative Equine Operations
- AAS 293, Equine Field Operations
- ANSC 507, Equine Discipline (ANSC 402 is a prerequisite)

Total: 65-68 credits

Small Animal Care

Animal companionship provides millions of people an oasis in a hectic, impersonal world, and pet owners consistently seek additional advice on the care of their animals. The small animal care specialization prepares students to work in companion animal jobs 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, pharmacology, and toxicol-

ogy. During their second year, students spend four hours a week at the NHSPCA performing all aspects of 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
Course, Credits**

First Year, Fall Semester

- AAS 228, Anatomy and Physiology of Domestic Animals, 4 cr.
- AAS 230, Small Animal Breeds and Behavior, 4 cr.
- AAS 231, Introduction to Animal Science, 3 cr.
- AAS 278, AAS Computer Applications, 1 cr.
- COM 209, Expository Writing and Reading, 4 cr.

First Year, Spring Semester

- AAS 222, Small Animal Grooming, 2 cr.
- AAS 239, Fundamentals of Animal Health, 3 cr.
- AAS 242, Introduction to Business, AAS, 2 cr.
- AAS 249, Small Animal Care Techniques, 2 cr.
- Electives 1-3 cr.
- COM 212, Technical Writing, 2 cr.
- MTH 202, Math II, 3 cr.

Second Year, Fall Semester

- AAS 235, Animal Nutrition, 3 cr.
- AAS 246, Management Applications, 4 cr.
- AAS 279, Small Animal Care Practicum, 2 cr.
- AAS 297, Work Experience (summer), 0 cr.
- SSCI 201, Human Relations, 4 cr.
- AAS Electives 2-5 cr.

Second Year, Spring Semester

- AAS 224, Small Animal Management, 4 cr.
- AAS 240, Animal Breeding, 3 cr.
- AAS 279, Small Animal Care Practicum, 2 cr.
- AAS Electives, 2-4 cr.
- SSCI Class, 2-4 cr.
- Electives 2-3 cr.

Recommended AAS electives

- AAS 221, Dairy Production Techniques
- AAS 222, Small Animal Grooming (2nd time)
- AAS 227, Small Animal Diseases
- AAS 237, Equine Management Techniques
- AAS 251, Human/Animal Bond
- AAS 254, Animal Assisted Activities and Therapy
- AAS 257, Small Animal Diseases Lab (AAS 227 Prereq)
- AAS 276, Introduction to Lab Animals
- AAS 277, Lab Animal Practicum
- ABM courses (permission required)
- ANSC 402, Horsemanship
- ANSC 406, Careers in Animal Science

Total: 64-70 credits

Admissions Requirements

Applicants to the dairy management, equine management, and small animal care specializations must present at least one year of satisfactory work in college preparatory biology and two years of college preparatory math.

One year of high school chemistry is also highly recommended. Students with weaknesses in these academic areas are encouraged to take refresher classes before starting their coursework in the applied animal science program.

Applied Business Management

(For descriptions of courses, see page 238.)

The Applied Business Management program combines classwork and practical experience to give students a thorough understanding of the business field. Along with a core curriculum of skills in accounting, human resource management, marketing, sales and communications, students choose to specialize in either business computing or business management. After their first semester, students may take up to three elective courses chosen from University course offerings with approval.

Practical experience is gained through research projects with local industries, municipalities and state agencies, and student-run businesses. Students may also elect to take internships with area businesses.

Curriculum Fees

Applied Business Management:	
Business computing	\$205*
Business management	\$105*

Business Computing

Success in managing businesses depends partly on the effective use of cutting edge personal computers and the latest and most productive applications of computer technology. The business computing specialization allows students to gain an up-to-date working knowledge of business hardware, operating systems, programming tools, networking, and applications software. In addition, students in this specialization gain a solid background in basic principles of management, accounting, supervision, communications, and business policy.

Career Opportunities: Office manager, computer specialist, assistant manager, purchasing and inventory controller, bookkeeper, business owner.

Business Computing Program of Study Course, Credits

First Year, Fall Semester

ABM 204, Principles of Management, 4 cr.
ABM 205, Applied Financial Accounting, 4 cr.
COM 209, Expository Writing and Reading, 4 cr.
MTH 201, Mathematics I, 3 cr., or
MTH 202, Mathematics II, 3 cr.

First Year, Spring Semester

ABM 208, Managerial Accounting, 4 cr.
ABM 218, Computer Database Management, 2 cr.
ABM 220, Computer Spreadsheet Applications, 2 cr.
ABM 222, Operating Systems and Networking, 2 cr.
COM 210, Public Speaking, 2 cr.
Electives 4 cr.

Second Year, Fall Semester

ABM 202, Professional Writing, 2 cr.
ABM 206, Human Resource Management, 4 cr.
ABM 217, Web Page Programming and Design, 4 cr.
SSCI 201, Human Relations, 4 cr.
Electives 2-4 cr.

Second Year, Spring Semester

ABM 211, Business Policy, 4 cr.
ABM 219, Desktop Publishing and Advanced Applications, 4 cr.
Social Science Elective, 2-4 cr.
Electives 4 cr.

Total: 64-66 credits

Business Management

Small- to medium-sized businesses represent the largest and fastest growing segment of the state and regional economy. The business management specialization is specifically designed for students who wish to seek entry-level management positions in existing firms, prepare for management of a family-owned business, or start a new business. 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, nationwide management trainee programs, assistant manager, purchasing and inventory controller, bookkeeper, sales professional, business owner.

Business Management Program of Study Course, Credits

First Year, Fall Semester

ABM 204, Principles of Management, 4 cr.
ABM 205, Applied Financial Accounting, 4 cr.
COM 209, Expository Writing and Reading, 4 cr.
MTH 201, Math I, 3 cr., or
MTH 202, Math II, 3 cr.

First Year, Spring Semester

ABM 207, Applied Marketing, 4 cr.
ABM 208, Managerial Accounting, 4 cr.
ABM 220, Computer Spreadsheet Applications, 2 cr.
COM 210, Public Speaking, 2 cr.
Electives 4 cr.

Second Year, Fall Semester

ABM 202, Professional Writing, 2 cr.
ABM 206, Human Resource Management, 4 cr.
ABM 214, Applied Sales, 4 cr.
SSCI 201, Human Relations, 4 cr.
Electives 2-4 cr.

Second Year, Spring Semester

ABM 211, Business Policy, 4 cr.
ABM 232, Business Law, 4 cr.
Social Science Elective 2-4 cr.
Electives 4 cr.

Total: 64-66 credits

Admissions Requirements

Students entering the business computing or business management specialization must have a minimum of two years of college preparatory mathematics (preferably three). Several ABM courses require a strong background in basic mathematics and algebra.

Civil Technology

(For descriptions of courses, see page 239.)

Civil Technology is a dynamic educational opportunity offering skill-based learning through class instruction, extensive laboratory experience, and fieldwork. Students choose from one of the following specializations: architectural technology, construction management, and surveying and mapping.

The cornerstone of the educational experience is instruction in computer-aided design (CAD) using the Thompson School's state-of-the-art CAD labs. Students in field surveying use the latest 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.

Curriculum Fees

Civil technology, all specializations: \$70*

Architectural Technology

In the Architectural Technology specialization, students expand on the broad construction-related base of the Civil Technology curriculum. From faculty who are experienced, registered architects and engineers, students are introduced to the technical skills used in the architectural profession, including com-

*This one-time, nonrefundable fee is required to cover laboratory materials, specialized equipment maintenance, and transportation that is unique to the applied nature of each specialization. The curriculum fee covers the entire two-year course of study. The special fees listed in the course description are for nonmatriculating students only.

puter-aided design (CAD) 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 for architecturally 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.

Architectural Technology Program of Study Course, Credits

First Year, Fall Semester

CT 220, Professional Practice, 1 cr.
 CT 222, Computer Aided Design Level 1, 4 cr.
 CT 223, Introduction to Surveying & Mapping, 4 cr.
 AM 280, Technical Computer Literacy/Internet Applications, 4 cr.
 MTH 203, Algebra and Trigonometry, 3 cr.

First Year, Spring Semester

CT 231, Design I, 4 cr.
 AM 275, Building Science/Residential Construction, 4 cr.
 COM 212, Technical Writing and SSCI 204, Leadership Effectiveness and Group Performance, 4 cr.
 Elective, 4 cr.

Second Year, Fall Semester

CT 227, Mechanical & Electrical Systems, 4 cr.
 CT 247, Construction Contracting, 4 cr.
 CT 281, Architecture I History and Design, 4 cr.
 CT 297, Work Experience, 0 cr.
 COM 209, Expository Writing and Reading, 4 cr.

Second Year, Spring Semester

CT 282, Architecture II, 4 cr.
 SSCI 202, Social Issues, 4 cr.
 *Technical Elective, 4 cr.
 Elective 4 cr.

Total: 64 credits

Construction Management

In the Construction Management specialization, 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 develop-

ment 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, or in the bachelor of engineering technology program in civil engineering.

Graduates of the Construction Management specialization find employment in a variety of building industry-related positions.

Career Opportunities: Construction supervisor, project manager, cost estimator, public works department, contractor, code enforcement officer, construction material tester, land-development planning, site evaluator for building components, construction product manufacturer, product representative, DOT engineering technician.

Construction Management Program of Study Course, Credits

First Year, Fall Semester

CT 220, Professional Practice, 1 cr.
 CT 222, Computer Aided Design Level I, 4 cr.
 CT 223, Introduction to Surveying and Mapping, 4 cr.
 AM 280, Technical Computer Literacy/Internet Applications, 4 cr.
 MATH 203, Algebra and Trigonometry, 3 cr.

First Year, Spring Semester

CT 231, Design I, 4 cr.
 CT 233, Construction Surveying, 4 cr.
 CT 237, Land Design and Regulations., 4 cr.
 COM 212, Technical Writing and SSCI 204, Leadership Effectiveness and Group Performance 4 cr.

Second Year, Fall Semester

CT 230, Statics and Materials, 4 cr.
 CT 247, Construction Contracting, 4 cr.
 CT 297, Work Experience, 0 cr.
 COM 209, Expository Writing and Reading, 4 cr.
 CT 227, Mechanical and Electrical Systems 4 cr.

Second Year, Spring Semester

CT 234, Soils and Foundations, 4 cr.
 SSCI 202, Social Issues, 4 cr.
 *Technical Elective
 AM 275, Building Science/Residential Construction, 4 cr.

Total: 64 credits

Surveying and Mapping

As land values increase and the need to use our natural resources efficiently and to protect our environment becomes more critical, the role of surveyors is expanding. The Surveying and Mapping specialization 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.

Surveying and Mapping Program of Study Course, Credits

First Year, Fall Semester

CT 220, Professional Practice, 1 cr.
 CT 222, Computer Aided Design Level I, 4 cr.
 CT 223, Introduction to Surveying and Mapping, 4 cr.
 AM 280, Technical Computer Literacy/Internet Applications, 4 cr.
 MATH 203, Algebra and Trigonometry, 3 cr.

First Year, Spring Semester

CT 231, Design I, 4 cr.
 CT 233, Construction Surveying, 4 cr.
 CT 237, Land Design and Regulations, 4 cr.
 COM 212, Technical Writing and SSCI 204, Leadership Effectiveness and Group Performance 4 cr.

Second Year, Fall Semester

CT 240, Legal Aspects of Surveying and CT 243, Advanced Surveying and Mapping, 4 cr.
 CT 247, Construction Contracting, 4 cr.
 CT 297, Work Experience, 0 cr.
 COM 209, Expository Writing and Reading, 4 cr.
 Elective, 4 cr.

Second Year, Spring Semester

CT 244, Advanced Surveying Computations, 4 cr.
 SSCI 202, Social Issues, 4 cr.
 *Technical Elective
 Elective, 4 cr.

Total: 64 credits

Elective Courses

AM 275, Building Science/Residential Construction
 CT 227, Mechanical and Electrical systems
 CT 230, Statics and Materials
 CT 233, Construction Surveying
 CT 234, Soils and Foundations
 CT 237, Land Design and Regulations.
 CT 235, Intro. to Information Technology
 CT 240, Legal Aspects of Surveying
 CT 243, Advanced Surveying and Mapping
 CT 244, Advanced Surveying Computations
 CT 281, Architecture I History and Design

***Technical Elective Courses**

CT 235, Introduction to Information Technology
 AM 251, Welding and Fabrication Technology
 AM 262, Internal Combustion Engines II (Prereq. AM 261)

Admissions Requirement

Applicants to the architectural technology, construction management, and surveying and mapping specializations must present at least two years of satisfactory work in college preparatory mathematics.

Community Service and Leadership

(For description of courses, see page 240.)

The Community Service and Leadership Program 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.

CSL 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, CSL 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 Service and 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.

**Community Service and Leadership Program of Study
Course, Credits**

First Year, Fall Semester

- COM 209, Expository Writing and Reading, 4 cr.
- SSCI 201, Human Relations, 4 cr.
- CSL 201, Introduction to Community Service and Leadership, 4 cr.
- CSL 200, Technology for Community Service and Leadership, 2 cr.
- MTH, Mathematics course, 3 cr.

First Year, Spring Semester

- SSCI 202, Social Issues, 4 cr.
- COM 210, Public Speaking, 2 cr.
- CSL 205, Communication within Communities, 4 cr.
- CSL 202, Introduction to Non-Profit Organizations, 3 cr.
- CSL 203, Organizing and Supervising Volunteers, 3 cr.

Summer

- CSL 297, Volunteer/Work Experience, 0 cr.

Second Year, Fall Semester

- SSCI 204, Group Process and Leadership Development, 2 cr.
- ABM 215, Business and the Community, 4 cr., or
- CD 415, Community Development, 4 cr.
- CSL 204, Managing Change and Conflict in Communities, 4 cr.
- COM 211, Critical Reading, 2 cr.
- Electives, 4-6 cr.

Second Year, Spring Semester

- CSL 206, Literature of Family and Community, 4 cr.
- CSL 210, Community Service and Leadership Capstone Seminar, 4 cr.
- Electives, 6-8 cr.

Other Associated Courses

- CSL 207, Introduction to Non-Profit Budgeting and Accounting Practices, 3 cr.
- CSL 208, Essentials of Fund Raising for Community-Based Organizations, 2 cr.
- CSL 209, Essentials of Grant Writing for Community-Based Organizations, 2 cr.
- CSL 290, Civic and Community Internship, 2-4 cr.
- ABM 217, Web Page Programming and Design, 4 cr.

Total: 65-69 credits

Food Services Management

(For descriptions of courses, see page 240.)

The Food Services Management program has two distinct specializations: dietetic technician and restaurant management.

Curriculum Fee

Food Services Management:	
Dietetic technician	\$350*
Restaurant manager	\$400*

Dietetic Technician

Students who complete the dietetic technician specialization in food services management are prepared for a variety of positions in the food, fitness, and health-care industries. In a program that combines classroom work and practical experience, students learn such skills as evaluating the nutritional status of clients, developing nutrition care plans, and providing nutrition education. They also develop skills in the management of food production and delivery systems. Students participate in two practicums in the areas of medical food

*This one-time, nonrefundable fee is required to cover laboratory materials, specialized equipment maintenance, and transportation that is unique to the applied nature of each specialization. The curriculum fee covers the entire two-year course of study. The special fees listed in the course description are for nonmatriculating students only.

services management, clinical nutrition, and community nutrition for a total of at least 450 hours of field experience. These field experiences take place in local health-care settings and community nutrition programs.

The specialization is accredited by the American Dietetic Association. Students who successfully complete the program of study are eligible to sit for the Dietetic Technician Registration Exam. A dietetic technician registered is eligible for membership in the American Dietetic Association, an organization of nutrition professionals.

Career Opportunities: Registered dietetic technician. Clinical—hospitals, health-care facilities, retirement centers; Wellness—health clubs, weight clinics, wellness centers; Community—community nutrition programs, public health agencies, WIC agencies; Business—food companies, food vendors, distributors; Food services management—schools, daycare centers, restaurants.

**Dietetic Technician Program of Study
Course, Credits**

First Year, Fall Semester

- FSM 201, Food Preparation Fundamentals, 2 cr.
- FSM 278, Applied Principles of Food Preparation Lab, 1 cr.
- FSM 228/229, Applied Nutrition for Dietetic Technicians, 4 cr.
- MTH 201, Math I, 3 cr.
- NUTR 503, Principles of Food Services Management I, 3 cr.
- COM 209, Expository Reading and Writing, 4 cr.

First Year, Spring Semester

- FSM 200, Introductory Chemistry, 3 cr.
- FSM 207, Hospitality: Sanitation and Safety, 2 cr.
- NUTR 476, Nutritional Assessment, 3 cr.
- NUTR 504, Managerial Skills in Dietetics, 3 cr.
- ZOOL 401, Human Biology, 4 cr.

Second Year, Fall Semester

- FSM 205 Hospitality Computer Applications, 3 cr.
- FSM 275, Diet Therapy, 3 cr.
- FSM 290, Managerial and Clinical Dietetics Practicum, 7 cr.
- COM 210 Public Speaking, 2 cr.
- NUTR 510, Nutrition Education, 3 cr.

Second Year, Spring Semester

- FSM 260, Community Nutrition Practicum, 5 cr.
- FSM 265 Community Nutrition for Dietetic Technicians, 2 cr.
- FSM 295, Dietetic Seminar, 1 cr.
- SSCI 201, Human Relations, 4 cr.
- SSCI 202, Social Issues, 2 cr. or
- SSCI 204, Leadership Effectiveness and Group Performance, 2 cr. or
- NUTR 405, Food and Society, 4 cr.

Total: 64 to 66 credits

Restaurant Management

In the restaurant management specialization, 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 operate two restaurants located in the Thompson School: Stacey's Buffet, and the Balcony Bistro, an upscale gourmet dining establishment. They present weekly buffets, and cater banquets and special events sponsored by the School. Finally, a required summer internship rounds out the program's hands-on experiential learning. Students can also work at the UNH Dairy Bar (which is operated by the FSM program), the New England Center, and the UNH Bake Shop, 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 are strongly encouraged to take electives from the University's four-year program to get a head start on transfer status.

Career Opportunities: Restaurant owner/manager, caterer, food and beverage sales, food buyer, food and beverage manager, food services director.

Restaurant Management Program of Study Course, Credits

First Year, Fall Semester

FSM 201, Food Preparation Fundamentals, 3 cr.
 FSM 203, Introduction to Restaurant and Hospitality Management, 3 cr.
 FSM 205, Hospitality Computer Applications, 3 cr.
 FSM 228, Applied Nutrition, 3 cr.
 COM 210, Public Speaking, 2 cr.

First Year, Spring Semester

FSM 202, Menu Management, 3 cr.
 FSM 206, Food and Beverage Operations Control, 4 cr.
 FSM 207, Hospitality: Service, Sanitation, and Safety, 2 cr.
 COM 209, Expository Writing and Reading, 4 cr.
 MTH 201, Math 1, 3 cr.

First Year, Summer Semester

FSM 297, Restaurant Management Summer Internship, 3 cr.

Second Year, Fall Semester

FSM 209, Applied Restaurant Operations Management, 4 cr.
 FSM 218, Beverage Operations Management, 4 cr.
 FSM 240, Restaurant Sales and Promotion Management, 4 cr.
 SSCI 204, Leadership Effectiveness and Group Performance, 2 cr.

Second Year, Spring Semester

FSM 208, Non-Commercial and Contract Food Service Management, 3 cr.
 FSM 211, Food and Beverage Facilities Planning, 2 cr.
 FSM 212, Hospitality Personnel Management, 2 cr.
 FSM 215, Restaurant and Hospitality Law, 2 cr.
 FSM 226, Dining Room Practicum, 2 cr.
 FSM 241, Applied Buffet and Catering Management, 4 cr.
 SSCI 201, Human Relations, 4 cr.

Total: 66 credits

Forest Technology

(For descriptions of courses, see page 242.)

Students in the Forest Technology 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 recognized by the Society of American Foresters 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 sawmill and logging equipment, and a faculty dedicated to teaching with vast field experience in the subject areas.

Admissions Requirement

Applicants to the forest technology specialization must present at least two years of satisfactory work in college preparatory mathematics.

Curriculum Fee

Forest technology, specialization, \$260*

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, trails, and recreational facilities; how to map and survey property; and how to manage woodlands to improve 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.

Career Opportunities: Forestry aide, fire control technician, mapping technician, GIS 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.

Forest Technician Program of Study Course, Credits

First Year, Fall Semester

FORT 261, Dendrology, 3 cr.
 FORT 263, Forest Ecology, 3 cr.
 FORT 265, Forest Orientation Seminar, 1 cr.
 FORT 283, Forestry Computer Applications, 1 cr.
 COM 209, Expository Writing and Reading, 4 cr.
 MTH 203, Algebra and Trigonometry, 3 cr.

First Year, Spring Semester

FORT 260, Forest Mapping, 2 cr.
 FORT 266, Forest Surveying, 4 cr.
 FORT 270, Applied Silviculture, 4 cr.
 FORT 275, Forestry Field Practices, 1 cr.
 FORT 280, Aerial-Photo Interpretation, 2 cr.
 COM 212, Technical Writing, 2 cr.
 Electives 2-4 cr.
 Social Science Elective 2 cr.

Second Year, Fall Semester

FORT 267, Leadership, Supervision, and Safety Practices, 2 cr.
 FORT 269, Wildlife Ecology and Conservation, 3 cr.
 FORT 272, Mensuration, 4 cr.
 FORT 277, Logging, 4 cr.
 FORT 297, Forestry Work Experience, 0 cr.
 Electives 2-4 cr.

Second Year, Spring Semester

FORT 273, Management Operations and Analysis, 3 cr.
 FORT 274, Industrial Forest Management Tour, 2 cr.
 FORT 276, Forest Products, 4 cr.
 FORT 278, Forest Insects and Diseases, 2 cr.
 FORT 279, Forest Fire Control and Use, 2 cr.
 SSCI 202, Social Issues, 4 cr.

Total: 66-70 credits

*This one-time, nonrefundable fee is required to cover laboratory materials, specialized equipment maintenance, and transportation that is unique to the applied nature of each specialization. The curriculum fee covers the entire two-year course of study. The special fees listed in the course description are for nonmatriculating students only.

Horticultural Technology

(For descriptions of courses, see page 243.)

Horticultural Technology students study the art and science of applied plant biology, 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 specializations in floriculture operations, general ornamental horticulture, or landscape operations. Employment opportunities in these areas continue to be excellent. Graduates enter a rapidly expanding job market in greenhouse production, floral design, nursery and garden center management, interior plantscaping, parks and grounds management, golf course management, arboriculture and urban forestry, fruit and vegetable production, and landscape design, construction, and maintenance. Many recent graduates have established their own horticulture enterprises.

Curriculum Fee

Horticultural technology, all specializations \$305*

Floriculture Operations

Season after season, fresh, high-quality floricultural crops are in demand by an increasingly plant-loving public. Students in the floriculture operations specialization gain a solid foundation in the applied plant sciences and more concentrated studies in greenhouse crop production, floral design, and garden center management. Through facilities at the Thompson School, the University, and at commercial operations across the state, they are exposed to a range of greenhouse technologies. Students may also select a floral design sequence, combining lecture, discussion, and studio work to complement and lend structure to creative talents in floral design. Frequent field trips in the state and region reinforce learning in campus classes and labs.

Graduates of the floriculture operations specialization enter the work force with the knowledge, technical skills, and experience to move rapidly to positions of increasing responsibility. Many graduates own their

own floriculture or related businesses, while others opt for continued education at the baccalaureate level.

Career Opportunities: Greenhouse crop production, garden center management, floral design, nursery production and management, flower shop management.

Floriculture Operations Program of Study Course, Credits

First year, Fall Semester

HT 201, Freshman Seminar, 1 cr.
HT 205, Intro to Plant Materials, 2 cr.
HT 207, Plant Structure and Function, 3 cr.
HT 215, Soils and Land Use (Half-term I), 2 cr.
HT 219, Computers in Horticulture, 2 cr.
HT 227A, Horticultural Facilities Management, 3 cr.
COM 209, Expository Writing and Reading, 4 cr.

First Year, Spring Semester

HT 204, Plant Propagation, 3 cr.
HT 217, Soils and Plant Nutrition (Half-term I), 2 cr.
HT 227B, Horticultural Facilities Management, 3 cr.
HT 258, Herbaceous Ornamental Plants, 2 cr.
MTH, Mathematics course, 3 cr.
COM 210, Public Speaking, 2 cr. or
COM 211, Critical Reading, 2 cr. or
COM 212, Technical Writing, 2 cr.

Second Year, Fall Semester

HT 227C, Horticultural Facilities Management, 1 cr.
HT 234, Pest Management: Diseases (Half-term II), 2 cr.
HT 236, Pest Management: Insects (Half-term I), 2 cr.
HT 237, Pest Management: Weeds (Half-term I), 1 cr.
HT 239, Pest Management: Control Applications (Half-term II), 1 cr.
HT 240, Intro to Floral Design, 2 cr.
HT 275, Floricultural Crop Production, 2 cr.
HT 297, Horticultural Work Experience, 0 cr.
SSCI 201, Human Relations, 4 cr. or
SSCI 202, Social Issues, 4 cr.
Approved Electives 1–5 cr.

Second Year, Spring Semester

HT 227D, Horticultural Facilities Management, 1 cr.
HT 276, Bedding Plant Production, 2 cr.
HT 280, Garden Center and Nursery Management, 3 cr.
HT 288, Horticultural Business Management, 4 cr.
HT 290, Senior Seminar (Half-term I), 1 cr.
SSCI 203, Environmental Issues and Society, 2 cr.
HT Electives 3–7 cr.

Total: 64–72 credits

General Ornamental Horticulture

Students who prefer to be generalists in horticultural technology may opt for the general ornamental horticulture specialization. Students gain the broadest possible background in horticultural technology, a background attractive to employers in all specialty areas. Working closely with a faculty adviser, each student designs his or her own program, tak-

ing courses in the curriculum that fulfill the student's particular needs. They first complete core requirements in the fundamentals of plant growth and development, soils, plant propagation, plant identification, and plant health care. Students may then choose elective coursework combining studies in floriculture, fruit and vegetable production, landscaping, interiorscaping, arboriculture, nursery management, and/or floral design.

Career Opportunities: Garden center manager, grounds manager, greenhouse manager, fruit and vegetable production manager, nursery manager, horticulture business owner.

General Ornamental Horticulture Program of Study Course, Credits

First year, Fall Semester

HT 201, Freshman Seminar, 1 cr.
HT 205, Introduction to Plant Materials, 2 cr.
HT 207, Plant Structure and Function, 3 cr.
HT 215, Soils and Land Use (Half-term I), 2 cr.
HT 219, Computers in Horticulture, 2 cr.
HT 227A, Horticultural Facilities Management, 3 cr.
COM 209, Expository Writing and Reading, 4 cr.

First Year, Spring Semester

HT 204, Plant Propagation, 3 cr.
HT 217, Soils and Plant Nutrition (Half-term I), 2 cr.
HT 227B, Horticultural Facilities Management, 3 cr.
MTH, Mathematics course, 3 cr.
SSCI 203, Environmental Issues and Society, 2 cr.
COM 210, Public Speaking, 2 cr. or
COM 211, Critical Reading, 2 cr. or
COM 212, Technical Writing, 2 cr.

Second Year, Fall Semester

HT 234, Pest Management: Diseases (Half-term II), 2 cr.
HT 236, Pest Management: Insects (Half-term I), 2 cr.
HT 237, Pest Management: Weeds (Half-term I), 1 cr.
HT 239, Pest Management: Control Applications (Half-term II), 1 cr.
HT 260, Grounds Maintenance, 1 cr. or
HT 227C, Horticultural Facilities Management, 1 cr.
HT 297, Horticultural Work Experience, 0 cr.
SSCI 201, Human Relations, 4 cr. or
SSCI 202, Social Issues, 4 cr.
HT Electives 5–9 cr.

Second Year, Spring Semester

HT 260, Grounds Maintenance, 1 cr. or
HT 227D, Horticultural Facilities Management, 1 cr.
HT 288, Horticultural Business Management, 4 cr.
HT 290, Senior Seminar (Half-term I), 1 cr.
HT Electives 10–14 cr.

Total: 64–72 credits

Landscape Operations

Ornamental horticulture has been projected to be one of the fastest growing industries of the coming decade. It is a field that also offers unparalleled aesthetic satisfaction and meaningful reward. To succeed in landscaping increasingly requires a degree of techni-

*This one-time, nonrefundable fee is required to cover laboratory materials, specialized equipment maintenance, and transportation that is unique to the applied nature of each specialization. The curriculum fee covers the entire two-year course of study. The special fees listed in the course description are for nonmatriculating students only.

cal and scientific expertise, as well as creativity, artistry, and problem-solving skills. Students in the landscape operations specialization gain a solid foundation in general horticulture and a thorough introduction to the landscape industry. In their classes, students meld theory and practice, and they apply what they learn in weekly lab periods and on-site visits to area operations. Many graduates eventually form their own landscape companies, and others continue their education toward a four-year degree in areas such as landscape architecture, parks and recreation, plant and soil science, environmental science, or business management.

Career Opportunities: Landscape design, landscape construction, garden centers, nurseries, golf courses, schools and parks, commercial businesses, government and health-care facilities.

Second Year, Spring Semester

- HT 270, Grounds Management (Half-term II), 2 cr.
- HT 272, Landscape Design Studio, 4 cr.
- HT 288, Horticultural Business Management, 4 cr.
- HT 290, Senior Seminar (Half-term I), 1 cr.
- HT Electives 6–10 cr.

Total: 64 credits

**Landscape Operations Program of Study
Course, Credits**

First Year, Fall Semester

- HT 201, Freshman Seminar, 1 cr.
- HT 205, Intro to Plant Materials, 2 cr.
- HT 207, Plant Structure and Function, 3 cr.
- HT 215, Soils and Land Use (Half-term I), 2 cr.
- HT 219, Computers in Horticulture, 2 cr.
- HT 260, Grounds Maintenance (Half term I), 1 cr.
- COM 209, Expository Writing and Reading, 4 cr.
- SSCI 203, Environmental Issues and Society, 2 cr.

First Year, Spring Semester

- HT 217, Soils and Plant Nutrition (Half term I), 2 cr.
- HT 256, Horticultural Pruning, 2 cr.
- HT 258, Herbaceous Ornamental Plants, 2 cr.
- HT 260, Grounds Maintenance (Half term II), 0-1 cr.
- MTH, Mathematics course, 3 cr.
- SSCI 201, Human Relations, 4 cr. or
- SSCI 202, Social Issues, 4 cr.
- COM 210, Public Speaking, 2 cr. or
- COM 211, Critical Reading, 2 cr. or
- COM 212, Technical Writing, 2 cr.

Second Year, Fall Semester

- HT 234, Pest Management: Diseases (Half-term II), 2 cr.
- HT 236, Pest Management: Insects (Half-term I), 2 cr.
- HT 237, Pest Management: Weeds (Half-term I), 1 cr.
- HT 239, Pest Management: Control Applications (Half-term II), 1 cr.
- HT 251, Intro to Graphic Communication, 2 cr.
- HT 257, Woody Landscape Plants, 2 cr.
- HT 263, Landscape Construction, 3 cr.
- HT 265, Turfgrass Maintenance, 2 cr.
- HT 270, Grounds Management (Half-term I), 2 cr.
- HT 297, Horticultural Work Experience, 0 cr.
- Approved Electives 1–5 cr.

UNIVERSITY OF NEW HAMPSHIRE AT MANCHESTER

Karol A. LaCroix, Dean
Peter Haebler, Associate Dean
Thaddeus M. Piotrowski, Associate Dean

Bachelor of Arts

Business
Communication Arts
English
History
Humanities
Psychology

Bachelor of Science

Electrical Engineering Technology
Computer Technology Option
Mechanical Engineering Technology
Nursing (Registered Nurse Baccalaureate Program)
Sign Language Interpretation

Associate in Arts

General Studies

Associate in Science

Biological Sciences
Business Administration

Certificate Programs for Professional Advancement

Business and Accounting Skills for Managers
Communication Skills for Managers
Human Behavior Studies

The University of New Hampshire at Manchester was established in 1985 to increase access to a University education for people who live and work in central New Hampshire. The newest college of the University offers associate and selected bachelor's degrees, access to other UNH undergraduate and graduate degree programs, special courses, workshops, seminars, and cultural events for the region.

Degree Programs

The University of New Hampshire at Manchester (UNHM) offers bachelor of arts degree programs in business, communication arts, English, history, humanities, and psychology and bachelor of science degree programs in electrical engineering technology with an option in computer technology, mechanical engineering technology, nursing (registered nurse certification required), and sign language interpretation. Students are required to satisfy University requirements, which include completion of at least 128 credits, a 2.00 minimum cumulative grade-point average, general education requirements, and, for the bachelor of arts degree, a foreign language requirement. The foreign language is not required in the bachelor of science programs.

Students may also pursue UNH associate in arts or associate in science degree programs full or part time with a choice of concentrations. Requirements for the associate degrees include completion of 64 credits, a 2.00 minimum grade-point average, and an interdisciplinary core course. Those students who complete the last 16 credits of the associate degree with a grade-point average of at least 2.50, earn a cumulative associate degree grade-point average of 2.50 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 are also available through the University of New Hampshire at Manchester.

Minors

The following academic minors are available at UNHM for enrolled baccalaureate candidates. Further information may be obtained from the Academic Counseling Office, (603) 641-4170.

American Sign Language and Deaf Studies
Art
Computer Information Systems
Education
Electrical Engineering Technology
English
History
Humanities
Illumination Engineering
Mechanical Engineering Technology
Philosophy
Political Economy
Political Science
Psychology
Sociology
Women's Studies

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 adviser, general studies students can select structured course plans or pre-majors that are compatible with almost every baccalaureate major.

Certificate Programs for Professional Advancement

UNHM'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 postsecondary 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. Students must complete four required courses at UNHM in their chosen program to earn a certificate. The college's accessible course schedules allow students to attend day, evening, or Saturday classes, full or part time.

Communication Skills for Managers
(4 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
(4 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
(4 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 yearlong (two semesters) plan of academic support and study skill enhancement.

Students are identified as CTP eligible during the standard admission application review process and may enter the program during the fall or spring semester. Typically, CTP students register for credit-bearing courses on a part-time basis. In some instances, CTP students may be required to supplement their academic schedules with noncredit coursework to strengthen writing or quantitative skills.

Attendance at the New Student Orientation and enrollment in the CTP studies skills lab 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.

UNHM Application Deadlines

The application deadline for the fall semester is June 15 and for the spring semester is November 1. For priority consideration for financial aid, the application deadline is May 1 for the following academic year.

For More Information

UNHM courses are listed on page 246 of this catalog. To receive a UNHM bulletin, catalog, or more specific information on UNHM courses and 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, phone (603) 641-4150; fax (603) 641-4125; TTY/TTD (603) 641-4308.

DIVISION OF CONTINUING EDUCATION

William F. Murphy, Dean

The Division of Continuing Education provides access to higher education for residents of New Hampshire and surrounding areas. Whether individuals are pursuing college study for academic, professional, or personal enrichment, UNH Continuing Education courses and programs enable them to participate in University programs appropriate to their changing educational needs. These needs may at times be best satisfied through participation in workshops, seminars, short courses, or certificate programs—at other times by enrollment in credit courses and degree programs.

The faculty of the Division of Continuing Education is drawn from the teaching staffs of the University and from experts in business, industry, and the community.

In addition to the programs listed below, it is possible to complete many of the degree requirements in other areas of study offered by the University through enrollment in credit courses scheduled by the Division of Continuing Education each semester and during the summer.

Associate in Arts Degree

The associate in arts degree gives students an opportunity to obtain a general, two-year college education and to elect coursework in several career-related fields. The program is particularly suited to adults who are returning to the University after an interruption in their studies, who wish to be either full- or part-time degree students, and who need some time to establish their academic goals.

A wide range of University credit courses is available during both the daytime and the early evening hours.

Within the A.A. program, students have the opportunity to complete concentrations in a broad range of subjects offered by all of the schools and colleges or to take courses in several fields of study to explore a major, or they may elect to concentrate in computer/information systems applications or pre-engineering and physical sciences. (For descriptions of courses, see page 151.)

The degree can be complete in itself or it can be a halfway mark toward a bachelor's degree. Credits earned as an A.A. degree candidate are transferable into related baccalaureate programs at UNH and other colleges and universities.

Admission Requirements

For the associate in arts degree program, candidates must have a high school diploma or an equivalency certificate and should have

demonstrated ability and motivation through academic achievement, work experience, and/or military service. Associate in arts degree candidates are not guaranteed housing but are encouraged to contact the Department of Housing, (603) 862-2120, to explore possibilities.

Graduates of associate in arts programs are usually awarded a minimum of 64 credits upon entry into a UNH bachelor's degree program. Degree candidates wishing to continue their studies should consult with their advisers to ensure that their planned programs meet the specific requirements for the selected major at the institution awarding the bachelor's degree.

The associate in arts degree program is offered on a full-time and a part-time basis. Students interested in the A.A. degree program should obtain the application form from the UNH Admissions Office or from the Division of Continuing Education.

Degree Requirements

For degree requirements, see page 18.

Career Concentrations

It is possible to earn a concentration in an area of study while enrolled in the Associate in Arts Degree Program. A concentration consists of 20 credits and is identical to a *minor* currently offered at UNH. Students are responsible for obtaining a list of courses needed for the minor from the department and following that curriculum. After graduation, the concentration will appear on the student's UNH transcript.

Pre-Engineering and Physical Sciences

Adults who desire a University degree in engineering or the physical sciences may enroll on a full- or part-time basis through the associate in arts degree program.

This program satisfies first-year course requirements of most B.S. programs in en-

engineering and physical sciences. For further information, see separate Pre-Engineering Bulletin.

Required courses: MATH 425-426; PHYS 407-408; CHEM 403-404.

Academic Regulations and Pass/Fail

Associate in arts degree candidates are subject to the academic requirements established by the University for all students.

Associate in arts degree candidates, after completion of a minimum of 16 credits at UNH on a regular graded basis of A to F, may use the pass/fail grading alternative in a maximum of two elective 4-credit courses. The pass/fail grading alternative may be used for a maximum of 4 credits per semester. No pass/fail grading alternative may be used in fulfillment of University general education requirements or for courses in students' declared career concentrations. The minimum passing grade for credit is a D- (0.67).

Advising

Program planning and other advising services are provided by the professional staff of the Division of Continuing Education. Academic advisers are available on an appointment basis, call (603) 862-1548.

Financial Aid

Associate in arts degree candidates are eligible for the full range of financial aid offered by the University. See the Financial Aid section of this catalog.

Special Student Status

Special students—those who are not formally admitted into a degree program at the University of New Hampshire—may enroll in University credit courses each semester through the Division of Continuing Education.

All special undergraduate students are limited to 11 credits per term unless they obtain written permission from the director of admissions, Grant House. Special graduate students are also subject to enrollment limitations. Contact the Division of Continuing Education for details.

Undergraduate Courses

Special students must have a high school diploma or its equivalent and be at least 18 years of age.

Graduate Courses

Special students must hold a bachelor's degree or equivalent from a regionally accredited college or university.

Prerequisites

All students are responsible for satisfying course prerequisites, if any. Instructors may require students to withdraw from a course if they are not adequately prepared for the level of work.

Academic Standards

A cumulative grade-point average of 2.00 (C grade) is the minimum acceptable level for undergraduate work in the University. The records of special undergraduate students are examined periodically; academically deficient or potentially deficient students may be warned or excluded.

Noncredit Courses and Workshops

Throughout the year, the Division of Continuing Education offers a wide range of noncredit courses, seminars, and workshops to the community. These offerings provide opportunities for personal growth or professional continuing education in business, industry, teaching and education, government, or the professions.

Professional seminars typically meet for one or two days while courses meet in the evenings, one night a week. Topics are offered in management and supervision, computers, graphic arts, teaching, and human resources, engineering and manufacturing, nonprofit management, health and human services, and many more.

Personal enrichment courses are offered during the day and evening, during the week, and on weekends. Examples include physical fitness and recreation, parent-child communication, arts and crafts, local history, current events, personal financial planning, creative writing, and photography.

Noncredit Certificate Programs

Certificate programs consist of specifically developed sequences of courses or workshops that provide a sound balance of theory, fundamentals, practical skills, and specialized training. Certificates of achievement awarded by the Division of Continuing Education have earned professional acceptance as evidence of increased knowledge in basic principles and techniques.

Noncredit certificate programs include graphic arts, computer applications, human resources management, supervisory training,

desktop publishing, CAD, Web site design, workplace safety, and train the trainer.

Institutes and Conferences

The Division of Continuing Education also conducts and arranges conferences and institutes, which range from half-day briefings on specific topics to residential programs lasting several days or weeks. Such programs are offered on topics of professional, managerial, or technical interest, or current issues of concern in business, industry, and the professions.

The Division of Continuing Education uses the facilities of the entire University campus for its programs, including the New England Center, the extension centers at Pease International Tradeport and in Manchester, and nearby commercial establishments.

Course Charges

Students who enroll in credit courses through the Division of Continuing Education pay on a per-credit basis, depending on course level. These course charges are listed in the Division of Continuing Education Catalog published before each semester. The course charges for noncredit courses and for conferences, workshops, and institutes vary according to the scope of the individual programs.

Class Schedule

While students may enroll in morning and afternoon classes through the Division of Continuing Education, many courses offered each semester are scheduled in the late afternoon and early evening to accommodate working adults.

All courses offered by the University each semester are open to special students on a space-available basis.

For More Information

For further information about programs or services, course offerings, registration procedures, and academic requirements, call or write the Division of Continuing Education, University of New Hampshire, Brook House, 24 Rosemary Lane, Durham, NH 03824-3529, (603) 862-4234; e-mail to learn.dcc@unh.edu; or visit the Web site at www.learn.unh.edu. Students may also register for courses on the Web using a credit card.

GRADUATE SCHOOL

Bruce L. Mallory, Dean
Harry J. Richards, Associate
Dean

Master of Arts

Counseling
Economics
English
Language and Linguistics
Literature
Writing

Environmental Education

History
Museum Studies
Music
Music Education
Music History
Political Science
Psychology
Sociology
Spanish

Master of Science

Accounting
Animal Sciences
Biochemistry
Chemical Engineering
Chemistry
Civil Engineering
Communication Sciences and
Disorders

Computer Science

Earth Sciences
Geology
Ocean Mapping
Oceanography
Electrical Engineering
Family Studies
Marriage and Family
Therapy

Genetics

Hydrology
Kinesiology
Materials Science

Mathematics

Applied Mathematics
Statistics

Mechanical Engineering

Microbiology
Natural Resources
Environmental Conservation
Forestry
Soil Science
Water Resources
Wildlife

Nursing

Nutritional Sciences
Occupational Therapy
Ocean Engineering
Ocean Mapping

Physics

Plant Biology
Resource Administration
and Management
Resource Economics
Zoology

Master of Arts in Teaching

Elementary Education
Secondary Education

Master of Education

Administration and Supervision
Counseling
Early Childhood Education
Special Needs
Elementary Education
Reading
Secondary Education
Special Education
Teacher Leadership

Master of Science for Teachers

Chemistry
College Teaching
English
Mathematics

Master of Business Administration

Master of Public Health

Master of Adult and Occupational Education

Master of Arts in Liberal Studies

Master of Fine Arts

Painting

Master of Public Administration

Master of Social Work

Certificate of Advanced Graduate Study

Educational Administration
and Supervision

Doctor of Philosophy

Animal and Nutritional Sciences
Biochemistry
Chemistry
Computer Science
Earth and Environmental
Sciences

Geology

Oceanography

Economics

Education

Engineering

Chemical Engineering
Civil Engineering
Electrical Engineering
Materials Science
Mechanical Engineering
Ocean Engineering
Systems Design

English

Genetics

History

Literacy and Schooling

Mathematics

Mathematics Education

Microbiology

Natural Resources and Environmental Studies

Physics

Plant Biology

Psychology

Sociology

Zoology

The Graduate School offers a wide range of programs leading to the master's degree, one program leading to the C.A.G.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 Center for Graduate and Professional Studies. Located on the campus at the University of New Hampshire at Manchester, the center offers 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 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 from the Graduate School, Thompson Hall, 105 Main Street, Durham, NH 03824-3547. The Web site address is www.gradschool.unh.edu.

Early Admission-University of New Hampshire Seniors

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 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 two courses for up to eight graduate credits.

Dual Credit-UNH Seniors

University of New Hampshire seniors who have been admitted to the Graduate School under early admission may,

upon recommendation of the department and approval of the Graduate School, be allowed a maximum of two graduate-level courses for up to 8 credits toward both a bachelor's and master's degree. Dual credit forms must be completed and approved by the dean of the Graduate School at the beginning of the semester for which dual credit is sought. Dual credit forms are available at the Graduate School.

Admission to the 3/2 Program

Undergraduate UNH students may be admitted to one of the approved five-year combined bachelor's degree/master of business administration programs (see page 96), which normally commence during the fall semester of their senior year. Application to the Graduate School is made during the second semester of the junior year. Interested students should contact the Whittemore School for information.

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.

SUMMER SESSION

William F. Murphy, Dean

The University of New Hampshire offers students the opportunity to continue their studies on a year-round basis through multiple terms during the summer months. The summer courses are of the same high quality as those during the regular academic year and require the same level of academic performance.

Summer Session offerings include a broad range of undergraduate and graduate credit courses in most of the major academic disciplines. Throughout the summer, classes are scheduled in the morning, afternoon, and evening. Special institutes for teachers and other professionals are also offered during the summer and vary in length depending on content.

Enrollment in Summer Session classes does not imply admission to degree candidacy.

Undergraduate Courses

Undergraduate courses are open to undergraduates from UNH and other colleges, to interested members of the community who have a high school diploma or its equivalent or who are at least 18 years of age, and to high school students completing their junior or senior year.

Graduate Courses

Graduate courses are open to UNH graduate students and other individuals with a bachelor's degree from a regionally accredited college or university or its equivalent from a foreign institution.

Other Offerings

Other Summer Session offerings include pre-college programs for high school students; noncredit courses and certificate programs; workshops and seminars for business, industry, and the professions; and residential conferences and special institutes for teachers, other professions, students, and the community.

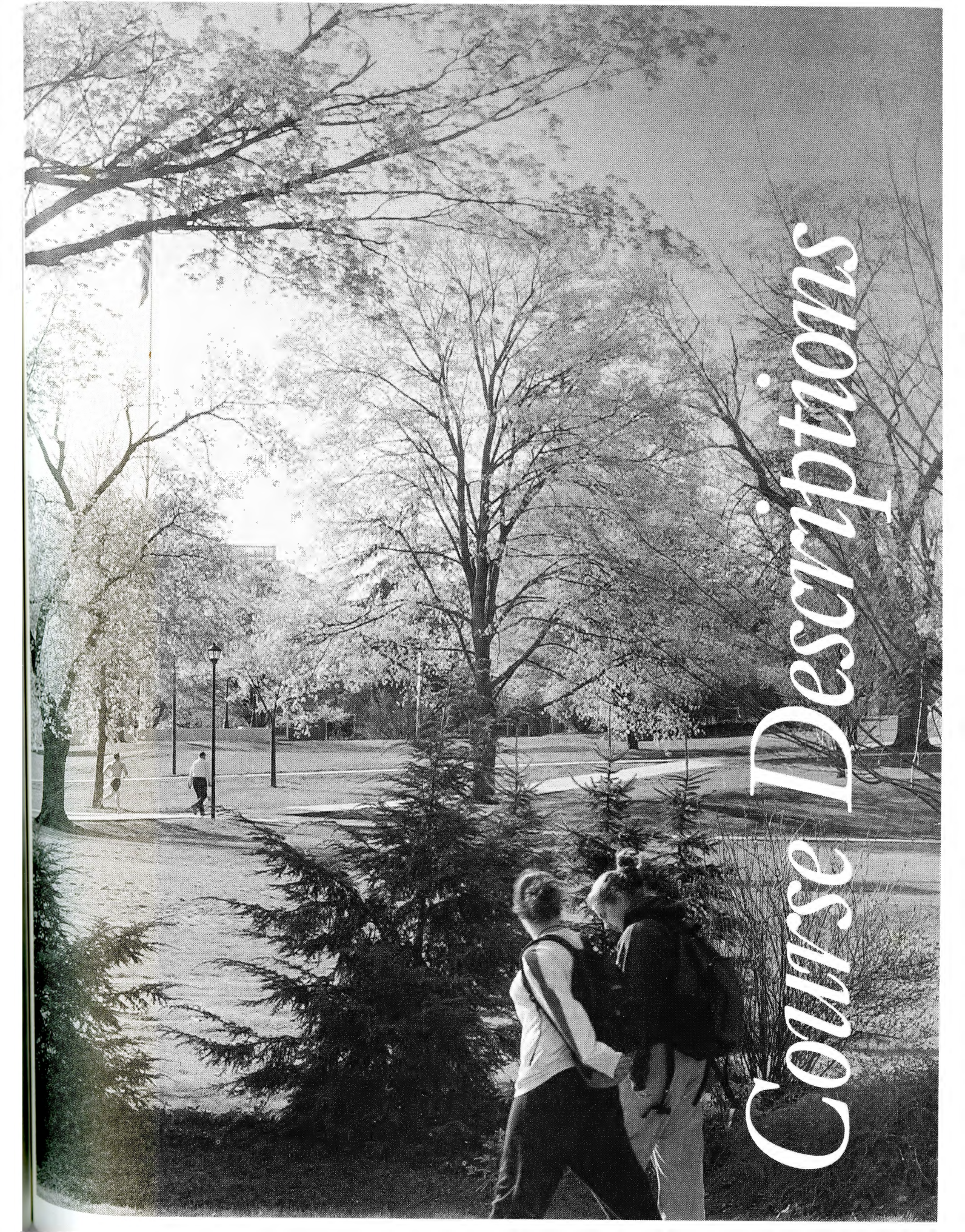
Institutes and Conferences

The Division of Continuing Education and Summer Session uses the facilities of the entire University campus during the summer to conduct special programs, as well as those of the New England Center, the Pease Education and Training Center and nearby commercial establishments.

Conferences and institutes in the form of day meetings or residential programs lasting several days or weeks are conducted by the schools and colleges of the University or may be arranged for external groups. Non-university groups wanted to hold or cosponsor a conference should call the Summer Session Office (603) 862-1937 or Conference Services (603) 862-1900.

For More Information

A separate summer catalog is published each year in March and is available from Summer Session, University of New Hampshire, 24 Rosemary Lane, Durham, NH 03824-3529, (603) 862-4234; e-mail learn.dce@unh.edu; Web site: www.learn.unh.edu/summer.



Course Descriptions

DESCRIPTION OF COURSES

Explanation of Arrangement

The title and Arabic number designate the particular course. When two course numbers are connected by a hyphen, the first semester of the course, or its equivalent, is a prerequisite to the second. If the course numbers are separated by a comma, qualified students may take the second semester without having had the first. Course numbers separated by a slash indicate same subject offerings at lower and upper levels.

In courses that are not designated by title as laboratory courses, the notation "Lab" indicates that laboratory sessions are a part of the course.

All courses marked with "#" have not been offered in the last three years.

Prerequisites and Corequisites

Each prerequisite for a course is separated from the other prerequisites by a semicolon; e.g., Prereq: EDUC 601; PSYC 635. If permission (of the instructor, department, adviser, or committee) is a prerequisite for all students, it is listed among the prerequisites (e.g., Prereq: EDUC 601; PSYC 635; permission). If, on the other hand, permission may be substituted for one or more of the listed prerequisites, it follows the other prerequisites and is separated from them by a slash mark (e.g., Prereq: EDUC 601; PSYC 635; or permission). If permission may be substituted for only one of the prerequisite courses, it is listed with the course for which it may be substituted (e.g., Prereq: EDUC 601 or permission; PSYC 635).

Corequisites are courses that must be taken in the same semester.

Credits

The number of credits listed is the number of semester credits each course number will count toward graduation (except in the case of variable credit courses). Students must register for the number of credits shown or, if the course is variable credit, within the range of credits shown.

"Cr/F" following the description indicates that no letter grade is given but that the course is graded Credit or Fail.

For up-to-date information about when a course is offered; who teaches the course; the number of recitations, lectures, labs, and such, students are referred to each semester's *Time and Room Schedule*.

The system of numeric designation is as follows:

- 200–299 Courses in Thompson School of Applied Science.
- 300–399 Associate in arts /associate in science courses. Courses may be taken for credit only by associate's degree or nondegree students. Credits may not be applied to baccalaureate degrees.
- 400–499 Introductory courses not carrying prerequisites and courses generally falling within University and college requirements.
- 500–599 Intermediate-level courses for undergraduate credit only.
- 600–699 Advanced-level undergraduate courses. Entrance to courses numbered 600 and above normally requires junior standing.
- 700–799 Advanced-level undergraduate courses. Ordinarily not open to freshmen and sophomores.
- 800–999 Courses that carry graduate credit only and therefore are open only to admitted or special graduate students.

Accounting and Finance (ACFI)

(For program description, see page 99.)

Chairperson: Ahmad Etebari

Professors: Ahmad Etebari, John Freear, Fred R. Kaen

Associate Professor: Catherine A. Craycraft
Assistant Professors: John R. Becker Blease, Stephen J. Ciccone, Afshad J. Irani, Toni Q. Smith, Stefanie Tate

Adjunct Faculty: William F. Knowles, Edwin Nelson

620. Topics in Accounting I

Special topics; may be repeated. Prereq: ACFI 621 or ACFI 723 depending on topics and junior standing. 4 cr.

621. Intermediate Financial Accounting I

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: all Group A courses. 4 cr.

622. Intermediate Financial Accounting II

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. 4 cr.

640. Topics in Finance I

Special topics; may be repeated. Prereq: ACFI 601 and junior standing. 4 cr.

701. Financial Policy

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: ACFI 601. 4 cr.

702. Investments Analysis

Security valuation, efficient markets, portfolio management, options, and alternative investments. Computer research topics. Prereq: ACFI 601; permission. 4 cr.

703. International Financial Management

Financial management problems facing multinational firms. Primary focus on effects of currency denominations on financial decisions. Prereq: ACFI 601. 4 cr.

704. Derivative Securities and Markets

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: ACFI 601. 4 cr.

720. Topics in Finance II

Special topics. Prereq: ACFI 601 and senior standing. Writing intensive. 4 cr.

723. Advanced Managerial Accounting Concepts and Applications

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: all Group A courses. 4 cr.

724. Auditing

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. 4 cr.

725. Financial Statement Analysis

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, all Group B courses, and senior standing. Not offered every year. 4 cr.

726. Introduction to Federal Income Tax

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: ACFI 601. 4 cr.

740. Topics in Accounting II

Special topics. Prereq: ACFI 621 or 723, depending on topics, and senior standing. 4 cr.

750. Internships in Accounting

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. Cr/F. 1 to 4 cr.

751. Internships in Finance

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. Cr/F. 1 to 4 cr.

752. Independent Studies in Accounting

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. 1 to 4 cr.

753. Independent Studies in Finance

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. 1 to 4 cr.

754. Honors Seminar in Accounting and Finance

Seminar discussions of advanced readings in accounting and finance. For seniors with standing in the honors program. 4 cr.

Administration (ADMN)

(For program description, see page 96. For faculty listings, see pages 130, 151, 154, 176, 193.)

400. Introduction to Business

This course will introduce students to business organizations, the business disciplines and critical issues in contemporary business. The priority will be in having students develop strong intellectual foundations in business, knowledge of core disciplines of business, and an awareness of businesses' role in the economy and in the larger society. The course will include once a week lectures and also small group discussion sessions. The lectures will be organized by the lead WSBE faculty person and include visits and discussions with executives from New Hampshire companies. Writing intensive. 4 cr.

403. Computing Essentials for Business

Self-paced course covering the fundamental skills and proficiency of general business software applications. Topics will include word processing and spreadsheet applications. Cr/F. 1 cr.

410. Management Information Systems

This course provides an introduction to computer literacy, basic computer hardware and software concepts, business applications of information technology and computer ethics. Hands-on exercises include spreadsheets, databases and web pages. 4 cr.

420. Business Statistics

Introductory coverage of statistical methods for

managerial decision-making; probability, descriptive and inferential statistics, and regression. Quantitative techniques common to many introductory statistics courses are covered, but the emphasis is on understanding concepts such as uncertainty, inferences from sample data, and model formulation, and on utilizing these techniques as aids in decision-making. No credit for students who have had ADM 430; BIOL 528; EREC 525; HHS 540; MATH 644; PYSC 402; SOC 502. Prereq: ADMN 410; MATH 420 or 424A. 4 cr.

502. Financial Accounting

Fundamentals of financial accounting concepts and procedures for analyzing economic events and the preparation and use of financial statements. No credit for students who have had ACFI 501 or ADMN 532. 4 cr.

503. Managerial Accounting

The use of information by managers to (1) determine the cost and profitability of the organization's products or services; (2) plan, control, and evaluate routine operations; and (3) make special non-routine decisions. The demand for managerial accounting information is derived from an integrated treatment of organizational objectives, an orientation to customers, and a focus on activities as the unit of analysis for measurement of cost, quality, and time. No credit for students who have had ADMN 533. Prereq: ADMN 502. 4 cr.

601. Introduction to Financial Management

The investments, financing, and dividend decisions of the firm in a global setting. Topics include capital budgeting, designing and issuing securities, manager performance evaluation, resolution of agency problems, and working capital management. Open to WSBE majors only. Prereq: ADMN 502; ECON 401. 4 cr.

611. Behavior in Organizations

Behavioral science concepts applied to work settings. Focus on understanding and analyzing individual beliefs, values, goals, perceptions, motivation, commitment, and decision making; group structures and processes (interpersonal skills, communication, conflict resolution, leadership, and team work); organizational control systems (rewards, task design, performance appraisal); outcomes (satisfaction and development of the person as well as the organization); and organizational change. Open to WSBE majors only. No credit for students who have had MGT 580. Prereq: ADMN 400; ADMN 410; ADMN 503. Writing intensive. 4 cr.

640. Quantitative Decision Making

Introduction to the use of quantitative tools in the decision-making process of an organization. Planning and operational problems in the manufacturing and services sectors are emphasized. Topics include forecasting, capacity planning, optimization, project scheduling, simulation and risk analysis, quality, inventory management, and waiting lines. Open to WSBE majors only. Prereq: ADMN 420; ADMN 503. 4 cr.

651. Marketing

Covers marketing as the process of planning and developing goods and services to satisfy the needs of target customers: consumers, other businesses, institutions. Focus on how marketing contributes to the firm's goals through product planning, pricing, promotion, and distribution policies. Open to WSBE majors only. No credit for students who

have had MKTG 550 or HMG 600. Prereq: ADMN 400; ECON 401. 4 cr.

685, 686. Study Abroad

Open to students studying abroad in the discipline as approved by the department chair and Undergraduate Programs Office. Cr/F. 1 to 16 cr.

695/695W. Independent Study

Individual research projects that are student designed. Initial sponsorship of a business administration faculty member must be obtained, and approval of WSBE Undergraduate Programs Office and department chair. For juniors and seniors in high standing. 695W is writing intensive. 1 to 12 cr.

696. Supervised Student Teaching Experience

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 four credits may be earned as a teaching assistant in any one course. Cr/F. 1 to 4 cr.

703. Strategic Management: Decision Making

Capstone course: Problem-solving, decision-making, and strategic thinking relative to managerial, economic, ethical, legal, political, social, and technological aspects of an organization's environment. Integrates the functional discipline skills within the role of the general manager as leader and chief strategist, organizational builder and doer. Case discussion and analysis, industry and competitive analysis, environmental scanning, industry simulation, strategic audit, stakeholder analysis, values, ethics and social issues management within the public policy process are important course components. Open to WSBE majors only. Prereq: ADMN 601; ADMN 611; ADMN 640; ADMN 651 and senior standing. 4 cr.

795. Internship

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 Group C elective. Prereq: permission of instructor, department chair, and director of undergraduate programs. Cr/F. 1 to 16 cr.

798/798W. Topics

Special topics; may be repeated. 798W is writing intensive. Prereq: permission. 2 to 4 cr.

799. Honors Thesis/Project

Supervised research leading to the completion of an honors thesis or project; required for graduation from the honors program in administration. Prereq: permission of director of undergraduate programs and department chair. Writing intensive. 4 to 8 cr.

Aerospace Studies (AERO), Reserve Officer Training Corps

(For program description, see page 111.)

Assistant Professor: Major Thomas Schweichheimer

301. Leadership Laboratory

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. 4 cr.

415. Foundations of the United States Air Force I

Mission and organization of today's Air Force as an instrument of the U.S. national defense policy. Customs and courtesies, officership, and communication foundations are discussed. 1 cr.

416. Foundations of the United States Air Force II

Air Force installations, fundamentals of Air Force written and verbal communication, and current events of interest to Air Force Officers are discussed. 1 cr.

541. Evolution of United States Air Force Air and Space Power I

The nature of warfare; development of air power from balloons and dirigibles through World War II. 1 cr.

542. Evolution of United States Air Force Air and Space Power II

Development of air power from post-World War II through the peaceful use of air power in humanitarian efforts; and research and development of present and future aerospace vehicles. 1 cr.

671. Air Force Leadership Studies I

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. 4 cr.

672. Air Force Leadership Studies II

Organizational and personal values; management of change; organizational power, politics, managerial strategy, quality, and tactics; Air Force cases studied. 4 cr.

681. National Security Affairs I

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. 4 cr.

682. National Security Affairs II

Focus on attitudes toward the military, socialization processes, role of the professional military leader-manager, and military justice and administrative law. 4 cr.

695. Officer Internship (Air Force)

Experiential learning through class and field work in a military environment. Written analysis re-

quired. Prereq: AERO 671 (maybe taken concurrently). Permission of department chair required. For AFROTC cadets only. Cr/F. 4 cr.

American Studies (AMST)

(For program description, see page 26.)

Coordinator: Brigitte Gabcke Bailey

501. Introduction to American Studies

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. 4 cr.

502. Introduction to African American Literature and Culture

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. 4 cr.

503. Introduction to Native American Studies

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. 4 cr.

603. Photography and American Culture

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. 4 cr.

604. Landscape and American Culture

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 ecocriticism. Writing intensive. 4 cr.

605. Film in American Culture

Advanced, focused study of American cinema. Topics vary from year to year and with instructor. Focus may range from general consideration of American film history, theory, and criticism, to specific analyses of selected types of American cinema: "classical" Hollywood, "new" Hollywood, and "alternatives," to specific periods, movements, genres, and film-makers. Prereq: ENGL 533, or CMN 550, or permission. Special fee. Writing intensive. 4 cr.

#607. Religion in American Thought and Life Interdisciplinary study of the varied nature of American religious experience and its relationship to other aspects of American culture. Topics vary from year to year, and may include, for example: the interdisciplinary study of a spiritual community, African-American religious history, material culture and spiritual expression, politics and religious free speech, religious culture in the nineteenth-century, multi-ethnic American religions, and literature. Writing intensive. 4 cr.

608. Women Artists and Writers 1850-Present

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. 4 cr.

609. African American Experience in the 20th Century

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. 4 cr.

610. New England Culture

An interdisciplinary course investigating some of the major contributions New England has made to American life. The course 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. Writing intensive. 4 cr.

612. Periods in American Culture

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. 4 cr.

613. Regions in American Culture

The study of the culture, history, and politics of particular regions in the United States. Topics vary and may include: the history and literature of the South; natural resources, expansion, and European American/Native American contacts in the West; cultural interactions of the Southwest. May be repeated for credit if subject matter is different. 4 cr.

614. Native American Studies Topics

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. 4 cr.

615. Asian American Studies Topics

The multidisciplinary study of Asian American literature, culture, theory, and history. Perspec-

tives 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. 4 cr.

696. Special Topics

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. 4 cr.

697. Seminar in American Studies

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. 4 cr.

750. Applied American Environmental Philosophy

Applying the philosophical theory underlying environmental studies and approaches to environmental conservation. Students conduct critiques of extensive readings and write papers creatively analyzing aspects of selected philosophical works. Major research manuscript required. (Also offered as NR 750.) 4 cr.

795. Independent Study

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. 1 to 8 cr.

Animal Sciences (ANSC)

Department of Animal and Nutritional Sciences
(For program description, see page 81. For Dairy Management description, see page 85. For courses in Nutritional Sciences, see page 90.)

Chairperson: Thomas L. Foxall

Professors: William E. Berndtson, Gale B.

Carey, William A. Condon, Thomas P.

Fairchild, Thomas L. Foxall, Charles G.

Schwab, Samuel C. Smith, Robert L. Taylor, Jr.

Affiliate Professors: Ronald E. Rompalla,

Martin Stokes

Associate Professors: Patricia D. Bedker,

Elizabeth P. Boulton, Paul C. Tsang

Affiliate Associate Professor: Arthur F.

Stucchi

Assistant Professors: Janet C. Briggs, Peter S.

Erickson, David H. Townson

Affiliate Assistant Professors: Larry Bush,

Donald Collins, Paul F. Cotter, Wendell Davis,

Glenn T. Shwaery, Richard E. Taylor

Senior Veterinary Pathologist: Roger E.

Wells

Director of Preveterinary Programs: Joseph J. Moore

Senior Veterinary Pathologist: Alice Roudabush

Teacher/Trainer: Sarah Hamilton

401. Animals and Society

The use of animals in agricultural production, for recreation, companionship, and research is considered. The nutrition, genetics, diseases, and reproduction of domestic animals are covered. Special fee. Lab. 4 cr.

402. Horsemanship

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. 3 cr.

403. Summer Horsemanship

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. 1 cr.

404. Introductory Equine Science

Study of the horse industry encompassing nutrition, genetics, breeds, selection procedures, and health maintenance. Special fee. Lab. 4 cr.

405. Food and Society

Consideration of the cultural significance of food, emphasizing historical, psychological, social, political, and economic aspects. (Also offered as NUTR 405.) Writing intensive. 4 cr.

406. Careers in Animal Science

Survey of various areas of animal and veterinary science and opportunities available. Cr/F. 1 cr.

408. Dairy Production Techniques

Practical experience in dairy husbandry techniques. Only for students with no previous experience in dairy husbandry. Prereq: permission. 2 cr.

409. Introduction to Dairy Herd Management

Economic principles and management factors involved in successful dairy herd management. Criteria for success, record keeping, applied genetics, housing, materials handling, feeding, and health care are topics covered. Coreq: ANSC 410 (Not offered every year.) 3 cr.

410. Introduction to Dairy Herd Management Lab

Practical study of various aspects of dairy herd management. Farm visits and case studies will be involved. Should be taken concurrently with ANSC 409. (Not offered every year.) 1 cr. Coreq: ANSC 409

430. Dairy Cattle Selection

Principles of selecting dairy cattle based on performance, pedigree analysis, progeny testing, and type evaluation. Lab. 2 cr.

432. Animal Forages

Production and utilization of New England forage crops. Selection of species and varieties; cultural and harvesting practices for top production of excellent quality. Combining uses for greatest efficiency in feeding various livestock classes. Lab. 3 cr.

507. Scientific Approach to Equine Discipline

Physiological development, control, and educa-

tion; biting, lunging, driving, and equine gymnastics. Special fee. Lab. 3 cr.

511-512. Anatomy and Physiology

Introduction to the principles of human structure 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, cardiovascular, respiratory, endocrine, gastrointestinal, and renal systems. Structure of the above systems will be covered at both the microscopic and macroscopic levels. Prereq: CHEM 403-404. Special fee. Lab. No credit if credit earned for ZOO 507-508; ZOO 518 and ZOO 625. Not open to freshmen. 4 cr.

530. Dairy Cattle Diseases

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. 2 cr.

600. Field Experience

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. 1 to 4 cr.

602. Animal Rights and Societal Issues

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. 4 cr.

604. Equine Selection

Principles of selecting the performance sport horse with an analysis of conformation, gait, soundness, and pedigree. Breed improvement through applied genetics, heritability, stallion and mare selection and inherited abnormalities. An additional hour has been added totaling 4 contact hours. 4 cr.

605. Equine Business Management

Many of the careers equine science students aspire to are actually small businesses. Running a successful equine-related enterprise involves equine business planning, marketing, management and profitability, in addition to an equine science background. These concepts apply when developing a new equine business, expanding or refocusing a current equine business, and to those working as part of the management team of an existing equine business. This course will examine these underlying fundamentals. Students will also be involved in business planning for an equine business, evaluation and redirection recommendations for an existing equine business, case studies, role-plays. 4 cr.

607. Small Animal Diseases

Common diseases in companion animals; emphasis on canine and feline medicine. 2 cr.

609. Principles of Nutrition

Applied animal nutrition and nutrient metabolism. Prereq: one year of chemistry; one semester of physiology. 4 cr.

612. Genetics of Domestic Animals

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. 4 cr.

620. Equine Diseases

Body-systems approach to the discussion of medical and surgical diseases affecting the horse. Prereq: ANSC 404. Coreq: ANSC 622. 2 cr.

622. Equine Disease Clinic

Evaluation techniques of the normal and abnormal horse using the University horse herd. Discussion of clinical cases within the herd. Prereq: ANSC 404; Coreq: ANSC 620. 2 cr.

625. Equine Sports Medicine and Lameness

Limitations of the healthy horse in athletic competition and the prevention and treatment of equine athletic injuries with heavy emphasis on the musculoskeletal system. Prereq: ANSC 404; ANSC 511-512; permission. Special fee. 4 cr.

626. Cell Physiology

Advanced study of the physiological processes and characteristics of mammalian cells, and the biochemical/biophysical components that control cell homeostasis and function. Emphasis will be placed upon transmembrane transport mechanisms, cell communication and signal transduction, adhesion and contractility mechanisms, metabolism, and the organization of the intracellular milieu. Prereq: BIOL 411 or ZOOL 507-508 or ZOOL 625; permission. Maximum enrollment of 50 students. 4 cr.

650. Dairy Industry Travel Course

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. 1 cr.

651. Biotechnology Experience: Cell Culture and Biomanufacturing

Course begins by introducing the student to the proteins and companies of biotechnology and to current good manufacturing practices. Remainder of 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. Prereq: BIOL 411-412; CHEM 403-404. (Also listed as MICR 651.) Permission required. 4 cr.

652. Biotechnology-Based Diagnostics and Detection

To introduce advanced students in chemistry, biochemistry, molecular biology, physics, and engineering to the basic concepts and principles of biotechnology-based diagnostic and detection methods. These include immunoassay, nucleic acid probes, biosensors, and microarrays. This course will also introduce advanced students to the basic concepts of applied R&D and product development. This course will provide the student with a fundamental understanding of biotechnology-based diagnostic methods and the basic steps necessary to develop a product based on a laboratory concept. Prereq: permission. 4 cr.

653-654. Principles of Teaching Equitation

Teaching techniques and procedures, with emphasis on dressage; opportunity to teach riding theory and techniques to other students under supervision of instructor. Teaching certificate awarded to students successfully completing course. Prereq:

ANSC 402 and 507; permission. Special fee. Lab. A year-long course; 4 cr. each semester, 8 cr. total, an IA grade (continuous course) given at the end of first semester. Withdrawal from course results in loss of credit. 4 cr.

694. Summer Cooperative for Real Education in Agricultural Management

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. 4 cr.

695, 696. Supervised Teaching Experience

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. 1 to 2 cr.

697. Equine Seminar

Current equine industry issues, recent literature and research, and professional preparation. Offered to sophomores and juniors only. Cr/F. 1 cr.

698. Cooperative for Real Education in Agricultural Management (CREAM)

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. Permission. Two semesters of 4 cr. each are required. 4 cr.

701. Physiology of Reproduction

Comparative aspects of embryology, anatomy, endocrinology, and physiology of reproduction. Special fee. Lab. 4 cr.

702. Endocrinology

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. (Also offered as BCHM 702.) Prereq: BCHM 658 or 751; permission. Special fee. 4 cr.

704. Principles of Pathobiology

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 sys-

tem, and neoplasia. Prereq: ANSC 511/512 or permission. 4 cr.

706. Human Genetics

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. Prereq: BIOL 604 or ANSC 612. (Also offered as GEN 706.) (Not offered every year.) 3 cr.

708. Ruminology

Anatomy of the ruminant gastrointestinal tract, physiological factors related to rumen function, and microbial metabolism of carbohydrates, protein, and lipids. Prereq: MICR 503 or equivalent. Coreq: ANSC 710. 2 cr.

710. Dairy Nutrition

Feeding management of dairy cattle. Emphasis on feedstuffs, nutritional requirements, and diet formulation for efficient production and optimum health. Prereq: ANSC 609; permission. Coreq: ANSC 708. 2 cr.

714. Research Methods in Endocrinology

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 BCHM 658 or ANSC 702/BCHM 702; permission. Special fee. Lab. Writing intensive. 5 cr.

715. Physiology of Lactation

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. 4 cr.

718. Mammalian Physiology

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. 4 cr.

724. Reproductive Management and Artificial Insemination

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. 4 cr.

727. Advanced Dairy Management I

Advanced management evaluation of milking procedures, reproduction, genetics, herd health, feeding, housing, and milking systems. Prereq: junior or senior standing; permission. 4 cr.

728. Advanced Dairy Management II

Advanced management evaluation of record keeping, financial and business management, personnel management, waste management, and marketing. Prereq: junior or senior standing; permission. Writing intensive. 4 cr.

743. Technical Writing in Dairy Management

Emphasis on writing scientific articles and articles for the end user on subjects pertaining to the dairy industry. Students are also expected to make several oral presentations. Resume preparation is also included. Prereq: senior standing; permission. Writing intensive. 2 cr.

746. Animal Cell Culture

Theory and principles fundamental to the culture of animal cells in vitro. Introduction to techniques of preparation and maintenance of animal cell cultures. Application of cell culture to contemporary research in the biological sciences. Special fee. Lab. 4 cr.

750. Nutritional Biochemistry

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; BCHM 658; or equivalents. (Also offered as NUTR 750.) Fall semester only. Writing intensive. 4 cr.

751. Cell Culture

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: MICR 503; permission. (Also offered as MICR 751 and PBIO 751.) Special fee. Lab. 5 cr.

#752. Mammalian Cell Culture

Basic concepts and techniques associated with the cultivation of mammalian cells in vitro, including media preparation, cell viability, transfer, cloning, cryopreservation; use of transformed cell harboring cloning vectors for production of bioproducts. (No credit if already taken MICR 751.) Prereq: MICR 503. (Also offered as MICR 752.) Special fee. Lab. 5 cr.

760. Geriatric Nutrition

Emphasis on the nutritional requirements and status of the elderly in view of psychological and physiological changes in aging. Approaches for nutrition intervention and support will be addressed. Prereq: NUTR 400 or permission. (Also offered as NUTR 760.) Cr/F. Summer session only. 3 cr.

795. Investigations

Investigations in genetics, nutrition, management, diseases, histology, equestrian management/agribusiness, physiology, cell biology, microbiology, dairy management, or teaching experience. May be repeated. Prereq: permission. 1 to 4 cr.

799. Honors Thesis

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. Prereq: permission. IA. Writing intensive. 1 to 4 cr.

Anthropology (ANTH)

Department of Anthropology
(For program description, see page 31.)

Chairperson: Charles E. Bolian

Professor: Stephen P. Reyna

Associate Professors: Charles E. Bolian, Joe L.P. Lugalla, Nina Glick Schiller, Deborah Winslow

Assistant Professor: Justus M. Ogembo

411/411H/411W. Global Perspectives on the Human Condition: An Introduction to Anthropology

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, commodification, and movements for social commodification, and movements for social justice. 411H and 411W are writing intensive. 4 cr.

412. Physical Anthropology and Prehistoric Archaeology

Human physical evolution and cultural prehistory; evolutionary theory and archaeological techniques. 4 cr.

450. Introduction to Race, Culture, and Power

Race, culture, and power intersect at a social space where those in that space experience differing opportunities and access to social and economic privileges, resources, and power. This course explains the way race functions today as a social and cultural category to justify systematic inequality and differences in power and to obscure the functioning of the global economy. The course draws on emerging literature on Blackness, Whiteness, and Minorities and on analyses of the differential implementation of social welfare policies in the United States. (Also listed as INCO 450.) 4 cr.

500/500W. Peoples and Cultures of the World

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 sociocultural 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 precolonial 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 fam-

ily, 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 precolonial 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 sociocultural 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 precolonial 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. 500W is writing intensive. 4 cr.

501. World Prehistory

A) North America; B) Mesoamerica; C) South America; D) Near East; E) Other. The development of prehistoric culture in various areas of the world. Offered in the following sections as staff is available and student needs dictate. North America: Archaeology of the Indians north of Mexico from earliest evidence of settlement to European contact. Diversity of cultures from ecological and evolutionary perspectives. Emphasis on the Eastern Woodlands, the Plains, and the Southwest. Mesoamerica: Cultural development from earliest cultures through the Spanish conquest. Emphasis on origins of agriculture and rise of Olmec, Teotihuacan, Mayan, Toltec, and Aztec civilizations. Stress on factors critical to the development of complex societies. South America: Cultural development from earliest migrations through Inca Empire. Focus on major regions of South America. Consideration of Intermediate Area, Amazon Basin, and Central Andes as core regions for foundations of civilization. Near East: From earliest cultures to the development of agriculture and settled village life. Examines the processes that gave rise to the world's first civilizations. 4 cr.

511. Core Concepts in Anthropology

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. 4 cr.

#512. Introduction to World Ethnography

Primarily for major and minors, but open to all students. Historical and geographic factors, types of social and economic organization, and problems involved in the comparative study of human societies and institutions. Analysis of selected peoples in the major ethnographic areas. 4 cr.

#514. Method and Theory in Archaeology

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. 4 cr.

#515. Anthropology and Contemporary Issues
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. 4 cr.

516. Kinship and Social Organization
The significance of kin and non-kin relations in human societies. Topics include the origins and evolution of human society, variations in the form and functions of marriage, family, and kin-based groups and selected non-kin relationships. Primary focus will be on non-industrial societies. Prereq: ANTH 411 or permission. 4 cr.

517. Critical Reading and Writing in Anthropology
Basic skills of reading, writing, and analysis essential to the study of anthropology. Focus on learning to recognize, compare, and evaluate critically the central arguments of several major books drawn from different subfields and orientations in anthropology. Small class size for extensive discussion and feedback. Prereq: ANTH 411 or 412; or permission. Writing intensive. 4 cr.

520. Anthropology of Migration
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. 4 cr.

597. Special Topics
Occasional and experimental offerings on an entry level. May be repeated for different topics. No prerequisite. 4 cr.

601. Topics in Popular Culture
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. It 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. 4 cr.

610. Medical Anthropology: Illness and Healing
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 and 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. 4 cr.

614. Economy, Culture, and Society
This course explores the different ways that humans have earned their livelihood, from foraging and agriculture to industrial capitalism. Emphasis is placed on the social and cultural correlates of different economic strategies, with particular attention to the consequences of the spread of capitalism. Consideration is given to issues of equality, gender, sustainability, and the utility and limits of a "globalization" perspective. Prereq: ANTH 411 and ANTH 511, or permission. Writing intensive. 4 cr.

616. Religion, Culture, and Society
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. Writing intensive. 4 cr.

#618. Political Anthropology
Political processes and structures in nonindustrial societies. Major topics: centralization of power and authority, legal systems, and warfare. Prereq: ANTH 411 or permission. 4 cr.

625. Female, Male, and Society
Critical, cross-cultural study of sex-related behavior in historical as well as contemporary perspective. Draws on anthropological, social-psychological, and sociological literature. (Also offered as SOC 625.) 4 cr.

626. Women in the Middle East
This course explores the diversity of women's lives in the Middle East and North Africa. Among the themes addressed are: national, regional, class and ethnic variations; the effects of differing ecological adaptations (rural, urban, and nomad) on gender roles; the underlying cultural and religious values that affect gender relations in this part of the world, and the social, ecological, economic, and political factors which shape how those values are enacted in every day life. Also examines women's active participation in contemporary movements such as feminism, nationalism, and Islamic fundamentalism, as well as their roles in periods of national, radical, or revolutionary ferment. 4 cr.

627. Urbanization in Africa
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. 4 cr.

650. Field School in Archaeology
Field and laboratory methods in archaeology. Emphasis on excavation techniques and data analysis as related to project research design. Includes practical experience in lab as well as field. Prereq: permission. Special fee. 4 to 8 cr.

680. Globalization, Development, and Poverty
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. 4 cr.

690. Ethnographic Field Research
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. Writing intensive. 4 cr.

697. Special Topics
Occasional or experimental offerings. May be repeated for different topics. Prereq: ANTH 411 or permission. Writing intensive. 4 cr.

698. Folklore and Folklife
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.) 4 cr.

699. Senior Thesis
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. 4 or 8 cr.

700. Internship
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. 1 to 4 cr.

701. History of Anthropological Theory
Reading and discussion of the works of major theoreticians of American, British, and French schools. Selections from the works of Spence, Morgan, Tylor, Boas, Kroeber, Lowie, Steward, White, Durkheim, Mauss, Levi-Strauss, Malinowski, Radcliffe-Brown, Evan-Pritchard, and others are treated in terms of their contributions to the historical development of anthropology and their relevance to contemporary debates in anthropological theory. Prereq: ANTH 511. 4 cr.

702. Issues in Contemporary Anthropological Theory
Explores such recent directions in the discipline as cognitive/symbolic anthropology, cultural materialism, evolutionary theory, gender studies, inter-

pretive anthropology, political economy, practice theory, and structuralism. Prereq: ANTH 701 or permission. 4 cr.

710. Youth, Culture, and Society in Comparative Perspective

This course examines lifestyles, social identities, and subcultures of youth in a variety of sociocultural and historical settings. Students will develop an understanding of the conditions that foster the formation of social identity and the emergence of age-based subcultures. The course explores the relationship between individual and social identity, and between youth subcultures and dominant cultural systems. (Also listed as EDUC 710.) 4 cr.

714. Caste, Class, and Colonialism

Peasants, urban communities, race and ethnicity, stratification, local-national integration, the effects of colonialism, modernization, and social change. Prereq: ANTH 411 or permission. 4 cr.

715. Global Warring

Global Warring examines warfare in societies with and without the state. It explores different theoretical perspectives concerning war, rejecting biological approaches in favor of the one that stresses logics of power. This latter position suggests that human societies have their cultural, economic, and political institutions; that these when interconnected are structures of power called complexes; and that the 'logics' of complexes—how they act. explain war. Specifically, it is argued that a 'military-capitalist' complex evolved during the making of the modern state, one of whose logics led to global warring in the interests of powerful capitalist actors and their allies in political and cultural institutions. Prereq: ANTH 411 or 511, and at least two other courses in social sciences or history or by permission of professor. 4 cr.

720. Roots and Routes: Migration and Globalization

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 phenomena, 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. 4 cr.

#750. Middle East: Issues of Ethnicity, Work, and Identity

Community studies approach to such topics as ethnicity and identity in the interrelationship of language, religion, and corporate membership in a community; ethnic division of labor; work; pluralism, and family networks; mobility and immobility; estates vs. classes. (Also offered as SOC 750.) 4 cr.

760. Race in Global Perspectives

The concept of race developed to justify European Colonialism. Race, because it is a relationship of power, has emerged as a form of transnational identification which unites people in common struggle for social justice. Using history, ethnography, novels, and films, this advanced

seminar looks at the development and deployment of concepts of race in different situations of inequality around the world. Possible topics include the black Atlantic, Pan-Africanism, First People identity, whiteness, orientalism, mestisaje, and anthropological treatments of Jewish identity. Prereq: INCO 450 or ANTH 450; introduction to race, culture, and power. 4 cr.

780. Anthropology of Globalization

The central question of the Anthropology of Globalization is the following: "What is happening to the life ways of people and identities around the world as a result of contemporary globalization and why?" To answer this question we begin the course by exploring the global processes behind images of untouched cultures presented through tourism. We explore contemporary commodification of culture. This course develops a definition of globalization by examining the relationship between contemporary and past periods and processes of globalization, reviewing the ways in which cultures and identities were constructed through processes of globalization. We include in our exploration changing values, social relationships, racial, ethnic, and national identities, gender constructions, and the nature of social protest. Juniors and Seniors only. (Students are encouraged to first complete ANTH 680, Globalization, Development, and Poverty.) Writing intensive. 4 cr.

795, 796. Reading and Research

A) Cultural/Social Anthropology; B) Anthropological Linguistics; C) Archaeology; D) Physical Anthropology. Prereq: 12 credits of anthropology; permission. 1 to 8 cr.

797. Advanced Topics

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. 4 cr.

Art and Art History

(For program description, see page 31.)

Chairperson: Michael McConnell

Professors: David S. Andrew, Grant Drumheller, Scott Schnepf, David R. Smith, Mara R. Witzling

Associate Professors: Patricia A. Emison, Chris Enos, Eleanor M. Hight, Craig A. Hood, Maryse Searls McConnell, Michael McConnell, Jennifer K. Moses, Langdon C. Quin

Assistant Professors: Benjamin S. Cariens, Brian W.K. Chu, Lorna Jo Stone

Affiliate Assistant Professor: Vicki C. Wright

Adjunct Faculty: Joan Larson Esch

Art Studio

Two-Dimensional Courses

Architecture

455. Introduction to Architecture

Study of architectural graphics, design theories, form determinants, and the architect in society. Includes case study projects. Lab. 4 cr.

Drawing

532/532H. Introductory Drawing

Students deal primarily with observational perspective problems (still life, architectural interiors, landscape, etc.), utilizing a full range of drawing materials. Lab. 4 cr.

632. Intermediate Drawing

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. 4 cr.

633. Life Drawing

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. 4 cr.

732. Advanced Drawing

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. 4 cr.

Painting

544. Water Media I

Transparent and opaque water color. Prereq: ARTS 546. Lab. 4 cr.

546. Introductory Painting

Use of the still life and the figure. Color, value, composition, and some art history. Slide lectures. Prereq: ARTS 532. Lab. 4 cr.

#645. Water Media II

Continuation of ARTS 544; introduction to other water-based media. Prereq: ARTS 544. Lab. 4 cr.

646. Intermediate Painting

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. 4 cr.

746. Advanced Painting

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). 4 cr.

Photography

551. Photography

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. 4 cr.

651. Photography Workshop

Individualized projects involving creative methods, including color, manipulative, and documentary techniques. Students provide their own cameras. Prereq: ARTS 551. May be repeated for a minimum of 12 credits. Lab. 4 cr.

Printmaking

536. Introduction to Printmaking: Intaglio
Study of intaglio printmaking techniques, including etching, dry point, and engraving. Prereq: ARTS 532 or permission. Special fee. Lab. 4 cr.

537. Introduction to Printmaking:**Lithography**

Study of lithographic processes on stone and aluminum plate. Prereq: ARTS 532 or permission. Special fee. Lab. 4 cr.

636. Printmaking Workshop

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. 4 cr.

Three-Dimensional Courses

All courses elective by permission of the Department of Art and Art History.

Ceramics**501. Ceramics**

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. 4 cr.

601. Ceramics Workshop

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. 4 cr.

701. Clay and Glaze Calculation

Presentation and practice of scientific method for calculating glazes, based on the empirical formula technique. Includes background information on clay and the chemistry of glazes and glaze materials. Prereq: ARTS 501. Special fee. Lab. (Not offered every year.) 4 cr.

Sculpture**567. Introductory Sculpture**

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. 4 cr.

667. Sculpture Workshop

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. 4 cr.

#767. Bronze Casting

Practice of designing, building, and maintaining a working sculpture foundry. Emphasis on a thorough understanding of the lost-wax investment casting process, including pattern making, mold making, wax working, investing, casting, chasing, and patination. Prereq: ARTS 667 (8 credits.). Special fee. Lab. (Not offered every year.) 4 cr.

Woodworking**525. Woodworking**

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. 4 cr.

625. Wood/Furniture Design Workshop

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. 4 cr.

725. Wood Multiples

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. 4 cr.

Special Courses**598. Sophomore Seminar**

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. 4 cr.

600. Internship

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. 1 to 4 cr.

695. Special Problems in the Visual Arts

Topics and prerequisites to be announced before registration. May be repeated with permission of the instructor. Lab. 4 cr.

695I. Problems in Visual Arts/Italy

Part of the ITAL 685/686 study abroad program held in Italy. Coreq: ITAL 681, ITAL 682. 4 cr.

699. Museum Studies

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, 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. 4 cr.

700H. Honors Seminar

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. 4 or 8 cr.

796. Independent Study in the Visual Arts

A) Photography; B) Sculpture; C) Drawing; D) Painting; E) Printmaking; F) Water Media; G) Architectural Design; H) Curatorial Assistant; I) Art History; J) Ceramics; K) Wood Design. 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 cred-

its. Prereq: permission of department chairperson and supervising faculty member or members. 1 to 8 cr.

798. Seminar/Senior Thesis

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. 4 to 8 cr.

Art History

All introductory 400- and 500-level courses in art history have the following goals: to introduce the discipline, its vocabulary, its periods and styles, its media, and its various approaches. Exemption from prerequisites by permission of instructor.

#431/431H. Visual Studies

Appreciation and understanding of the visual arts. Examines works from a variety of periods; emphasis on styles, formal analysis, methods, and materials of art production. For freshmen and sophomores; open to juniors and seniors by permission. Not for art dept. major credit. Writing intensive. 4 cr.

480. Introduction to Art History

Analysis of the central forms and meanings of art history through intensive study of selected artists and monuments. The course will include 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 Fallingwater, Georgia O'Keeffe's abstractions, ukiyo-e prints, and Benin sculpture. 4 cr.

487/487H. Themes and Images in Art

Examination of one or two central ideas embodied in the imagery of painting, sculpture, architecture, and other arts across a wide cultural spectrum. Stress on the interconnection between visual forms and the symbolic and philosophic concepts they express. Papers and essay examinations are required. A) Classicism and its Discontents; B) Nature and Culture in Art; C) Primitivism and Modern Art; D) Major Mythic Images of Women; E) Symbols of Innocence and Experience in the New World; F) Abstraction and Ideology; H) Portrait, Self, and Society. Descriptions of sections available in the Art and Art History Department Office. No more than one section of the course may be taken for credit. Writing intensive. 4 cr.

570. Art of the Ancient World

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. 4 cr.

571. Art of the Middle Ages

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. 4 cr.

572. Art of the Age of Humanism

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. 4 cr.

573. Art of the Modern World

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." 4 cr.

574. Architectural History

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. 4 cr.

580. History of Art to 1400

A chronologically and geographically broad introduction to the history of art and architecture and to the discipline of art history. The first semester of the two-semester sequence ranges from the Ancient World to the Renaissance. 4 cr.

581. History of Art from 1400 to the Present

A chronologically and geographically broad introduction to the history of art and architecture and to the discipline of art history. The second semester of the two-semester sequence ranges from the Renaissance to the present. ARTS 580 is recommended as preparation for, but is not a formal prerequisite for 581. 4 cr.

585. History of Islamic Art

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.) 4 cr.

608. Arts and American Society: Women Writers and Artists, 1850-Present

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 ENGL 608, HUMA 608, and HIST 608.) Studio art majors who take this course for major credit will not receive major credit for ARTS 610. Writing intensive. 4 cr.

610. Regional Studies in America: New England Culture in Changing Times

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, ENGL 610, HIST 610, and HUMA 610.) Studio art majors take this course for major credit will not receive major credit for ARTS 608. Writing intensive. 4 cr.

#654. 17th and 18th Century American Architecture

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. 4 cr.

655. Early Modern Architecture: Revolution to World War I

Chief architectural styles and significant buildings in Europe and America from the visionary Neo-classicists 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. 4 cr.

656. Contemporary Architecture: The Buildings of Our Times

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. 4 cr.

673. Egypt and Nubia: Art, Architecture, and Rediscovery

An examination of the art and architecture of Egypt and Nubia from the ancient, Christian, and Islamic periods to the modern era. Specific topics include: Egyptian religion and the major funerary complexes of the pharaohs; art and culture in Nubia; Egypt under the Ptolemies and the Ro-

mans, Christian monastic reform and the Copts; the spread of Islam under the Fatimids and Mamluks; travelers and archaeologists in the nineteenth century. Through field trips, the course will take advantage of the extensive collection of Egyptian art at the Museum of Fine Arts in Boston, as well as the collections of Coptic and Islamic art at the Harvard University Art Museums in Cambridge, MA. 4 cr.

674. Greek Art

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. 4 cr.

675. Roman Art

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. 4 cr.

#676. History of Illuminated Manuscripts

During the Middle Ages manuscripts were the primary locus of the painting tradition. After a consideration of the development of the manuscript book and our method of study, this course will consider the major works of manuscript illumination and their painted cycles of miniatures. Such important works as *The Book of Kells*, the *Winchester Bible*, the *Psalter of St. Louis*, and the *Tres Riches Heures* of Jean de Berry are considered in their cultural and historical contexts. Prereq: one 400- or 500-level art history course. Writing intensive. 4 cr.

677. Early Medieval Art

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. 4 cr.

678. Romanesque and Gothic Art

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. 4 cr.

679. Northern Renaissance Art I

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. 4 cr.

#680. Northern Renaissance Art II

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. 4 cr.

681. Early Renaissance Art in Italy

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. 4 cr.

682. High Renaissance and Mannerist Art in Italy

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. 4 cr.

683. Baroque Art in Southern Europe

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. 4 cr.

684. Baroque Art in Northern Europe

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. 4 cr.

685. Graphic Art of the Renaissance and Baroque Periods

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 by 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. 4 cr.

686. Neo-Classicism to Romanticism

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. 4 cr.

687. Realism and Impressionism

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. 4 cr.

688. 20th Century Art I

An examination of European and American art from symbolism to surrealism. The course 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. 4 cr.

#689. 20th Century Art II

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. 4 cr.

690. Women Artists of the 19th and 20th Centuries

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. 4 cr.

#691. A History of Venetian Art

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. 4 cr.

692. History of Photography

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. 4 cr.

693. American Art

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. 4 cr.

697. Topics in Asian Art

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. Prereq: one 400- or 500-level art history course or permission of the instructor. 4 cr.

784. Dutch Genre Painting

An intensive study of Dutch genre painting in the 17th century, focusing especially on the art of Vermeer and his contemporaries in the third quarter of the century. In addition to individual artists and their works, attention will be paid to aspects of their social background such as the emergence of privacy and the nuclear family, to parallels with the early novel, and to general themes governing realism as an artistic mode. Prereq: one 400- or 500-level art history course and instructor's permission. 4 cr.

786. European Colonialism and Visual Culture

An examination of the interrelationship of European colonialism and the visual arts from the late eighteenth to the twentieth century. The approaches of Said, Bhabha, Nochlin, Solomon-Godeau, Pinney, and others provide the theoretical foundation for unmasking the pictorial strategies and cultural biases in visual representations of non-European peoples and places. These visual representations and their dissemination will be studied in relation to imperial history and to the changing concepts of race, from Rousseau's "noble savage" to the racial "types" created for anthropology, ethnography, and geography. 4 cr.

795. Methods of Art History

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. 4 cr.

799. Seminar in Art History

Topics and prerequisites to be announced before registration. May be repeated with permission of instructor. Writing intensive. 4 cr. (See also ARTS 695, 669, 700H, and 796 under Special Courses.)

Art Education

All courses elective by permission of the Department of Art and Art History.

791. Art Education (Elementary)

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. 4 cr.

#792. Art Education (Secondary)

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. 4 cr.

Biochemistry and Molecular Biology (BCHM)

(For program description, see page 81.)

Chairperson: Anita S. Klein

Professors: Rick H. Cote, Clyde L. Denis, Thomas M. Laue, Samuel C. Smith, Stacia A. Sower, William R. Trumble

Research Professor: Vernon N. Reinhold
Associate Professors: John J. Collins, Anita S. Klein, Andrew P. Laudano, G. Eric Schaller, William K. Thomas

Research Associate Professor: William A. Gilbert

Assistant Professors: Lisa B. Clark, Charles E. Warren

Research Assistant Professor: Thomas P. Moody

600. Field Experience

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. 1 to 4 cr.

658. General Biochemistry

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: BCHM 659 (except BCHM majors who are encouraged to take BCHM 755). 3 cr.

659. General Biochemistry Laboratory

Structured laboratory experiments that provide training in analytical and preparative techniques fundamental to modern biochemistry and molecular biology. Coreq: BCHM 658 (except for BCHM majors who are encouraged to take BCHM 755 instead of BCHM 659). Special fee. 2 cr.

702. Endocrinology

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. (Also offered as ANSC 702.) Prereq: BCHM 658 or 751; or permission. Special fee. 4 cr.

711. Genomics and Bioinformatics

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 of a range of bioinformatics approaches—the computer applications used in genome analysis. Prereq: BIOL 604. (Also offered as GEN 711 and MICR 711.) Lab. 4 cr.

750. Physical Biochemistry

Structure, interactions, and physical-chemical properties of biomolecules. Thermodynamic, kinetic, and spectroscopic methods for the study of proteins and nucleic acids. Prereq: 2 semesters organic chemistry, 1 semester of calculus; or permission. 3 cr.

751. Principles of Biochemistry

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 BCHM 658-659; or permission. 4 cr.

752. Principles of Biochemistry

Continuation of in-depth survey of biochemistry: metabolism of proteins, nucleic acids, carbohydrates, and lipids; molecular biology of DNA, RNA, and protein synthesis and regulation. Prereq: CHEM 547-548 or CHEM 651-652 or CHEM 545 and 546 and BCHM 658-659; or permission. 4 cr.

754. Laboratory in Biochemistry and Molecular Biology of Nucleic Acids

Application of modern techniques to the analysis of biomolecules, with an emphasis on nucleic acids; includes DNA isolation and analysis, cloning, sequencing, and analysis of gene products. No credit if credit has been received for MICR 704. Prereq: BCHM 658/659; 751; or permission. (Also offered as PBIO 754 and GEN 754.) Special fee. (Not offered every year.) Writing intensive. 5 cr.

755. Laboratory in Biochemistry and Molecular Biology

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 BCHM 799 should take this course in their junior year.) Prereq: BCHM 751-752; or permission. BCHM 752 may be taken concurrently with BCHM 755. Special fee. Writing intensive. 5 cr.

761. Cell Signaling Transduction in Health and Disease

Signal transduction and the regulation of metabolism, cell growth, and cellular activation. Emphasis is on the molecular basis of cellular communication, sensory signal transduction and cancer. Prereq: BCHM 751 or 658; or permission. 3 cr.

766. Environmental Genomics

Environmental genomics uses existing and developing high throughput genomic-scale technologies to investigate ecological and evolutionary theory, and so provides a more complete understanding of how organisms respond to environmental change at the molecular genetic level. Course covers an array of systems involved in this emerging field, with the central aim of understanding the effects of environmental change on genome structure, gene expression, and adaptive evolutionary change. Information is derived from the primary literature in the field and covers prac-

tical and technical concepts as well as the underlying theoretical basis for the major research themes. Prereq: BIOL 604; or permission. (Also offered as GEN 766.) 4 cr.

771. Molecular Genetics

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: BCHM 658 or 751; BIOL 604; or permission. (Also offered as GEN 771.) 4 cr.

782. Developmental Genetics

The molecular genetic basis of metazoan development. Focuses on how genes direct the process of development and how this problem is analyzed in model organisms using molecular genetic approaches. Topics include: control of cell division, maternal factors, cell-cell interactions, and differential gene expression. Prereq: BIOL 604; BCHM 658 or 751. (Also offered as GEN 782.) Not offered every year. 3 cr.

794. Protein Structure and Function

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: BCHM 658 or 751. 4 cr.

795. Investigations

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 BCHM or major electives. 1 to 4 cr.

799/799H. Senior Thesis

Research in biochemistry and molecular biology for senior majors. 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: BCHM 659 or 755; permission. Writing intensive. 1 to 4 cr.

Biology (BIOL)

(For program description, see page 83.)

Coordinator: Subhash C. Minocha

400. Professional Perspectives on Biology

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. 1 cr.

404. Biotechnology and Society

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. 4 cr.

411/411H. Principles of Biology I

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. 4 cr.

412/412H. Principles of Biology II

The biology of organisms, including survey of kingdoms, behavior, evolution, and ecology. Required for majors in the biological sciences. Special fee. Lab. 4 cr.

528. Applied Biostatistics I

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 639; MATH 644; PSYC 402; SOC 502. 4 cr.

541. General Ecology

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. 4 cr.

600. Field Experience

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. 1 to 4 cr.

602. Project Lake Watch

Project Lake Watch brings together several highly successful areas of excellence at UNH: capabilities in satellite remote sensing and geographic information systems, microbial ecology, limnology, and the long-term monitoring of NH lakes by volunteer citizens. Project Lake Watch will recruit 10 sophomores from all colleges to become outreach teachers of geospatial technologies, relating these to established methods of monitoring NH lake water quality. These students will experience active, hands-on learning and will then disperse the newer technologies to participating volunteers in the NH Lakes Lay Monitoring Program. IA (continuous grading) course. 3 or 5 cr.

603. Seminar/Project Lake Watch

Project Lake Seminar is a forum for maintaining academic focus and cohesiveness among program participants throughout the academic year. In addition to weekly meetings in which current developments in lake remote sensing will be considered, students will also use this forum to plan summer academic activities, carry out outreach teaching with volunteer lake monitors and prepare scientific presentation for a national meeting. Prereq: BIOL 602, permission. 3 cr.

604. Principles of Genetics

Chemical structure of genetic material, Mendelism, gene recombination, and chromosome mapping. Mutation, gene expression and regula-

tion, 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. 4 cr.

605. Eukaryotic Cell and Developmental Biology

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. 4 cr.

695, 696. Biology Teaching Practices

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 8 credits. 1 to 4 cr.

#702. Genetics Lab

An experimental approach to understanding the fundamental principles of heredity. Theoretical aspects of genetics hypothesis testing, data analysis, and techniques of isozyme and DNA electrophoresis and polymerase chain reaction (PCR). In lab, students conduct mating and mutagenesis experiments with plants, animals, and yeast; do human DNA fingerprinting; and employ techniques of DNA isolation, electrophoresis, PCR, cytogenetics, and statistical analysis to generate and interpret genetic data. Prereq: BIOL 604 or equivalent. Special fee. (Also offered as GEN 702.) 4 cr.

711. Applied Biostatistics II

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. Special fee. 4 cr.

795, 796. Independent Investigations

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. 1 to 4 cr.

799. Honors Thesis

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.) Writing intensive. 2 to 8 cr.

Departmental Biological Science Courses

(Other biological science courses include those listed and described under the following department/program headings: *Animal Sciences*, p. 133; *Biochemistry and Molecular Biology*, p. 141; *Genetics*, p. 168; *Microbiology*, p. 200; *Natural Resources*, p. 204; *Nutritional Sciences*, p. 210; *Plant Biology*, p. 216; and *Zoology*, p. 232.)

Chemical Engineering (CHE)

(For program description, see page 55.)

Chairperson: Stephen S.T. Fan

Professors: Dale P. Barkey, Russell T. Carr, Stephen S.T. Fan, Ihab H. Farag, Virendra K. Mathur, Palligarnai T. Vasudevan

Affiliate Professor: Joseph J. Paterno

Associate Professor: Donald C. Sundberg

Assistant Professor: Nivedita R. Gupta

410. Survey of Current Energy and Pollution Control Technology

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. Prereq: good background in high school chemistry. 4 cr.

501. Introduction to Chemical Engineering I

Systems of units; material balances and chemical reactions; gas laws; phase phenomena. 3 cr.

502. Introduction to Chemical Engineering II

Energy and material balances for systems with and without chemical reactions; design case studies. 3 cr.

601. Fluid Mechanics and Unit Operations

Continuity, momentum, and energy equations; laminar and turbulent flow in pipes; rheology. Applications to flow in porous media, filtration, and fluidization. 3 cr.

602. Heat Transfer and Unit Operations

Thermal properties of materials, steady-state and transient conduction and convection; radiation; applications to heat exchangers and process equipment. 3 cr.

603. Applied Mathematics for Chemical Engineers

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. Prereq: knowledge of scientific computer programming. Lab. 4 cr.

604. Chemical Engineering Thermodynamics

Volumetric and phase behavior of ideal and real gases and liquids; cycles; steady-flow processes; chemical equilibrium. Lab. 4 cr.

605. Mass Transfer and Stagewise Operations

Diffusion in gases, liquids, and solids; design and analysis of distillation, absorption, adsorption, extraction, and other stagewise equipment and operations. 3 cr.

606. Chemical Engineering Kinetics

Use of laboratory data to design commercial re-

actors. Continuous, batch, plug-flow, and stirred-tank reactors for homogeneous and catalytic multiphase reactions. 3 cr.

608. Chemical Engineering Design

Introduction to cost engineering. Application of acquired skills to design of chemical processes. Individual major design project required. Safety for industrial processes. Lab. (Also offered as ENE 608.) Writing intensive. 4 cr.

612. Chemical Engineering Laboratory I

Selected experiments in fluid mechanics, heat transfer, and unit operations. Writing intensive. 3 cr.

613. Chemical Engineering Laboratory II

Selected experiments in mass transfer, stagewise operations, thermodynamics, and kinetics. Writing intensive. 3 cr.

695. Chemical Engineering Project

Independent research problems carried out under faculty supervision. 1 to 4 cr.

696. Independent Study

Prereq: permission of the adviser and department chairperson; granted only to students having superior scholastic achievement. 1 to 4 cr.

701. Introduction to Polymer Engineering

Principles of polymer chemistry, polymerization kinetics, polymer rheology, and material characteristics. Design and analysis of polymer reactors, extruders, molding machines, and other forming operations. Lab. 4 cr.

705. Natural and Synthetic Fossil Fuels

Study of U.S. and foreign reserves of coal, oil, and natural gas. Petroleum processing and refining. Coal, oil shale, and tar sand. Gasification and liquefaction of coal. Lab. 4 cr.

712. Introduction to Nuclear Engineering

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. 4 cr.

744. Corrosion

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. 4 cr.

751. Process Simulation and Optimization

Techniques for computer-aided analysis of chemical processing systems. Development of mathematical models to describe process behavior. Application of optimization techniques. Prereq: a knowledge of scientific computer programming. Lab. 4 cr.

752. Process Dynamics and Control

Dynamic behavior of chemical engineering processes described by differential equations; feedback control concepts and techniques; stability analysis. Lab. 4 cr.

*#754. Graphic, Numerical, and Finite Element Applications in Chemical Engineering

Computational methods for solving differential equations resulting from the modeling of a process or physical phenomena. Graphical display of results of data and curve-fitted equations. Use of interactive graphics and the solution of boundary-value problems. Applications of finite element analysis and discussion of other software available. Prereq: CHE 603 or permission of instructor; a knowledge of scientific computer programming. 4 cr.

761. Biochemical Engineering

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. 4 cr.

762. Biomedical Engineering

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. 4 cr.

Chemistry (CHEM)

(For program description, see page 56.)

Chairperson: Howard R. Mayne

Professors: Christopher F. Bauer, N. Dennis Chasteen, Arthur Greenberg, Richard P. Johnson, Howard R. Mayne, W. Rudolf Seitz, Sterling A. Tomellini, Gary R. Weisman, Edward H. Wong

Research Professor: Vernon N. Reinhold

Associate Professors: Steven B. Levery, Glen P. Miller, Roy Paul Planalp, Charles K. Zercher

400. Freshman Seminar

Chemistry Seminar: an introduction to the chemistry profession. Talks and workshops on the career of a chemist in academia, industry, medicine, law, teaching and government. Cr/F. 1 cr.

*#401. Introduction to Chemistry

Elementary, broad view of chemistry; emphasizes topics related to everyday life. For students who do not intend to take any other chemistry courses, and those interested in satisfying a science requirement. Not a prerequisite for any other chemistry courses. Lab. (Not offered every year.) Cannot be taken for credit if credit received for CHEM 403, 405, or 409. 4 cr.

#402. Introduction to Chemistry

Elementary, broad view of chemistry; emphasizes topics related to everyday life. For students who do not intend to take any other chemistry courses, and those interested in satisfying a science requirement. Not a prerequisite for any other chemistry courses. Lab. (Not offered every year.) Cannot be taken for credit if credit received for CHEM 404. 4 cr.

*403. General Chemistry

Fundamental laws and concepts applied to non-metals, metals, and their compounds. For students who plan to take further chemistry courses. Required for chemistry majors. Previous chemistry recommended. Knowledge of algebra, exponentials, and logarithms required. Special fee. Lab. Cannot be taken for credit if credit received for CHEM 401, 405, or 409. 4 cr.

404/404H. General Chemistry

Fundamental laws and concepts applied to non-metals, 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. Cannot be taken for credit if credit received for CHEM 402. 4 cr.

*405. General Chemistry

Basic principles; atomic structure, bonding, equilibria, and thermodynamics. Prereq: one year of high school chemistry, algebra, and knowledge of exponentials and logarithms. Cannot be taken for credit if credit received for CHEM 403-404. Special fee. 4 cr.

#406. Quantitative Analysis

Studies of pollution, environmental problems, and the more traditional professional work in chemistry rely heavily on a sound knowledge of analytical chemistry. Gravimetric and volumetric analysis, potentiometry, spectrophotometry, and selected separations methods. Prereq: CHEM 404 or 405. Coreq: CHEM 407. 3 cr.

#407. Quantitative Analysis Laboratory

Gravimetric and volumetric analysis; chemical separations; potentiometry and spectrophotometry. Treatment of data, error analysis, and calculation of results. Coreq: CHEM 406. Special fee. 2 cr.

*#409. Chemistry and Society

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. Lab. (Not offered every year.) Cannot be taken for credit if credit received for CHEM 401, 403, or 405. 4 cr.

517. Quantitative Analysis

A combination of lecture, laboratory, and in-class problem solving is used to study solubility, acid-base, redox, and complexation reactions and their application for quantitative chemical measurements. Prereq: CHEM 404 or 405. Coreq: CHEM 518. Lab. 4 cr.

518. Quantitative Analysis Laboratory

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. Coreq: CHEM 517. Special fee. 1 cr.

545. Organic Chemistry

Introductory study of carbon compounds for those who desire a brief terminal course. Prereq: CHEM 404 or 405. Coreq: CHEM 546. Students receiving credit for CHEM 545 may not receive credit for CHEM 402, 547-548, or 651-652. 3 cr.

546. Organic Chemistry Laboratory

Coreq: CHEM 545. Special fee. Lab. 2 cr.

547. Organic Chemistry

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. Coreq: CHEM 549. Students receiving credit for CHEM 547-548 may not receive credit for either CHEM 545 or 651-652. 3 cr.

548. Organic Chemistry

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. Coreq: CHEM 550. Students receiving credit for CHEM 547-548 may not receive credit for either CHEM 545 or CHEM 651-652. 3 cr.

*Students receive credit for only one course from 401, 403, 405, and 409, and for only one course from 402 and 404.

549. Organic Chemistry Laboratory

Coreq: CHEM 547. Special fee. Lab. 2 cr.

550. Organic Chemistry Laboratory

Coreq: CHEM 548. Special fee. Lab. 2 cr. 574. Introduction to Inorganic Chemistry Elementary concepts including periodicity, descriptive chemistry of metals and nonmetals, and coordination compounds. Prereq: CHEM 404; 405; or permission. 3 cr.

651-652/652A. Organic Chemistry

Principal classes of organic compounds, aliphatic and aromatic, class reactions and structural theory. Intended primarily for prehealing arts, biological science, and health science students. Prereq: CHEM 404; 405; or permission. Coreq: CHEM 653. Students receiving credit for CHEM 651-652 may not receive credit for either CHEM 545 or 547-548. 3 cr.

653-654. Organic Chemistry Laboratory

Coreq: CHEM 651. Special fee. Lab. 2 cr.

683-684. Physical Chemistry I, II

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. 3 cr.

685-686/686W. Physical Chemistry Laboratory

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. 2 cr.

696. Independent Study

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. 1 to 4 cr.

698. Seminar

Student reports on topics of interest. Prereq: CHEM 548 or 652; CHEM 684. Writing intensive. 1 cr.

699. Thesis

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 or permission. Lab. Two semesters of 4 credits each are required. Writing intensive. 4 cr.

708. Spectroscopic Investigations of Organic Molecules

Survey of the use of modern spectroscopic techniques for the identification and structural and dynamic characterization of organic compounds. Topics include proton and carbon-13 nuclear magnetic resonance spectroscopy, infrared spectroscopy, and mass spectroscopy. Problem solving is emphasized. 1 to 4 cr.

755. Advanced Organic Chemistry

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. 3 cr.

756/756W. Advanced Organic Chemistry Laboratory

Synthesis and structural determination of complex organic compounds, techniques for the separation, determination of purity, and identi-

fication of compounds by spectroscopic and chemical means. Coreq for CHEM majors: 755. Special fee. 2 or 3 cr.

762. Instrumental Methods of Chemical Analysis

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 corequisite; or permission. Coreq: CHEM 763. 3 cr.

763/763W. Instrumental Methods of Chemical Analysis Laboratory

Experimental parameters, error analysis, and applications of the methods covered in CHEM 762. 763W is writing intensive. Coreq: CHEM 762. Special fee. 2 or 3 cr.

774. Inorganic Chemistry

Basic theoretical concepts and their applications to inorganic reactions and compounds. Prereq: organic chemistry; physical chemistry; or permission. 3 cr.

775/775W. Inorganic Chemistry Laboratory

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. 775W is writing intensive. Coreq: for undergraduates: CHEM 774. Special fee. 2 cr.

776. Physical Chemistry III

Application of quantum theory to atomic electron structure, spectroscopy, and molecular structure. Prereq: CHEM 683-684. Special fee. Lab. 4 cr.

778. Chemistry of Large Molecules

Basic chemistry of high-molecular-weight compounds, including synthetic polymers and substances occurring in living systems. Elementary aspects of the structures, syntheses, and properties of large molecules, and their roles in modern science, technology, and living systems. Prereq: one semester of organic chemistry. (Not offered every year.) 4 cr.

795. Special Topics

New or specialized topics not covered in regular course offerings. May be repeated to a maximum of 4 credits. Prereq: permission. 2 to 4 cr.

Civil Engineering (CIE)*(For program description, see page 56.)***Chairperson:** Jean Benoit**Professors:** Jean Benoit, Michael R. Collins, Pedro A. de Alba, David L. Gress, Nancy E.

Kinner, James P. Malley

Research Professor: T. Taylor Eighmy**Associate Professors:** Thomas P. Ballesterro,

Raymond A. Cook, Charles H. Goodspeed,

Robert M. Henry

Research Associate Professor: Kevin H.

Gardner

Assistant Professor: Jo S. Daniel**Research Assistant Professor:** Jeffrey S. Melton**400. Civil Engineering Lectures I**

Introduction to the profession; the civil engineer

as a planner, builder, and problem solver; and the goals of the civil engineering curriculum. Introduction to concepts of integrated design, engineering ethics, and technical writing. Lectures by faculty and visitors. Introduction to word processing and spreadsheet software. Field trips to construction sites. Required of CIE first-year students; open to others by permission. Cr/F. 1 cr.

401. Civil Engineering Lectures II

Introduction to civil engineering, engineering codes, and the use of common computer software to solve civil engineering problems. 2 cr.

505. Surveying

Principles of land measurements by ground and photogrammetric methods. Application of error theory to planning and adjusting engineering surveys. Conformal mapping and its applications to state plane coordinate systems. CIE majors or permission. Coreq: MATH 426 or permission. Special fee. Lab. Writing intensive. 4 cr.

525. Statics for Civil Engineers

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. Prereq: MATH 426, PHYS 407. 3 cr.

526. Strength of Materials

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. 3 cr.

527. Dynamics

Particle and rigid body dynamics in two and three dimensions. Equilibrium; work and energy relationships; momentum, impulse, and impact; rotational and translational interactions; and friction. Prereq: CIE 525 or permission. 3 cr.

530. Introduction to Civil Engineering Applications

Introduction to the solution of civil engineering problems using computer applications; regression analysis, curve fitting, numerical integration, statistics, roots of equations, spreadsheets, databases, CAD, and an introduction to engineering drawings. Emphasis on use of computers as an engineering tool, and how to verify results obtained from a computer analysis. Prereq: CIE 400, 525; or permission. Special fee. 3 cr.

622. Engineering Materials

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 526, CIE major; or permission. Special fee. Lab. Writing intensive. 4 cr.

633. Project Engineering

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. 3 cr.

642. Fluid Mechanics

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: CIE 527, CIE/ENE major; or permission. Special fee. Lab. Writing intensive. 4 cr.

665. Soil Mechanics

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 642, CIE/ENE major; or permission. Special fee. Lab. 4 cr.

681. Classical Structural Analysis

Analytical stress and deflection analysis of determinate and indeterminate structures under static and moving loads by classical methods. Prereq: CIE 525, 526, CIE major; or permission. 3 cr.

696. Work Experience

Based on appropriate career oriented work experience. Student can get one credit per experience and can be repeated for a total of three credits. A written final report is required. Prereq: permission. Cr/F. 1 cr.

697. Internship

Off-campus work in the civil engineering field for on-the-job skill development. Needs to be supervised by a civil engineering faculty member and a proposal for the internship must be submitted and approved by the department prior to the start of the internship. IA (continuous grading.) Cr/F. 2 to 4 cr.

721. Pavement Design

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. 3 cr.

722. Properties and Production of Concrete

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, heavy-weight, and other special concretes. Prereq: CIE 622 or permission. 3 cr.

723. Bituminous Materials and Mixtures

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. 3 cr.

#734. Project Analysis

Methods of analysis for decision making used in the planning, design, and management of various engineering systems involving chance and uncertainty. Topics in applied probability and statistics are used for risk analysis and for investigating system performance and reliability. Prereq: CIE 633, MATH 644; or permission. 3 cr.

741. Open Channel Flow

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. 3 cr.

745. Engineering Hydrology

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. 3 cr.

#754. Transportation Engineering and Planning

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. 3 cr.

755. Design of Water Transmission Systems

Pressure, sewer, and open channel system design. Theory developed for individual components to large complex systems. Topics include: closed conduit flow, open channel flow, groundwater flow, valves and meters, pump selection, system planning and layout, and system operation and maintenance. Pressure system modeling with program EPANET. Rainfall runoff calculations with US SCS TR55 model. Prereq: CIE 642 or permission. 4 cr.

757. Coastal Engineering and Processes

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. 3 cr.

760. Foundation Design I

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. 4 cr.

761. Foundation Design II

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. 3 cr.

762. Introduction to Geotechnical Earthquake Engineering

Overview of 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. 3 cr.

#763. Geological Engineering

Functional classification of rocks and rock masses. Stereographic projection. Engineering properties of rocks. Rock mechanics. The influence of geology in the design of underground excavations, tunneling, foundations, and rock slope engineering. Prereq: ESCI 401 or permission. 3 cr.

766. Introduction to Geo-Environmental Engineering

Soil composition and structure; hydrogeology; attenuation and contaminant transport; containment design including landfills, geosynthetics 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. 3 cr.

774. Reinforced Concrete Design

Introduction to 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. 4 cr.

778. Issues in Engineering Practice and Management

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. 3 cr.

782. Timber Design

Introduction to the design of timber structures. Structural properties of wood. Determination of horizontal and vertical loads. Horizontal and vertical load-resisting systems. Design of horizontal diaphragms, shear walls, beams, and columns. Bolted, screwed, and nailed connections. Prereq: CIE 681 or permission. 3 cr.

783. Matrix Structural Analysis and Modeling

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. 3 cr.

#785. Introduction to Structural Vibrations

Dynamic analysis of single- and multi-degree-of-freedom systems. Simple beam and frame structures. Earthquake analysis and design. Pre- or coreq: CIE 783. 3 cr.

786. Introduction to Finite Element Analysis

Topics include basic matrix theory, Galerkin method, direct stiffness method, development of finite element theory, and modeling techniques, applications in solid mechanics, heat transfer, fluids, and dynamics using commercially available codes. Prereq: CIE 681, 783; or permission. 3 cr.

787. Dynamics of Structures

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. 3 cr.

788. Project Planning and Design

Student groups will be 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: senior CIE major or permission. Writing intensive. 4 cr.

789. Project Management

Project management concepts including labor, material and equipment usage; cost estimation; financing and economic evaluation of projects; scheduling; and quality control and safety during construction. Existing projects are integrated in class discussions and homework. An understanding of CIE 633 topics is assumed. 3 cr.

791. Prestressed Concrete

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. 3 cr.

792. LRFD Bridge Design

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 or permission. Coreq: CIE 793. 3 cr.

793. Structural Design in Steel

Design of members and connections: tension and compression members, beams, and beam/columns, bolted and welded joints. Prereq: CIE 622, 681; or permission. 3 cr.

795. Independent Study

Seniors in good standing may pursue independent studies under faculty guidance. A written culminating report is required. Prereq: permission. 1 to 4 cr.

796. Special Topics

Advanced or specialized topics not normally covered in regular course offerings. May be repeated, but not in duplicate areas. Prereq: permission. 1 to 4 cr.

Communication (CMN)

(For program description, see page 33.)

Chairperson: Lawrence J. Prelli

Professors: Sheila McNamee, Joshua Meyrowitz

Associate Professors: Patrick J. Daley, James M. Farrell, Sally W. Jacoby, Beverly James, John Lannamann, Lawrence J. Prelli

Assistant Professors: Jennifer L. Borda, Lawrence W. Rosenfield

Lecturers: Jennifer Friedlander, R. Michael Jackson

Media**455/455H. Introduction to Mass Communication**

Nature, development, and the effects of mass media. Overview of mass communication history and theory. 4 cr.

505. Analysis of Popular Culture

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 455, 456, and 457, or by permission. 4 cr.

515. Analysis of News

Explores the psychological, social, economic, po-

litical, and cultural factors that influence the definition and reporting of news. Prereq: CMN 455, 456, and 457, or by permission. 4 cr.

519. Advertising as Social Communication

Social role of advertising, public policy debates concerning advertising, influence of advertising on culture, and methods of analyzing advertising messages. Prereq: CMN 455, 456, 457, or by permission. 4 cr.

550. Cinema and Society

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. Prereq: CMN 455, 456, and 457, or by permission. Special fee. 4 cr.

567. Images of Gender in the Media

The symbolic construction of sexuality and gender in specific social, historical, and cultural settings. Examination of the power to define media images and the media's function as one element in the preservation of gender inequality. Prereq: CMN 455, 456, and 457, or by permission. 4 cr.

596. Special Topics in Media Studies

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, 456, and 457, or by permission. 2 or 4 cr.

615. Public Opinion and Mass Communication

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 any 500-level media studies course. Writing intensive. 4 cr.

640. Media, Culture, and Society

Focuses on the construction of meaning in the interplay between social structure and cultural expression. Theory and analysis emphasize the ideological role of the media in the social struggle for meaning. Prereq: CMN 455, 456, 457 and any 500-level media studies course or permission. Writing intensive. 4 cr.

#642. European Media and Culture

Examination of the mass media in Europe as central sites for the production of culture and the formation of identity. Topics include the structural configurations of the media and their particular political and economic contexts, and policy debates over the issues including transborder broadcasting, language preservation, the status of minorities, and the globalization of culture. Prereq: CMN 455, 456, 457 and any 500-level media studies course or permission. Writing intensive. 4 cr.

650. Critical Perspectives on Film

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. 4 cr.

658. Media Analysis and Criticism

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 (three 500-level courses recommended) or permission. Writing intensive. 4 cr.

696. Seminar in Media Studies

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 any 500-level media studies course or permission. Writing intensive. 4 cr.

#701. Modes of Communication Inquiry

Overview of selected philosophical orientations, issues, and concepts central to communication research. Examination of both qualitative and quantitative methods. Prereq: CMN 455, 456, 457 and two 500-level CMN courses or permission. Writing intensive. 4 cr.

#772. Seminar in Media Theory

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. 4 cr.

795. Independent Study

Advanced individual study in rhetoric, media, or interpersonal communication. Project to be developed with supervising instructor. May be repeated for credit. Prereq: permission. 1 to 4 cr.

Rhetoric**456/456H. Propaganda and Persuasion**

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. 4 cr.

504. Introduction to Argumentation

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 455, 456, and 457, or by permission. 4 cr.

507. Introduction to Rhetorical Theory and Analysis

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 455, 456, and 457, or by permission. 4 cr.

557. Great Speakers and Speeches

Historical survey of masterpieces of oratory from the period of Demosthenes and Cicero through the golden age of American oratory with Lincoln and Webster, to the time of Martin Luther King, John Kennedy, and Ronald Reagan. Critical attention to the circumstances, talents, and rhetorical attributes that combine to make eloquent, persuasive discourse and effective public communication. Prereq: CMN 455, 456, and 457, or by permission. 4 cr.

597. Special Topics in Rhetorical Studies

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 455, 456, and 457, or by permission. 2 or 4 cr.

600. Public Speaking as a Civic Art

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: CMN 455, 456, 457 and any 500-level rhetorical studies course or permission. 4 cr.

#604. Public Argument in Contemporary Society

Studies of inquiry and advocacy within such contemporary fields as law, politics, science, ethics, business, and the arts. Prereq: CMN 455, 456, 457 and any 500-level rhetorical studies course or permission. 4 cr.

#605. Argumentation and Public Advocacy

Ideas and methods of adversarial and consensual public advocacy. Applied emphasis on public policy argumentation and decision making. Prereq: CMN 455, 456, 457 and any 500-level rhetorical studies course; CMN 500 or 504 recommended. 4 cr.

607. Persuasion in American Politics

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 any 500-level rhetorical studies course or permission. Writing intensive. 4 cr.

#647. Rhetoric of Science

Employs rhetorical analysis to examine how science is socially constructed through communication. Investigates persuasive strategies writers and speakers employ to gain approval of ideas as "science" and of themselves as "scientists." Explores strategies used to construct images and ideas about "science" and "scientists" in the popular media, and the influence of these constructed images and ideas on selected political and social issues within society at large. Prereq: CMN 455, 456, 457 and any 500-level rhetoric course or permission. 4 cr.

656. Principles of Rhetorical Criticism

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, dramatic, generic, literary, and psychological. Prereq: CMN 455, 456, 457, and any 500-level rhetorical studies course (CMN 507 recommended). Writing intensive. 4 cr.

657. Public Address and the American Experience

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 lead-

ing 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 when topic varies. Prereq: CMN 455, 456, 457 and any 500-level rhetorical studies course or permission. Special fee. Writing intensive. 4 cr.

#670. Systems and Theories of Rhetoric

Critical interpretation of significant works in the history of rhetorical theory and the major philosophical systems underlying them. Selected contemporary theories of rhetoric examined as they relate to classical perspectives. Explores fundamental philosophical and theoretical questions asked by rhetorical theorists and several responses to those questions. Prereq: CMN 455, 456, 457 and any 500-level rhetorical studies course (CMN 507 recommended). 4 cr.

697/697H. Seminar in Rhetorical Study

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 any 500-level rhetorical studies course or permission. Writing intensive. 4 cr.

703. Seminar in Rhetorical Theory

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. 4 cr.

Interpersonal**457. Introduction to Interpersonal Communication**

Research and theory that define the area of interpersonal communication. Examination of the associations between communication and such social phenomena as self-concept, social attraction, relationship development, and health. 4 cr.

503. Introduction to Group Process

Focuses on a variety of concepts relevant to the study, analysis, and understanding of communication in the small group setting. Issues include leadership, group roles, problem-solving and decision-making processes in task-oriented groups. Prereq: CMN 455, 456, and 457, or by permission. 4 cr.

530. Family Communication

Comparison and evaluation of theories of communication developed for the analysis of family interaction. Focus on pattern development and intervention, change, stability, and coherence in family interaction. Prereq: CMN 455, 456, and 457, or by permission. 4 cr.

572. Language and Social Interaction

This course introduces students to major works in the study of language and social interaction. Topics covered explore how discursive activities construct identity, gender and ethnicity, race, culture and power. This course is devoted to intensive reading of these central themes. Prereq: CMN 455, 456, and 457, or by permission. 4 cr.

583. Gender and Expression

Analysis of the different ways people communicate about gender, the different ways men and women communicate, and the consequences of these differences. Prereq: CMN 455, 456, and 457, or by permission. 4 cr.

598. Special Topics in Interpersonal Studies

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 455, 456, and 457, or by permission. 4 cr.

602. Theories of Interpersonal Communication

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 any CMN 500-level interpersonal studies course or permission. Writing intensive. 4 cr.

630. Psychology of Communication

Exploration of differing world views in the study of the individual in interaction, with emphasis on how they generate very different conceptions of the human communication process. Specific attention to such notions as the construction of social meaning, the construction of self, and the construction of interactive patterns. Prereq: CMN 455, 456, 457 and any 500-level interpersonal studies course or permission. Writing intensive. 4 cr.

632. Communication Theory

Terminology, concepts, theoretical models, functions, levels, modes and media, and role in taking human communication. Prereq: CMN 455, 456, 457 and any 500-level CMN course (three 500-level courses recommended) or permission. Writing intensive. 4 cr.

666. Conversation Analysis

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 one 500-level interpersonal CMN course or permission. Writing intensive. 4 cr.

#667. Ethnography of Communication

Theoretical and hands-on consideration of interpersonal communication and language use as culturally situated practices of particular communities, through which human beings reflect, construct, maintain, pass down, and challenge the cultures of which they are a part. Students will learn how to interpret culturally situated interpersonal communication and language use by employing various ethnographic and discourse analytic methods of investigation. Prereq: CMN 455, 456, 457 and one 500-level interpersonal course or permission. Writing intensive. 4 cr.

672. Theories of Language and Discourse

Focus on different theoretical orientations to the study of language and specific models for analyzing conversation. Specific issues include conversational rules and coherence, turn taking, narrative development and analysis, speech act analysis, accounts analysis, and conversational analysis. Prereq: CMN 455, 456, 457 and any 500-level interpersonal studies course (CMN 572 recommended) or permission. Writing intensive. 4 cr.

680. Perspectives on Culture and Communication

Theoretical and practical problems of intercultural communication. Explores how communication transactions create, maintain, and separate different cultures. Prereq: CMN 455, 456, 457 and any 500-level interpersonal studies course or permission. Writing intensive. 4 cr.

698. Seminar Interpersonal Studies

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 any 500-level interpersonal studies course or permission. Writing intensive. 4 cr.

#702. Seminar in Interpersonal Communication Theory

In-depth concentration on a particular theoretical orientation in interpersonal communication. Original works are read. Theoretical orientation varies by semester. Theories covered include rule theories, systems theories, individual difference theories, symbolic interactionism, constructivism, hermeneutics, phenomenology, cybernetics, etc. Prereq: CMN 455, 456, 457 and three 500-level CMN courses with at least one in interpersonal studies or permission. Writing intensive. 4 cr.

Electives**402/402H. Communication and Social Order**

Introduction to human communication from a broad liberal arts perspective; emphasizing the role of symbolic interaction in the construction of social reality. Processes of intrapersonal, interpersonal, group, public, and mass communication. Freshman, sophomore priority. 4 cr.

500. Public Speaking

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. 4 cr.

599. Internship

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. 1 to 4 cr.

799H. Honors Thesis

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. 4 cr.

Communication Sciences and Disorders (COMM)

(For program description, see page 69.)

Chairperson: Penelope E. Webster

Professor: Stephen N. Calculator

Associate Professors: Steven P. Bornstein,

Frederick C. Lewis, Penelope E. Webster

Affiliate Associate Professors: Linda Vallino Napoli

Assistant Professors: Sheryl Gottwald, Jeanne

H. O'Sullivan, Ruth E. Peaper, Amy S. Plante

Research Assistant Professor: Rae M.

Sonnenmeier

Affiliate Assistant Professor: Lygia Soares

Instructor: Mary Jane Sullivan

520. Survey of Communication Disorders

Causes, diagnosis, and treatment of speech, language, and hearing disorders. 4 cr.

521. Anatomy and Physiology of the Speech and Hearing Mechanisms

Anatomy, physiology, neurology, and function of the mechanisms for the production and perception of speech. 4 cr.

522. Acquisition of Language

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. 4 cr.

524. Clinical Phonetics

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. 4 cr.

533. Elementary American Sign Language

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. 4 cr.

630. Organic Pathologies

Neurological bases, diagnosis, and treatment of communication disorders; emphasis on motor speech disorders and aphasia. Prereq: permission. 4 cr.

631. Articulation and Language Disorders in Children

Research, diagnosis, and therapy procedures as applied to articulation and language disorders. 4 cr.

635. Professional Issues in Speech-Language Pathology

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. 3 cr.

660. Special Problems

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. 2 to 8 cr.

704. Basic Audiology

Normal hearing process and pathologies of the auditory system. Hearing screening, pure-tone testing, and speech audiometry. Prereq: COMM 521 or permission. 4 cr.

705. Introduction to Auditory Perception and Aural Rehabilitation

Research, testing, and clinical procedures of auditory perception, applied to the communicatively impaired. Prereq: COMM 704; permission. 4 cr.

723. Observation Skills in Speech-Language Pathology

Guided observation experiences familiarize students with the clinical process; develop systematic observation skills; fulfill observation requirement of the American Speech-Language-Hearing Association (ASHA). Writing intensive. 2 cr.

733. Intermediate American Sign Language

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 533 or its equivalent; juniors and seniors only. 4 cr.

777. Speech and Hearing Science

Physical, acoustical, and perceptual correlates of normal speech production and audition. Includes theoretical models with the generation, transmission, detection, and analysis of speech signals. 4 cr.

795. Independent Study

Individual or group projects involving directed study of an area of communication disorders which 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. 1 to 8 cr.

Community Development (CD)

Department of Resource Economics and Development

(For program description, see page 85.)

Chairperson: Alberto B. Manalo

Professors: John M. Halstead, Bruce E.

Lindsay

Associate Professors: Alberto B. Manalo,

Douglas E. Morris, Robert A. Robertson

Assistant Professor: Kelly L. Giraud

Instructor: Mary Adamo Robertson

415. Community Development Perspectives

Introduction of the concepts of community development and issues that are facing contemporary communities as they undergo change. Focus on strengthening communities through a process of citizens participation and decision making which empowers citizens to direct and control change that affects their lives in the local community. Emphasis given to the roles and responsibilities of professional administrators and individual citizens in the dynamic process of community policy formulation, decision making, and administrative implementation. 4 cr.

508. Applied Community Development

Students work in an actual community, assisting individuals and groups to identify needs and problems, establish attainable and objective goals, as-

sess requirements and resources, and formulate programs for development; methods of collection, analysis, and integration of pertinent primary and secondary economic, social, political, and physical data for community development. Prereq: CD 415 or permission. Lab 4 cr.

#607. Community Administration and Development

Principal theories and methods of community administration and development; skills required for professional and citizen volunteers who are involved in decision making and administrative activities in local communities. Emphasis on the responsibilities and strategies of individuals working in the field of local public administration. Prereq: CD 415 or permission. 4 cr.

614. Fundamentals of Planning

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; CD 415; or permission. (Offered every other year.) Writing intensive. 4 cr.

710. Seminar

Seminars arranged to students' needs and offered as demand warrants: in-depth treatment of area, including classic work. May be repeated. 2 to 4 cr.

#717. Law of Community Planning

Common law and the constitution with respect to property law, including eminent domain, land-use planning, urban renewal, and zoning. Makes the nonlawyer aware of the influence and operation of the legal system in community development. (Offered every other year.) 4 cr.

741. Critical Issues in Solid Waste Management

Overview of the basic issues in managing society's waste, focusing on municipal solid waste and sewage sludge or "biosolids." Issues such as recycling, source reduction, composting, incineration, land spreading, and land filling examined from different disciplines. Five basic modules: agronomy, economics, engineering and hydrology, planning and policy, and social/cultural/ethical issues. Guest speakers from state government, private sector firms, nonprofit and environmental groups, and the New Hampshire legislature featured selectively. Field trips to waste management sites, such as landfills, recycling centers, and composting operations. Prereq: EREC 411 or equivalent; BIOL 412 or equivalent; or permission. (Also offered as RAM 841.) 2 cr.

777. Topics in Community Planning

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: CD 614 or permission. (Also listed as RAM 877.) (Offered every other year.) Writing intensive. 4 cr.

793. Community Administration Internship

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. 1 to 8 cr.

794. Community Planning Internship

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. 1 to 8 cr.

795, 796. Investigations

Special assignments in readings, investigations, or field problems, or teaching experience. May be repeated. Prereq: permission. 2 to 4 cr.

797. Community Administration and Planning Seminar

Selected topics in community administration and in community and regional planning. Focusing 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. 1 to 4 cr.

Computer Engineering

(See *Electrical and Computer Engineering*, page 158.)

Computer Science (CS)

(For program description, see page 58.)

Chairperson: Philip J. Hatcher

Professors: R. Daniel Bergeron, Pilar de la Torre, Ted M. Sparr, Colin Ware

Associate Professors: Robert D. Russell, James L. Weiner

Affiliate Associate Professor: Sylvia Weber Russell

Assistant Professors: Radim Bartos, Michel Charpentier, Alejandro Hausner, Zachary Rubinstein, Elizabeth Varki

Affiliate Assistant Professors: Elise H. Turner, Roy M. Turner

Instructors: Mark L. Bochert, Michael Gildersleeve, Ellen M. Hepp, Brian L. Johnson, Israel J. Yost

401/401H. Computer Applications

Use of computers to manage and analyze information across a variety of settings and disciplines. Introduction to major categories of software for large and small computer systems and discussion of the computer's role in today's society. No prior computer experience required. Significant hands-on work in campus clusters required. Not open to students who have completed DCE 491 or 492. Not open to CS majors. CEPS students should check with their major department for approval. 4 cr.

402. Survey of Computer Science

Exploration of the core concepts of computer science, including computer architecture, operating systems, relationship between hardware and software, communications and networks, and data representation. Programming languages and concepts, algorithm analysis, database systems, graphics and ethics will also be discussed. Not open to CS majors. 4 cr.

403. Online Network Exploration

Introductory course covering basic topics relating to the Internet. Subjects discussed include e-mail, newsgroups, mailing lists, file transfer, telnet, the World Wide Web, Web browsers, search engines, and hypertext markup language (HTML). A large portion of the course focuses on Web publishing. Security and privacy issues, and commerce and legal issues are also discussed. Students are expected to have no previous experience with HTML. They will acquire new skills as well as broad understanding of the technical possibilities of living and working in an online society and its implications. 4 cr.

405. Applications Programming Using Visual Basic I

Introduction to 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. 4 cr.

407. Introduction to Computer Programming with Java

Introduction to the concepts and techniques of computer programming, including basic data structures such as lists, stacks, and queues. The topics include control structures, file manipulation, recursion, and an introduction to graphic user interface design. Introduces object-oriented design and analysis, including class definition and use, inheritance, and polymorphism. Good programming style is stressed. Significant out-of-class programming required. Not open to students who have had CS 410, 412, 415, or the equivalent. 4 cr.

410. Introduction to Scientific Programming

Introduction to 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. 4 cr.

415-416. Introduction to Computer Science I

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. 4 cr.

504. Web Design and Development

Advanced course covering topics related to the design and implementation of complex, interactive presentations for the World Wide Web. Students are expected to have a working knowledge of some programming language. Students will learn how to apply their knowledge of HTML in order to design more effective presentations and how to build upon this knowledge to utilize advanced Web development techniques such as cascading style sheets (CSS), dynamic HTML (DHTML), client-side scripting, and server-side programming. New and emerging Web-related technologies will also be discussed. Prereq: CS 403 and programming course, or permission of the instructor. 4 cr.

506. Applications Programming Using Visual Basic II

Introduction to advanced Visual Basic data structures, objects, and classes, focusing on the component Object Model (COM) and database objects. Topics include fundamentals of relational databases, VB data interface tools, and the SQL database language, as well as the manipulation of objects from other applications and the creation of programmer-defined classes and objects. Prereq: CS 405, or equivalent. 4 cr.

508. Introduction to Data Structures with C++

Introduction to basic data structures including strings, stacks, queues, lists, files, and binary search trees; emphasis on abstract data type (ADT) design and programming techniques. Basic introduction to C++ including nonhierarchical classes, operator overloading, template functions, and template classes. (Not offered for credit if credits received for CS 416.) Prereq: CS 410 (or 407). 4 cr.

509. Network/System Administration

Introduction to 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: CS 402 and a programming course, or permission of the instructor. 4 cr.

515. Data Structures

Review of 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. 4 cr.

611. Assembly Language Programming and Machine Organization

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. 4 cr.

620. Operating System Fundamentals

Introduction to operating system concepts and design. Job, process, and resource management; scheduling; file systems; interprocess communication. Prereq: CS 515 and CS 611 or ECE 612. 4 cr.

#658. Analysis of Algorithms

Introduction to use of basic mathematics in design and analysis of computer algorithms. Topics include O-notation, divide and conquer, the greedy method, dynamic programming, and NP-completeness. Prereq: MATH 531 and 532; CS 515. 4 cr.

659. Introduction to the Theory of Computation

Review of sets, relations, and languages. Induction and diagonalization. Finite automata, context-free languages, pushdown automata. Basic complexity theory. Prereq: MATH 531 and 532; CS 515. 4 cr.

671. Programming Language Concepts and Features

Explores the main features of modern, high-level, general general purpose programming languages from the user (programmer) point of view. Provides students with an opportunity to use nonimperative 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. 4 cr.

696/696W. Independent Study

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. 696W is writing intensive. 1 to 6 cr.

712. Compiler Design

Formal languages and formal techniques for syntax analysis and parsing; organization of the compiler and its data structures; problems presented by error recovery and code generation. Classical topdown and bottom-up techniques currently in wide-spread use, general discussion of LL(k) and LR(k) parsers; automatic methods of compiler generation and compiler compilers. Students required to define a simple, nontrivial programming language and to design and implement its compiler. Pre- or Coreq: CS 671. 4 cr.

#718. Software Engineering

Design approaches, implementation methodologies, and management techniques required to develop large, reliable software systems, including applications-oriented systems. Team programming projects. Prereq: CS 515 or permission. 4 cr.

719. Object-Oriented Methodology

Object-oriented system design and programming. Languages for object-oriented programming. Prereq: CS 671 or permission. Writing intensive. 4 cr.

720. Operating System Programming

Detailed discussion of operating system concepts and features. Practical examples and exercises that utilize advanced operating system features, including interprocess 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 620. 4 cr.

721. Operating System Kernel Design

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. 4 cr.

#722. Advanced Systems Programming

Topics in systems programming. Organization and implementation of typical POSIX 1003.2 utilities and tools. Emphasis on file handling, text processing, pattern matching, and portability. Prereq: CS 620. 4 cr.

724. Distributed Operating Systems

Fundamental concepts, algorithms, and design principles that form the basis of distributed and multiprocessor operating systems. Architectural overview, design, and implementation methodology of several real distributed systems. Prereq: CS 620. 4 cr.

725. Computer Networks

Introduction to local, metropolitan, and wide area networks using the standard OSI Reference Model as a framework. Introduction to the Internet protocol suite and to network tools and programming. Discussion of various networking technologies. Prereq: CS 620. 4 cr.

#727. Computer Communications Software Design

Telecommunications software; error detection algorithms; asynchronous and synchronous communications software; network architectures; protocol definition and implementation; links through a local area network; timing considerations. Selected communications software will be implemented. Prereq: CS 620. 4 cr.

730. Introduction to Artificial Intelligence

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. 4 cr.

735. Introduction to Parallel and Distributed Programming

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 620, 611 or ECE 612; or permission. Writing intensive. 4 cr.

745. Formal Specifications and Verification of Software Systems

Mathematical reasoning can be applied to study the behavior of software systems, an approach that is particularly relevant to safety critical systems. This can be achieved through the description of those systems along with their properties in formally defined, logically based languages. This course introduces techniques relevant to the application of formal specification and verification methods, including formal logic and proof techniques related to program correctness. Prereq: CS 515, MATH 531, 532. 4 cr.

#746. Introduction to Programming Semantics

Informal, nonmathematical introduction to descriptive techniques of denotational semantics. Provides framework needed to formally describe programming languages such as PASCAL. No previous knowledge of the theory of computation or of any particular programming language is assumed. Prereq: CS seniors only or instructor's permission. 4 cr.

760. Introduction to Human-Computer Interaction

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 620. Writing intensive. 4 cr.

#765. Introduction to Computational Linguistics

Introduction to computational analysis of natural language with a focus on semantic representations and the resolution of ambiguity. Provides an elementary working knowledge of linguistic and artificial intelligence analysis methods as motivated by examples of potential input texts. Topics include parsing, formal grammars, representation of knowledge and memory, inference, and interpretation of nonliteral language. Prereq: elementary knowledge of LISP or instructor's permission. 4 cr.

767. Interactive Data Visualization

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. 4 cr.

770/770W. Computer Graphics

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; three-dimensional image synthesis techniques. 770W is writing intensive. Prereq: CS 515. 4 cr.

775. Database Systems

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. Prereq: CS 515, MATH 531. 4 cr.

780. Topics

Material not normally covered in regular course offerings. May be repeated for credit. 4 cr.

Decision Sciences (DS)

(For program description, see page 99.)

Chairperson: A. R. Venkatachalam

Professors: Steven F. Bolander, Barry Shore, Jeffrey E. Sohl

Associate Professors: Roger B. Grinde, R. Daniel Reid, Christine M. Shea, A. R. Venkatachalam, Craig H. Wood

Assistant Professors: Pamila Dembla, Eleanne M. Solorzano, Theophanis Stratopoulos

Instructor: Peter W. Royce

#522. Advanced Business Statistics

A second-level course in statistics covering such topics as sample survey design and analysis, experimental design, analysis of variance, nonparametric methods, and GLIM. Prereq: DS 420 or equivalent. 4 cr.

#624. Time Series Forecasting

Introduction to modern methods of forecasting from time series data. Exponential smoothing, time series analysis and stationarity, Box-Jenkins analysis, state space model fundamentals, dynamic regression models. Each model methodology includes model identification, estimation, and diagnostic checking. Emphasis on use of the models as forecasting tools. Prereq: DS 420 or equivalent. 4 cr.

#625. Statistical Decision Making

Introduction to decision-making theory, including alternatives, criteria, loss functions, and risks. A probabilistic, including Bayesian, approach to decision making under uncertainty. Applications from statistics and management science. Prereq: DS 420 or equivalent. 4 cr.

#626. Applied Regression Analysis

Introduction to regression techniques as used in business; estimation and statistical inference in the context of the general linear model; residual analysis and model selection; interpretation of the analysis is emphasized. No credit for students who have had DS 726. Prereq: DS 420 or equivalent. 4 cr.

630. Quantitative Methods

An introduction to quantitative methods and how these methods serve as input to the decision-making process. The topics covered include linear programming problem foundation and solution, sensitivity analysis, network models, integer programming, goal programming, and forecasting. Prereq: WSBE majors only; all Group A courses and junior standing. 4 cr.

#632. Operations Research/Management Science

Review of the basic principles and methods of operations research/management science applied to managerial decision-making. Mathematical programming, networks, inventory, queuing, and scheduling. Junior or senior standing. 4 cr.

#633. Advanced Operations Research/Management Science

Analysis of complex operations research/management science models and their impact on the decision-making process. Project is undertaken by all students. Advance mathematical programming (nonlinear, parametric linear, stochastic, and dynamic), stochastic inventory models, heuristic programs, and forecasting. Prereq: DS 630 or DS 632 or equivalent. 4 cr.

650. Operations Management

Introduction to planning and analysis of operational problems in the manufacturing and service sectors; strategy standards, capacity, inventory, scheduling, and planning and control systems. Prereq: WSBE majors only; all Group A courses and junior standing. 4 cr.

670. Management Information Systems

Provides students with the background necessary to understand, develop, and use computer-based information systems in organizational environments. Topics include information technology, application software, and management of information resources. Prereq: CS 401 (or 495); WSBE majors only; all Group A courses and junior standing. 4 cr.

#672. Computer Systems Analysis and Design

Analysis and design of computer systems in administration. Applications in finance, accounting, marketing, and manufacturing. Case studies and projects. Prereq: DS 670; or equivalent. 4 cr.

698/698A. Topics

Special topics; may be repeated. Prereq: permission. 4 cr.

754. Resource Management

Analysis and development of resource management planning and control systems. Topics include inventory management, material requirements planning, and capacity management. Prereq: DS 650 or permission. 4 cr.

755. Manufacturing Management

Analysis and development of manufacturing management planning and control systems. Topics include production planning, master scheduling, distribution, and production activity control. Prereq: DS 650 or permission. 4 cr.

758. Strategic Management of Operations

Application of techniques and methodologies in the development of operations strategies. Projects with client firms using operations analysis emphasizing the firms' strategic operations alternatives. Prereq: DS 650 and permission. 4 cr.

#765. Total Quality Management

Integration of management aspects of quality improvement with methodologies and tools for

problem-solving and implementation. Experiential team projects and hands-on in-class exercises are used to supplement and enhance extensive written and video cases, facility tours, and guest speakers. (Also offered as MGT 765.) Prereq: DS 650 and MGT 611 or permission. 4 cr.

#767. Art and Science of Decision Making

Builds from the classical theory of decision-making and explores the problems inherent in the decision process. Both individual and group or two-party decision processes are explored with emphasis on negotiation as a means of decision making. No prerequisite required. 4 cr.

#772. Decision-Support Systems

Exploration of computer usage in support of the problem-solving and decision-making process. Topics include conceptual foundations of decision-support systems, design of decision-support systems, spreadsheets, databases, and expert systems. Use of microcomputers, cases, projects. Prereq: all Group B courses; DS 670; or permission. 4 cr.

798/798A-C. Topics

Special topics; may be repeated. Prereq: permission. 4 cr.

Division of Continuing Education (DCE) Career Concentration Courses

(For program description, see page 125.)

Dean of the Division of Continuing Education: William F. Murphy

519. Career Planning

Skills and methods of career planning, including integration of career and educational goals. Topics include self-assessment, occupational investigation, occupational selection and decision making, goal setting, and job search techniques. Available to associate degree students, freshmen, and sophomores; others by permission. Special fee. 2 cr.

599. Special Topics

Occasional course offerings of specialized material in A.A. career concentrations; general studies topics for nontraditional learners; travel/study programs. Prereq: permission. 1 to 4 cr.

Computer/Information Systems Applications

491. Computer/Information Systems Applications I

Computer hardware and software topics, focusing on applications and the usage of computers to solve a variety of problems. Major categories of software on microcomputers are utilized for demonstrations, discussions, and assignments. No computer experience required. Not open to students who have completed CS 401. Not open to WSBE majors. 2 cr.

492. Computer/Information Systems Applications II

Information system concepts, such as information development, processing, communications, automation, and ergonomics usage examined. Focus of assignments will be using various application software programs from the introductory course, DCE 491, and additional software to solve problems and develop concepts. Prereq: DCE 491.

Not open to students who have completed CS 401. Not open to WSBE majors. 2 cr.

Criminal Justice

552. Corrections Treatment and Custody

Scientific diagnosis and treatment of offenders. Institutional administration methods' climate, personnel, structure, and procedure. (Not offered every semester.) 4 cr.

Merchandising

411. Promotion and Advertising

Mass communication in marketing; use of advertising media; integration of promotional plans and sales techniques; evaluation of promotional efforts. Not open to WSBE majors. 4 cr.

531. Salesmanship

Principles and techniques of personal selling; customer's needs and satisfaction. Not open to WSBE majors. 4 cr.

596. Technical Writing

Students learn to produce both technical and non-technical documents for applications in education, business, industry, and the home. Each student creates small manuals for critique by the instructor and the class. Topics include logical thinking and organization, interviewing skills, technical writing styles and formats, word processing/graphic programs, paste-up, color usage, cover selection/design, interfacing with a print shop, and budget analysis. Prereq: ENGL 401 or 501; CS 401 or DCE 491-492. 4 cr.

Earth Sciences (ESCI)

(For program description, see page 58.)

Chairperson: J. Matthew Davis

Professors: Francis S. Birch, Wallace A. Bothner, S. Lawrence Dingman, Theodore C. Loder III, Larry A. Mayer, Karen L. Von Damm
Research Professors: Janet W. Campbell, Patrick M. Crill, Dork L. Sahagian, Robert W. Talbot, Charles J. Vorosmarty

Affiliate Professors: P. Thompson Davis, Berrien Moore III, Peter J. Thompson, David R. Wunsch

Associate Professors: J. Matthew Davis, Jo Laird

Research Associate Professors: Jack E. Dibb, Stephen E. Frolking, Michael L. Prentice, Larry G. Ward

Affiliate Associate Professor: Barry D. Keim

Assistant Professors: Julia G. Bryce, William C. Clyde, Robert J. Griffin, Joseph M. Licciardi, James M. Pringle

Research Assistant Professor: Cameron P. Wake

400. Freshman Field Seminar

A field introduction for new or prospective majors to New Hampshire's mountains, rivers, estuaries, and beaches. Field excursions (approximately 5) are scheduled on Friday afternoons. Cr/F. 1 cr.

401. Principles of Geology

The Earth; earth materials (rocks and minerals), landforms, and the processes that form them (volcanism, earthquakes, glaciation, etc.). Field trips. Special fee. Lab. Students may not receive credit for both ESCI 401 and ESCI 409. 4 cr.

402. Earth History

Introduction to basic geological principles. Use of case studies to illustrate scientific methods used in reconstructing Earth'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, Pleistocene glaciation, and human origins. Special fee. Lab. 4 cr.

405. Global Environmental Change

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. 4 cr.

409. Environmental Geology

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. 4 cr.

#450. Introduction to the Earth Sciences

Modular course introducing contemporary topics in earth sciences. Each module is approximately 3.5 weeks. Four of the following topics are offered each semester (check *Time and Room Schedule* for current semester offerings): Planetary Geology; Plate Tectonics; Rocks and Minerals; Earthquakes; Water Resources of New England; Springs and Underground Rivers; Evolution of Mountains; Volcanoes; The Global Ocean; The Gulf Stream; Geologic Time; Climate Change; Beaches and Coasts; Prehistoric Life; Energy and the Environment; Geology of Puerto Rico. Additional topics may be available. Special fee. Lab. 1 cr.

501. Introduction to Oceanography

Physical, chemical, geological, and biological processes in the sea. Special fee. Lab. 4 cr.

504. Introduction to Climate

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. 3 cr.

512. Principles of Mineralogy

Natural history of the solid state; introductory crystallography, diffraction, and structure of minerals. Silicate minerals; their chemical and physical properties, origins, occurrences, and uses. Nonsilicates. Prereq: CHEM 401, 403, or 405. Field trips. Special fee. Lab. 4 cr.

530. Field Methods

Standard geological field-mapping techniques, including pace and compass and plane table and alidade; bedrock and surficial mapping on topographic and aerial photographic bases in local areas; one 3- to 4-day exercise in a selected area of the Northern Appalachian Mountains. Prereq: ESCI 401 or 409; 402. Special fee. Writing intensive. 4 cr.

561. Surficial Processes

Processes leading to the development of landforms, chemical and mechanical weathering of earth-surface materials and erosion and transport in colluvial, fluvial, glacial, and coastal systems. Field trips. Prereq: ESCI 401 or permission. Special fee. Lab. 4 cr.

595, 596. Introductory Investigations

Special topics by means of lectures, conferences, assigned readings, and/or field or laboratory work in the areas of geology, hydrology, or oceanography. 1 to 4 cr.

614. Optical Mineralogy and Petrography

Description and classification of igneous, sedimentary, and metamorphic rocks in hand specimen and thin section; optical mineralogy. Prereq: ESCI 512. Special fee. Lab. 4 cr.

631. Structural Geology

Structural units of the Earth's crust and mechanics of their formation. Prereq: ESCI 530. Special fee. Lab and fieldwork. 4 cr.

652. Paleontology

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. 4 cr.

653. Estuaries and Coasts

Examines physical and biological aspects of estuaries and coasts with special regard to sediment transport. Includes field trips and cruises to the coastal environments of New Hampshire and Maine, with follow-up laboratory analyses. A student project is required involving field sampling and oceanographic equipment design, fabrication, and testing. Prereq: ESCI 501; or permission. Special fee. Lab. 4 cr.

658. Principles of Earth, Ocean, and Atmospheric Dynamics

Introduction to the basic elements of kinematics and dynamics, relevant to processes important in earth, ocean, and atmospheric sciences. Review of particle dynamics followed by an introduction to continuum mechanics of the solid earth, hydrologic and environmental fluid systems. Includes biweekly laboratories and homework problem recitation sessions. Prereq: MATH 426, PHYS 407. Lab. 4 cr.

703. Fluvial Hydrology

Mechanics of natural open-channel flows: forces, the continuity and energy principles, velocity distributions, flow resistance, fluvial erosion and sediment transport, channel form, computation of flow profiles, weirs, hydraulic jumps, and streamflow routing. Lab and field exercises. Prereq: one year each of calculus and physics. Special fee. 4 cr.

705. Principles of Hydrology

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. Special fee. Lab. Writing intensive. 4 cr.

#708. Hydrology and Water Resources
Interrelations of hydrologic data and analysis with the environmental, economic, and legal aspects of

water resource management. Examination of local, national, and global water-resource problems. Prereq: ESCI 705; basic statistics; or permission. 3 cr.

710. Groundwater Hydrology

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. 4 cr.

715. Global Atmospheric Chemistry

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. 3 cr.

717. Macro-scale Hydrology I

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.) 4 cr.

718. Macro-Scale Hydrology II

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.) 4 cr.

#725. Igneous Petrology

The evolution of igneous rocks as determined from field, petrographic, chemical, experimental, and theoretical studies. Application of thermodynamics to igneous petrogenesis. Physical properties of magmas. Prereq: mineralogy; petrography; adequate background in calculus, chemistry, and physics. Field trips. Special fee. Lab. (Offered in alternate years with ESCI 726.) 4 cr.

726. Metamorphic Petrology

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, multisystems, 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. 4 cr.

732. Regional Geology and Advanced Structure

Readings, discussion, and field/lab exercises in the tectonic analysis of mountain systems. Emphasis on the northern Appalachian Origin. Application of modern structural analysis. Field excursion. Prereq: ESCI 631 or permission. Special fee. 4 cr.

734. Applied Geophysics

Gravity, magnetic, seismic, and electrical methods of investigating subsurface geology. Fieldwork and use of computers in data analysis. Prereq: ESCI 401; one year of calculus; one year of college physics; or permission. Special fee. Lab. Writing intensive. 4 cr.

741. Geochemistry

Thermodynamics applied to geological processes; geochemical differentiation of the earth; the principles and processes that control the distribution and migration of elements in geological environments; stable and radiogenic isotopes in geologic processes. Prereq: ESCI 512 or permission. 4 cr.

745. Isotope Geochemistry

Discussion of element abundance and isotope formation; radioactive decay as applied to geologic systems, detailed investigation of K-Ar, Rb-Sr, U-Pb, and Sm-Nd systems, and geologic-oceanographic applications of stable isotopes. Lab involves mass spectrometric and chemical techniques of isotopic analysis. Course includes the completion of a laboratory project. Prereq: ESCI 741; or permission. Special fee. Lab. 4 cr.

746. Analytical Geochemistry

Theory, instrumentation, and applications of analytical methods in geochemistry. Prereq: one year of chemistry or geochemistry; or permission. Special fee. Lab. 4 cr.

747. Aqueous Geochemistry

Processes that determine the geochemical characteristics of water bodies. Emphasis on the geochemical continuum of terrestrial water and its geochemical evolution. Topics include the influence of cyclic salts, the nature of weathering reactions, the CO₂-CaCO₃ system, the formation and dissolution of salts and authigenic mineral formulation. Prereq: one year of chemistry or geochemistry; or permission. Lab. 4 cr.

750. Biological Oceanography

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.) 4 cr.

752. Chemical Oceanography

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). 3 cr.

752L. Chemical Oceanography Lab

Optional lab for ESCI 752. Includes short cruise aboard R/V *Gulf Challenger*. Coreq: ESCI 752. Special fee. 1 cr.

754. Sedimentary Rocks and Stratigraphy

Examine observational and interpretative techniques to evaluate sedimentary rocks in their stratigraphic context. The relationship between time, space, and deposition is assessed using a problem-solving approach based on real geologi-

cal examples. Topics such as facies analysis, stratigraphic correlation, and basin analysis provide the framework to interpret the stratigraphic record of earth history. Prereq: ESCI 614 or permission. Special fee. Lab and field trip. 4 cr.

755. Analytical Techniques for Sediments

A laboratory course focusing on applied analytical techniques geoscientists use in sediment sampling; coarse- and fine-grained textural analysis, and some aspects of mineralogical composition. Special fee. Lab. 2 to 4 cr.

#756. Estuarine Sedimentation

Examines all aspects of estuarine sedimentation, from erosion and transportation to deposition. Emphasis on fine-grained estuarine sediments and factors affecting particulate matter transport. Animal/sediment and plant/sediment interactions considered in detail. Includes an in-depth field research project in student's area of interest conducted by graduate students with undergraduate participation at the Jackson Estuarine Laboratory. Subject matter is relevant to students in related disciplines in which animal/plant/sediment relationships are important. Lab. 4 cr.

758. Introductory Physical Oceanography

Descriptive treatment of atmosphere-ocean interaction; general wind-driven and thermohaline ocean circulation; waves and tides; continental shelf and nearshore processes; instrumentation and methods used in ocean research. Simplified conceptual models demonstrate the important principles. Prereq: college physics; ESCI 501; or permission. 3 cr.

759. Geological Oceanography

Major geological features and processes of the ocean floor; geological and geophysical methods; plate tectonics. Prereq: two semesters each of calculus, physics, and geology; or permission. Lab. Writing intensive. 4 cr.

#760. Introductory Dynamic Oceanography

Basic physical laws governing ocean and atmospheric circulation under the influence of Earth rotation, density stratification, and friction. Topics include surface waves, wind-driven and thermohaline ocean circulation, ocean/atmosphere interaction, instabilities, fronts, and climate. Simplified mathematical models demonstrate the important principles. Prereq: college physics and differential equations; or permission. 3 cr.

#762. Glacial Geology

Glacial environment: glacial dynamics and glacial erosion and deposition. Review of world glacial stratigraphy in light of causes of glaciation and climatic change. Field trips. Prereq: ESCI 561 or permission. Special fee. Lab 4 cr.

#763. Glacier Research

Glaciers as proxy indicators of climate change with specific emphasis on the interpretation of physical and chemical time series collected from glaciers. Field and laboratory work used as a tool in the course. Prereq: surficial processes; glacial geology; one year of college calculus; one semester each of college physics and chemistry; or permission. 4 cr.

764. Introductory Paleoclimate Analysis

An overview of paleoclimate indicators for the last one million years in the context of global teleconnections (atmosphere-lithosphere-hydrosphere-cryosphere) and mathematical tools developed to interpret and link the different records of climate change. Prereq: one year calculus, one year chemistry, basic statistics; or permission. 4 cr.

765. Natural Climate Variability

Review of paleoclimate over the last several billion years of Earth history with particular emphasis on paleoclimate indicators and major events. Prereq; permission. Lab. (Offered in alternate years.) 4 cr.

770. Introduction to Ocean Mapping

An introduction to 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. 4 cr.

771. Geodesy and Positioning for Ocean Mapping

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.) 3 cr.

795, 796. Topics

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. 1 to 4 cr.

797. Colloquium

Presentation of recent research in the earth sciences by guest speakers and department faculty. May be taken four times. Cr/F.

799. Senior Thesis

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. Two-semester sequence; IA (continuing course) grade given at end of first semester. May be repeated to a maximum of 4 credits. Cr/F. 1 to 4 cr.

Economics (ECON)

(For program description, see page 99.)

Chairperson: Evangelos O. Simos

Professors: Bruce T. Elmslie, Richard W. England, Evangelos O. Simos, James R. Wible

Associate Professors: Karen Smith Conway, Michael D. Goldberg, Marc W. Herold, Ju-Chin Huang, Neil B. Niman, Torsten Schmidt, Allen R. Thompson

Assistant Professors: Chi-Young Choi, Robert D. Mohr

401/401H. Principles of Economics (Macro)

Basic functions of the United States economy viewed as a whole; policies designed to affect its performance. Economic scarcity, supply and de-

mand, 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. No credit for students who have had ECN 411. 4 cr.

402/402H. Principles of Economics (Micro)

Functions of the 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. Not open to students who have had EREC 411. No credit for students who have had ECN 412. 4 cr.

515. Economic History of the United States

United States economy from colonial times to the present. Models of economic development applied to the United States. How social, political, technological, and cultural factors shape economy; development and influence of economic institutions. Prereq: ECON 401 or 402; or permission. 4 cr.

#518. European Economic History

Western European economics from medieval times to the present. Explanations for differential growth rates and patterns; comparisons among political, social, and economic events. Prereq: Econ 401 or 402; or permission. 4 cr.

605/605W. Intermediate Microeconomic Analysis

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. 605W is writing intensive. Prereq: ECON 402. 4 cr.

607/607W. Ecological Economics

Analysis of efficiency, equity, and growth issues in the economy and their links to environmental quality and natural resources availability. Case studies of global warming, world hunger, etc. Prereq: ECON 401 and 402. 607W is writing intensive. 4 cr.

611. Intermediate Macroeconomic Analysis

Macroeconomic measurement, theory, and public policy determination. Prereq: ECON 401 and 402. 4 cr.

615. History of Economic Thought

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. 4 cr.

#630. Comparative Study of Economic Systems

Analyzes crisis of ideologies, markets, and non-market systems. Swedish capitalism, reform processes of state socialist systems. (Russia, Poland, Hungary), and the centrally planned Cuban economy. Stresses theory, policy, and institutions. Prereq: ECON 401 or permission. 4 cr.

635. Money and Banking

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. 4 cr.

641. Public Economics

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. 4 cr.

642. Health Economics

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.) 4 cr.

645. International Economics

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. 4 cr.

651. Governmental Regulation of Business

Mergers, competition, monopoly, and the regulated industries. Prereq: ECON 402. 4 cr.

653. Law and Economics

This course is an introduction to the field of Law and Economics. It focuses on the legal system and the economic consequences of property, contract, tort, criminal law and mediation. Prereq: ECON 402. Writing intensive. 4 cr.

656. Labor Economics

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. 4 cr.

658. Organizational Economics and Architecture

Organizational economics focuses on issues surrounding the need for coordination in an economy based on the division of labor. The role and function of the market, firm, and other coordinating mechanisms such as the Internet are analyzed in order to understand the role they play in facilitating economic activity. Prereq: ECON 402. Writing intensive. 4 cr.

668. Economic Development

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. 4 cr.

669. Women and Economic Development

Examines the position, roles, and contributions of women in economic development as interpreted through different discourses (feminism, 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. 4 cr.

670. Economics of Energy

The availability and use of inanimate energy resources and their relation to economic activity. Investigates energy demand, energy supply, the relation of energy to economic growth, and energy policy. Prereq: ECON 605 or permission. 4 cr.

680. Economics of Electronic Commerce

This course is an introduction to the new opportunities and challenges posed by the transformation of the Internet into an electronic marketplace. The focus of the course is electronic commerce: the creation and exchange of value between economic agents in an open digital marketplace. 4 cr.

685, 686. Study Abroad

Open to students studying abroad in the discipline as approved by the economics program director. Cr/F. 1 to 16 cr.

#692. International Economic Integration

Systematic analysis of the process and consequences of international integration. Introduction to the theoretical foundations of free trade areas, custom unions, common markets, and economic unions. Comprehensive examination of the historical developments in the formation of major economic blocs, such as the European Union (EU) and the North American Free Trade Area (NAFTA), and evaluation of the growing political and economic relationships between member countries regarding monetary and fiscal integration. Prereq: ECON 401; ECON 402. 4 cr.

695/695W. Independent Study

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. 695W is writing intensive. 2 to 12 cr.

696. Supervised Student Teaching Experience

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. 1 to 8 cr.

698/698A-D. Topics

Special topics. May be repeated. Prereq: permission. Writing intensive. 4 cr.

#707. Economic Growth and Environmental Quality

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. 4 cr.

711. Economic Fluctuations

Recurrent movements of prosperity and depression; emphasis on causes and public policy implications. Prereq: ECON 611; or permission. Writing intensive. 4 cr.

#720. United States Economic History

From colonial times to the present. Applied economic theory; economic models and interpretation of data. Influence of technology, industrialization, foreign trade, monetary factors, and government; non-economic factors. Prereq: ECON 605; ECON 611; or permission. 4 cr.

725. Mathematical Economics

Principal mathematical techniques and their application in economics. Topics covered: matrix algebra, derivatives, unconstrained and constrained optimization, linear and nonlinear programming, game theory, elements of integral calculus. Prereq: permission. 4 cr.

726. Introduction to Econometrics

Introduction to 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: DS 420 or equivalent. 4 cr.

#735. Economics of Financial Markets

Economic analysis of financial market systems. Topics include financial market functions, theories of saving and investment, financial intermediation, flow-of-funds analysis, loanable funds theory, interest rate forecasting, portfolio theory, capital-asset pricing models, structure of interest rates (including term-structure theory), and macroeconomic models of the financial sector. Prereq: ECON 635. 4 cr.

736. Seminar in Monetary Theory and Policy

Contemporary developments in monetary theory and the evaluation of policy measures. Prereq: ECON 635. Writing intensive. 4 cr.

#741. Introduction to Public Policy

Explores the basic issues of public sector economics and emphasizes the use of economic theory in predicting the effects of public policy on individual behavior and the overall economy. Specific topics include market failures, collective decision making, cost/benefit analysis, and an evaluation of tax and transfer programs. 4 cr.

745. International Trade

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. 4 cr.

746. International Finance

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. 4 cr.

747. Multinational Enterprises

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. 4 cr.

#755. Collective Bargaining

Historical development of the U.S. labor movement and the industrial relations system. Contem-

porary collective bargaining issues; the role of public policy in industrial relations. 4 cr.

#756. Labor Economics

Recent developments in labor market analysis and public policies related to contemporary labor issues. Labor supply, the structure and stratification of labor markets, economic discrimination, unemployment and poverty, inflation, and wage-price controls. Prereq: ECON 656. 4 cr.

768. Seminar in Economic Development

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. 4 cr.

795. Internship

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. 1 to 16 cr.

798/798A-B. Economic Problems

Special topics; may be repeated. Prereq: permission of adviser and instructor. Writing intensive. 2 or 4 cr.

799. Honors Thesis

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. 4 to 8 cr.

Education (EDUC)

(For program description, see page 33.)

Chairperson: Todd A. DeMitchell

Professors: Michael D. Andrew, John J. Carney, Todd A. DeMitchell, Ann L. Diller, Susan D. Franzosa, Ann Weaver Hart, David J. Hebert, Barbara E. Houston, David L. Howell, Bruce L. Mallory, Sharon N. Oja
Visiting Professor: Wanda S. Mitchell
Affiliate Professor: Jeanne E. Ormrod
Associate Professors: Eleanor D. Abrams, Grant L. Cioffi, Janet Elizabeth Falvey, E. Scott Fletcher, Virginia E. Garland, Georgia M. Kerns, Barbara H. Krysiak, Ann L. Loranger, Jane A. Nisbet, Joseph J. Onosko, Judith A. Robb, Paula M. Salvio, Thomas H. Schram, William L. Wansart, Dwight Webb
Affiliate Associate Professor: Harry J. Richards

Assistant Professors: Casey D. Cobb, Elizabeth A. Finkel, Mary K. Fries, John F. Hornstein, Ruth M. Wharton-McDonald
Lecturer: Timothy J. Churchard

440. Concepts of Career Exploration

Examines the four major roles of people (as family members, students, workers, and users of leisure time) and how these roles apply to (1) achieving a balanced life; (2) exploring individual areas for improvement; (3) relating present and future

classes to entering the world of work; and (4) developing flexibility for changes that may occur in the future. Special fee. 4 cr.

451. Welding and Fabrication Technology

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. 4 cr.

461. Internal Combustion Engines I

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. 4 cr.

462. Internal Combustion Engines II

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. 4 cr.

470. Residential Electricity

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. 2 cr.

475. Building Science/Residential Construction

The study of 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. 4 cr.

500. Exploring Teaching

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. 4 cr.

501. Occupational Competency Examination and Evaluation

Examination and/or evaluation to determine the level of competency within an occupation. Restricted to adult and occupational education majors. Prereq: permission. Special fee. Cr/F. 30 cr.

506. Service Learning Experiences in Literacy

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. 1 cr.

507. Mentoring Adolescents

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 would meet twice a month for two hours. Additionally, one tutoring session a month would be reserved for a

focus group discussion involving the mentors and their mentees at the school site. 2 cr.

630. Development of Food and Fiber in Third World Countries

The world food situation and the role of agriculture and education in development of third world agrarian systems. Identification of constraints on food production, technology transfer, advantages and disadvantages of different agriculture systems, agricultural marketing, and career opportunities in international agriculture. 4 cr.

#653. Humanities and Education: Society and the Formation of Character

Interdisciplinary modular course examines the manner in which society forms character through custom, laws, and formal institutions. Works by Plato, Rousseau, and Dewey explore if and how we can become educated. Students take three successive 5-week modules during the semester. (Not offered every year.) 4 cr.

694. Courses in Supervised Teaching

Supervised Teaching of Music. Cr/F. Supervised Teaching of Adult and Occupational Education. Cr/F. Supervised Teaching of Mathematics. Cr/F. 8 cr.

700. Educational Structure and Change

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; E) Teacher 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 in Educational Organizations.

Candidates for teacher licensure must take either 4-credit course 700A, or 2 credits each of 700F and 700G. Prereq. for teacher licensure: EDUC 500 and junior status. Prereq. for students not seeking teacher licensure: instructor permission. 2 or 4 cr.

701. Human Development and Learning: Educational Psychology

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. 2 or 4 cr.

703. Alternative Teaching Models

Basic teaching models, techniques of implemen-

tion, 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. 2 or 4 cr.

705. Alternative Perspectives on the Nature of Education

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 chose 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. 2 or 4 cr.

706. Introduction to Reading in the Elementary School

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. 4 cr.

707. Teaching Reading through the Content Areas

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. 2 cr.

710. Youth, Culture, and Society in Comparative Perspective

This course examines lifestyles, social identities, and subcultures of youth in a variety of sociocultural and historical settings. Students will develop an understanding of the conditions that foster the formation of social identity and the emergence of

age-based subcultures. The course explores the relationship between individual and social identity, and between youth subcultures and dominant cultural systems. (Also listed as ANTH 710.) 4 cr.

710A. Concepts of Adult and Occupational Education

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. 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. 4 cr.

710B. Microcommunications

Organization, presentation, and evaluation of microlessons in a variety of educational settings. Preliminary experience and practice in communications. Variables of communicating under controlled conditions with videotaping for immediate feedback. Required for majors and minors. Special fee. Writing intensive. 4 cr.

710C. Youth Organizations

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). 4 cr.

710D. Planning for Teaching

Organization of materials of instruction to meet group and individual needs. Techniques of instruction, planning for teaching, function of consulting committees, working with youth groups, program evaluation. Course scheduled concurrently with EDUC 694. Prereq: Microcommunications or permission. 4 cr.

710E. Workshops in Adult and Occupational Education

Modularized instruction of in-service education. Focus varies with the needs of the student. May be repeated up to 8 credits. 1 to 4 cr.

710F. Investigations

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. 1 to 4 cr.

710G. Field Experience

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. 2 to 16 cr.

710H. Investigations

Topics may include career education, secondary education, post-secondary education, adult education, extension education, exemplary education, cooperative education, disadvantaged and handicapped education, or teaching experience. An opportunity for undergraduate students to address a special problem. Prereq: permission. May be repeated. Cr/F. 2 to 4 cr.

720. Introduction to Computer Applications for Education

Major issues related to classroom computer applications: historical development; computer functioning; methods of instruction, problem solving, educational software development and evaluation, psychological and sociological impact of the computer on children and learning. A practical approach is stressed. Lab. 4 cr.

733. Introduction to the Teaching of Writing

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. 4 cr.

734. Children's Literature

Interpretive and critical study of literature for children in preschool and elementary settings. Methods of using literature with children. 4 cr.

735. Young Adult Literature

Critical study of the fiction and nonfiction genres that constitute literature written for the adolescent reader. Emphasis will be on literary analysis of young adult literature and its pedagogical uses in middle/junior high/high school curriculum. 4 cr.

741. Exploring Mathematics with Young Children

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, and to become adept at asking problem-posing questions. 4 cr.

750. Introduction to Exceptionality

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. 4 cr.

751A. Educating Exceptional Learners: Elementary

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. 4 cr.

751B. Educating Exceptional Learners: Secondary

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. Preparations for students' transitions to post-secondary life will be included. 4 cr.

752. Contemporary Issues in Learning Disabilities

Critical analysis of current and historical conceptions of learning disability in the areas of definition, supporting theories, assessment practice, and teaching methodologies. Focus will be on contemporary issues in the field that relate to working with students labeled as learning disabled at both elementary and secondary levels. 4 cr.

753. Contemporary Issues in Behavioral Disabilities

Nature and scope of emotional and behavioral disabilities in students for elementary through secondary levels. Theoretical perspectives, characteristics, assessment and educational intervention strategies will be included. 4 cr.

754. Contemporary Issues in Developmental Disabilities

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 will be included, with major emphasis on the school-age population. 4 cr.

755. Fostering Social Relationships for Students who Experience Significant Disabilities

This course will focus on the supports students with significant disabilities need in order to have a wide variety of satisfying social relationships. Students will learn to identify and facilitate the factors essential to the development of friendships such as: full inclusion; valued membership and belonging; shared experiences; an effective means of communication understood by everyone; and access to typical school, extra-curricular, and community environments and activities. Additionally, students will learn to identify and mitigate the barriers to friendships, such as: low expectations; devaluing of differences; age-appropriate experiences; and educational practices, such as pull-out and separate special education programs. Students will learn about appropriate relationship supports, especially relating to the facilitation of communicative interactions. 1 cr.

760. Introduction to Young Children with Special Needs

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. 4 cr.

776. Reading for Learners with Special Needs

Techniques and procedures for teaching reading to learners with special needs. Emphasis is placed on providing reading instruction in the least restrictive alternative. 4 cr.

781. Introduction to Statistics: Inquiry, Analysis, and Decision Making

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. 4 cr.

785. Educational Assessment

Theory and practice of educational evaluation; uses of test results in classroom teaching and student counseling; introductory statistical techniques. 4 cr.

791. Methods of Teaching Secondary Science

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. 4 cr.

795, 796. Independent Study

Juniors and seniors only, with approval by appropriate faculty member. Neither course may be repeated. 2 or 4 cr.

797. Seminar in Contemporary Educational Problems

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. 1 to 4 cr.

Electrical and Computer Engineering (ECE)

(For program description, see page 60.)

Chairperson: John R. LaCourse

Professors: Kent A. Chamberlin, Christian P. De Moustier, L. Gordon Kraft, John R. LaCourse, W. Thomas Miller III, Paul J. Nahin, Andrzej Rucinski, Kondagunta U. Sivaprasad

Affiliate Professor: Stuart M. Selikowitz

Associate Professors: Michael J. Carter, Allen D. Drake, Richard A. Messner

Research Associate Professors: David J. Forrest, William H. Lenharth

Affiliate Associate Professor: Charles H. Bianchi

Assistant Professors: Andrew L. Kun, Jianqiu Zhang

Research Assistant Professor: Brian P. Calder

Affiliate Assistant Professors: Raymond J. Garbos, Paul W. Latham II

Senior Lecturer: Barbara D. Rucinska

Instructor: Francis C. Hludik, Jr.

401. Perspectives in Electrical and Computer Engineering

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 introduced in lecture and implemented in a laboratory setting. This course provides a context for the electrical engineering and computer engineering curriculum and introduces students to the profession and the activities of electrical and computer engineering. Two lectures and one computer laboratory per week are required. No prerequisites; ECE majors or permission. Lab. 4 cr.

523. Designing with Programmable Logic

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) design 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 543, ECE 612 or permission. Lab. 4 cr.

537. Introduction to Electrical Engineering

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: MATH 527; PHYS 408. Lab. 4 cr.

541. Electric Circuits

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. Prereq: MATH 426; Pre- or Coreq: PHYS 408. Lab. 4 cr.

543. Introduction to Digital Systems

Fundamental analysis and design principles. Number systems, or 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. 4 cr.

544. Engineering Analysis

Analysis and solution of 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. 4 cr.

548. Electronic Design I

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. 4 cr.

596. Topics in Electrical and/or Computer Engineering

Topics in electrical and/or computer engineering. Prereq: permission. 1 to 4 cr.

603. Electromagnetic Fields and Waves I

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 544 or equivalent. 3 cr.

603H. Electromagnetic Fields and Waves I/Honors

Same topics as ECE 603. Honors students will attend an additional one-hour meeting each week. Prereq: PHYS 408; ECE 544 or equivalent. 4 cr.

612. Computer Organization

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; or permission. Lab. 4 cr.

617. Junior Laboratory I

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. Coreq: ECE 633, ECE 651. Writing intensive. 4 cr.

618. Junior Laboratory II

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, ECE 603. Writing intensive. 4 cr.

633. Signals and Systems I

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 or equivalent. 3 cr.

633H. Signals and Systems I/Honors

Same topics as ECE 633. Honors students will attend an additional one-hour meeting each week. Prereq: MATH 527 or equivalent. 4 cr.

634. Signals and Systems II

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 or permission. 3 cr.

647. Random Processes and Signals in Engineering

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 544. 3 cr.

649. Embedded Microcomputer Based Design

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 will be required to reinforce theoretical and applied concepts in an actual embedded architecture. Prereq: ECE 612 or permission. Lab. 4 cr.

651. Electronic Design II

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. 4 cr.

667/667H. Introduction to Computer Engineering

Electrical and electromagnetic energy relationships and their significance in the design process; wireless data communications; sampled data systems; computer architecture comparisons and tradeoffs. Honors students will engage in additional advanced project work. Prereq: ECE 612, PHYS 408 or permission. Lab. 4 cr.

668/668H. Fundamentals of Computer Engineering

Software engineering principles and practices; computer-aided design and computer-aided engineering methodologies; sampled data systems; computer architecture comparisons and tradeoffs. Honors students will engage in additional advanced project work. Prereq: ECE 612, PHYS 408 or permission. Lab. 4 cr.

681. Teaching Experience

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. 1 cr.

Some 700-level courses are offered subject to adequate student demand. Most 700-level courses require writing reports and giving oral presentations.

704. Electromagnetic Fields and Waves II

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 or equivalent. 4 cr.

711. Digital Systems

Principles and procedures related to the design and implementation of microprocessor-based embedded systems. Topics will include: microprocessor technologies; management of the development cycle; implementation methodologies such as printed circuit boards and system integration; design considerations related to manufacturing and testing of digital systems; and analysis implementation limitations related to electromagnetic noise, grounding/power schemes, timing, device packaging, and heat/power requirements. Students will prototype a digital system using CAD tools, printed circuit board technology, and modern diagnostic/testing procedures and tools. Devices such as microprocessors, microcontrollers, network controllers, data/acquisition/processing units, application specific integrated circuits, and interface logic will be selected for the design projects. Prereq: ECE 667 or ECE 668; or permission. Lab. 4 cr.

714. Introduction to Digital Signal Processing

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; or permission. Lab. 4 cr.

715. Introduction to VLSI

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. Prereq: ECE 667 or ECE 668 or permission. 4 cr.

717. Introduction to Digital Image Processing

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 or permission. Lab. 4 cr.

734. Network Data Communications

Introduces the basic concepts related to data transmission equipment and physical interfaces, data communication protocols, and the Open System Interconnection (OSI) Reference Model. Course material focuses on the physical layer hardware, signaling schemes, protocol packets, computer interfaces, error detection, and signal integrity. Data transmission protocols are covered relative to both wired and wireless networks. The student is introduced to both logical and wide-area networks, and how a networking system is constructed, tested, and managed. Network design and testing exercises reinforce the material presented in course lectures. Prereq: ECE 633 or permission. Lab. 4 cr.

745. Fundamentals of Acoustics

Acoustic wave equation for air; laws of reflection, refraction, and absorption; characteristics and measurement of acoustical sources; human perception of sound, loudness, intensity; microphones; acoustical materials; problems in environmental sound control; ultrasonics; architectural acoustics. Prereq: PHYS 408; MATH 527; ECE 544 or permission. Lab. 4 cr.

757. Fundamentals of Communication Systems

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 or permission. Lab. 4 cr.

758. Communication System Design

Systems 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; or permission. Lab. 4 cr.

760. Introduction to Fiber Optics

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 or permission. Lab. 4 cr.

761. Optical Engineering

First-order imaging optics, thin and thick lenses, aberrations, mirrors, stops, apertures, gratings, prisms, resolution, interferometry, diffraction, ray tracing, design of optical instruments, image evaluation, modulation transfer function, optical system design by computer. Prereq: permission. Lab. 4 cr.

772. Control Systems

Development of advanced control system design concepts such as Nyquist analysis; lead-lag compensation; state feedback; parameter sensitivity; controllability; observability; introduction to nonlinear and modern control. Includes interactive computer-aided design and real-time digital control. Prereq: ECE 634 or permission. (Also offered as ME 772.) Lab. 4 cr.

774. Introduction to Neural Networks

Introduction to theory and application of artificial neural networks. Single- and multi-layer feedforward and recurrent network architectures. Supervised, unsupervised, and reinforcement learning principles. Applications to control and signal processing. ECE majors or permission. 4 cr.

775. Applications of Integrated Circuits

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 nondigital integrated circuit devices. Prereq: ECE 651 or permission. Lab. 4 cr.

777. Collaborative Engineering

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, team 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. 4 cr.

781. Physical Instrumentation

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 or permission. Lab. 4 cr.

784. Biomedical Instrumentation

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, eletromyogram, electroencephalogram, pulse, and temperature. Current research topics, such as biotelemetry, ultrasonic diagnosis, and computer applications. Prereq: ECE 651 or permission. Lab. 4 cr.

785. Underwater Acoustics

Vibrations, propagation, reflection, scattering, reverberation, attenuation, sonar equations, ray and mode theory, radiation of sound, transducers, and small- and large-signal considerations. Prereq: permission. 4 cr. (Also offered as OE 785.)

791/791H. Senior Project I

Provides background for the capstone design experience. Topics include creativity, design methodology, specification development, total quality management, ethics, safety, reliability, aesthetics,

and preparation for oral and written reports. Capstone project selection procedure. Honors students will attend an additional meeting each week and engage in independent and advanced project work. Cr/F. 2 cr.

792/792H. Senior Project II

Continuation of ECE 791. This course requires the completion of the capstone design experience. Honors students will attend an additional meeting each week and engage in independent and advanced project work. Cr/F. 2 cr.

796. Special Topics in Electrical and Computer Engineering

New or specialized courses and/or independent study. Prereq: permission. 1 to 4 credits some sections may use credit/fail grading. 1 to 4 cr.

English (ENGL)

(For program description, see page 37.)

Chairperson: Rochelle Lieber

Professors: Janet Aikins, Elizabeth Jane Bellamy, Thomas A. Carnicelli, Mary Morris Clark, Walter F. Eggers, Burt H. Feintuch, Michael K. Ferber, Lester A. Fisher, Elizabeth H. Hageman, Jane T. Harrigan, Rochelle Lieber, Mekeel McBride, Andrew H. Merton, Thomas R. Newkirk, Susan Schibanoff, Charles D. Simic, David H. Watters

Associate Professors: John M. Archer, Brigitte Gabcke Bailey, Margaret-Love G. Denman, John Richard Ernest, Diane P. Freedman, Cynthia Gannett, Susan Margaret Hertz, James Krasner, Douglas M. Lanier, John S. Lofty, Lisa Watt MacFarlane, Lisa C. Miller, Naomi G. Nagy, Sarah Way Sherman, Sandhya Shetty, Rachel Trubowitz

Assistant Professors: Charlotte M. Bacon, Monica E. Chiu, Robin Hackett, Aya Matsuda, Paul Kei Matsuda, Martin McKinsey, Alexander M. Parsons, Petar Ramadanovic, Siobhan Senior

Before registering, students should see detailed course descriptions printed by the department.

English 401 is a prerequisite for all English courses but 400.

400. English as a Second Language

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. 1 to 16 cr.

401/401H. Freshman English

Training to write more skillfully and to read with more appreciation and discernment. Frequent individual conferences for every student. Special fee. Writing intensive. 4 cr.

401A. Freshmen English for English as a Second Language Students

A special section of Freshmen English 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 401A for credit. Special fee. Writing intensive. 4 cr.

#403. Introduction to the Study of Literature

The art of thoughtfully enjoying various kinds of literature, the substance and language of literature and literary techniques. Writing intensive. 4 cr.

500/500H. Writing about Reading: Writing About Nonfiction

Emphasis on close reading of a variety of nonfiction sources and on intensive writing to develop interpretative skills. Prereq: ENGL 401 or permission. Special fee. Writing intensive. 4 cr.

501/501H. Introduction to Creative Nonfiction

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. 4 cr.

502. Technical Writing

A writing course focusing on effective communication of technical information. Writing of various technical documents, such as business letters, proposals, reports, brochures and web pages. Special emphases on document design usability, visual rhetoric, and the use of technology in writing. Special fee. 4 cr.

503. Persuasive Writing

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. 4 cr.

505/505H. Introduction to Linguistics

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 505.) 4 cr.

511. Major Writers in English

In-depth study and discussion of a few American and/or British writers. Topics and approaches vary depending on instructors. Writing intensive. 4 cr.

#512. Introduction to American Literature

Works of major American writers from Irving to Faulkner, with emphasis on how to adapt and present the material to high school English classes. Open only to English teaching majors. (Not offered every year.) 4 cr.

513/513H. Survey of British Literature

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. Beowulf through 18th century. Writing intensive. 4 cr.

514/514H. Survey of British Literature

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. 4 cr.

515/515H. Survey of American Literature

From the beginning of American literature to the Civil War. Writing intensive. 4 cr.

516/516H. Survey of American Literature

From the Civil War to the present. Writing intensive. 4 cr.

517/517H. Introduction to African American Literature and Culture

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. 4 cr.

518/518H. Bible as Literature

Literature of the Old and New Testaments and the Apocrypha, primarily in the King James version. Writing intensive. 4 cr.

519/519H. Introduction to Critical Analysis

Critical Analysis of fiction, poetry, and drama. Frequent short papers. This course, or 529, is a prerequisite with a minimum grade of C for those intending to declare an English major. Students may not take both ENGL 519 and 529 for credit. Writing intensive. 4 cr.

#520. Literature and the History of Ideas

Interdisciplinary study of literary works as influenced and illuminated by the concepts of philosophers, historians, and scientists. Barring duplication of subject, may be repeated for credit. Writing intensive. 4 cr.

521/521H. Nature Writers

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. 4 cr.

#522. American Literary Folklore

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. 4 cr.

#523. Madness in Literature

How various writers depict insanity, and how they approach the problem of determining what attitudes and what behaviors are truly insane. Emphasis on 19th- and 20th-century works, but works from earlier periods also considered. Euripides' *The Bacchae*, Shakespeare's *King Lear*, Cervantes' *Don Quixote*, Hoffman's *The Golden Pot*, Dostoevsky's *Notes from Underground*, Robbe-Grillet's *The Voyeur*, Nabokov's *Pale Fire*, and other texts. Writing intensive. 4 cr.

#525. Popular Culture in America

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. 4 cr.

529/529H. Writing about Literature

Close reading of poetry, fiction, and drama. Frequent papers. A prerequisite with a minimum grade of C for those intending to declare English

as a major. Students may not take both ENGL 519 and 529 for credit. Writing intensive. 4 cr.

533. Introduction to Film Studies

A survey of the international development of the motion picture from the silent period to the present, emphasizing film's narrative practices. The course 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. Special fee. Writing intensive. 4 cr.

581/581H. Introduction to Postcolonial Literatures in English

Survey of contemporary Asian, African, and Caribbean fiction, drama, travelogues, essays, and poetry from the 1950s to the present. Introduction to political, historical, and cultural contexts within which these forms are produced. Writing intensive. 4 cr.

585. Introduction to Women in Literature

Survey of images of women in literature. Context and approach vary depending on instructor. Writing intensive. 4 cr.

586/586H. Introduction to Women Writers

Survey of women writers. Content and approach vary depending on instructor. Writing intensive. 4 cr.

595/595H. Literary Topics

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. Writing intensive. 1 to 4 cr.

600. English as a Second Language

A course 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. 1 to 16 cr.

605. Introduction to Linguistic Analysis

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 505, or permission. (Also offered as LING 605.) 4 cr.

#607. American Character: Religion in American Thought and Life

Interdisciplinary study of American religious experience and its relationship to other aspects of American culture, taught by a team of three specialists, each in a different discipline: American intellectual and cultural history, American literature, and American church history. Central emphasis on several transforming themes of the 19th century and their effects upon the interplay of religion and society. (Also offered as HIST 607, HUMA 607, and RS 607.) Writing intensive. 4 cr.

608. Arts and American Society: Women Writers and Artists, 1850-present

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 ARTS 608, HIST 608, and HUMA 608.) Writing intensive. 4 cr.

609. Ethnicity in America: The African American Experience in the 20th Century

Team-taught course investigating 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. 4 cr.

610/610H. Regional Studies in America: New England Culture in Changing Times

Team-taught course in 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 ARTS 610, HIST 610, and HUMA 610.) Not for art studio major credit. Writing intensive. 4 cr.

616/616A-D. Studies in Film

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, or permission. Special fee. Writing intensive. 4 cr.

619. Critical Approaches to Literature

Selected methods of literary criticism applied to fiction, poetry, and/or drama with critical approaches varying from year to year. A follow-up of 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 519, 529, or equivalent. Writing intensive. 4 cr.

620. Applied Experience

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 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, and major adviser. This course does not count toward the En-

glish major or minor. May be repeated with permission to a maximum of 8 credits. Cr/F. 1 to 4 cr.

621. Newswriting

Workshops to develop reporting and writing skills. Prereq: ENGL 501 or equivalent; written permission. May be repeated with the approval of the department chairperson. Special fee. Writing intensive. 4 cr.

623. Essay Writing

Intensive writing course emphasizing experimentation with a variety of essay forms. Also reading and discussion of contemporary essays. Prereq: ENGL 501 and written permission of instructor. Special fee. Writing intensive. 4 cr.

625, 626. Writing Fiction

Workshops in the fundamental techniques of fiction writing. Students work is criticized by fellow students; individual conferences with instructor. May be repeated for credit with approval of the department chairperson. Prereq: ENGL 501 or equivalent. Written permission of instructor required for registration. Special fee. Writing intensive. 4 cr.

627, 628. Writing Poetry

Workshop in the fundamental techniques of poetry writing. Class discussion and criticism of poems written by students. Individual conferences with instructor. Prereq: ENGL 501, 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. 4 cr.

630. Poetry

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. 4 cr.

631. Drama

Nature and types of drama illustrated by major English, American, and (translated) European plays. How to read a play. Live and filmed performances studied as available. Writing intensive. 4 cr.

632. Fiction

Modern novels and/or short stories. The way in which fiction communicates its meanings; the tools and methods at the fiction writer's disposal, primarily as they function in individual works. See course descriptions available in department office for further information. (Not offered each semester.) Writing intensive. 4 cr.

649. Studies in British Literature and Culture

Special topics in British studies, varying from year to year. (Not offered every year.) Writing intensive. 4 cr.

650. Studies in American Literature and Culture

Special topics in American studies, varying from year to year. (Not offered every year.) Writing intensive. 4 cr.

651. Comparative Literature

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. 4 cr.

652. Comparative Literature

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. 4 cr.

#655. Chaucer

Study of Chaucer's earlier works in the context of their continental sources and analogues. All readings in translation. Writing intensive. 4 cr.

657/657H. Shakespeare

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. 4 cr.

#680. Early British Drama

A survey of the development of British drama from the Middle Ages to the closing of the theatres in 1642. 4 cr.

#681. Introduction to African American Literatures in English

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. 4 cr.

685. Women's Literary Traditions

Intensive study of themes, topics, and techniques in women's literature. topics vary from year to year. Writing intensive. 4 cr.

#690. Introduction to African American Literature in America

Selected prose, fiction, drama, and poetry. Individual works and historical-cultural background. Course varies from year to year. Writing intensive. 4 cr.

693, 694. Special Topics in Literature

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. 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.) Writing intensive. 4 cr.

695, 696. Senior Honors

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. 4 cr.

697, 698. English Major Seminar

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: a grade of B or better in ENGL 519 or 529, and permission. For details, see course description available in the department office. Writing intensive. 4 cr.

701. Advanced Writing of Fiction

Workshop discussion of advanced writing problems and readings of student's fiction. Individual

conferences with instructor. Prereq: 625, 626, 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. 4 cr.

703, 704. Advanced Nonfiction Writing

Workshop course for students intending to write publishable magazine articles or nonfiction books. Equal stress on research and writing techniques. Prereq: ENGL 621; 722 recommended. Written permission of instructor required. May be repeated for credit with the approval of the department chairperson. Special fee. Writing intensive. 4 cr.

705. Advanced Writing of Poetry

Workshop discussion of advanced writing problems and submitted poems. Individual conferences with instructor. Prereq: ENGL 627, 628, or equivalent; written permission of the instructor. May be repeated for credit with the approval of the department chairperson. Special fee. Writing intensive. 4 cr.

707. Form and Theory of Fiction

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. 4 cr.

708. Form and Theory of Nonfiction

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. 4 cr.

709. Form and Theory of Poetry

A writer's view of the problems, traditions, and structures of poetry. Writing intensive. 4 cr.

710. Teaching Writing

Introduction to the various methods of teaching writing. Combines a review of theories, methods, and texts with direct observation of teaching practices. Writing intensive. 2 or 4 cr.

711. Editing

Emphasis on newspaper editing but principles applicable to magazine and book editing are also covered. Prereq: ENGL 612; permission. Special fee. Writing intensive. 4 cr.

713, 714. Literary Criticism

Major critics from Plato to the present; the chief critical approaches to literature. (Not offered every year.) Writing intensive. 4 cr.

715. Teaching English as a Second Language: Theory and Methods

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. 4 cr.

716. Curriculum, Materials and Assessment in English as a Second Language

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. 4 cr.

717. World Englishes

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 lan-

guage. 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.) 4 cr.

#718. English Linguistics and Literature

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. 4 cr.

719. Sociolinguistics Survey

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: 505 or permission. 4 cr.

720. Journalism Internship

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 621, ENGL 722, permission. Writing intensive. 1 to 16 cr.

721. Advanced Reporting

Students learn advanced techniques for developing story ideas and acquiring information from people and documents. Discussion of legal and ethical issues facing reporters. Prereq: ENGL 621 and written permission. Special fee. Writing intensive. 4 cr.

722. Feature Writing

Students refine interviewing, reporting, and writing techniques. Emphasis on in-depth features. Prereq: ENGL 621; permission of instructor. May be repeated for credit with the approval of department chairperson. Special fee. Writing intensive. 4 cr.

725, 726. Seminar in English Teaching

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. 4 cr.

727. Issues in Second Language Writing

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. 4 cr.

728. Writing Consultation and Assessment

This course 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 the course, each student will undertake a supervised practicum experience in the University Writing Center. Prereq: ENGL 501 or 503. Coreq: supervised practicum experience in the Writing Center. Writing intensive. 4 cr.

#732. Folklore and Folklife

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. 4 cr.

739. American Indian Literature

Close study of traditional and/or contemporary American Indian literature and folklore with historical and cultural background. Writing intensive. 4 cr.

741. Literature of Early America

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. 4 cr.

742. American Literature, 1815-1865

Fiction, nonfiction, and poetry in the period of romanticism, transcendentalism, nationalism. Individual works and cultural background. (Not offered every year.) Writing intensive. 4 cr.

743. American Literature, 1865-1915

Fiction, nonfiction, and poetry in the period of realism, naturalism, industrialism, big money. Individual works and background. Writing intensive. 4 cr.

744. American Literature, 1915-1945

Fiction, poetry, and drama in the period of avant-garde and leftism, jazz age, and Depression. Individual works and cultural background. Writing intensive. 4 cr.

745. Contemporary American Literature

A gathering of forms, figures, and movements since 1945. Individual works and cultural background. Writing intensive. 4 cr.

#746. Studies in American Drama

Topics vary from year to year. Examples: 20th-century American drama; contemporary playwrights; theatricality in American life. (Not offered every year.) Writing intensive. 4 cr.

747. Studies in American Poetry

Topics vary from year to year. Examples: poets of the open road; Pound and his followers; major American poets; contemporary American poetry. (Not offered every year.) Writing intensive. 4 cr.

748. Studies in American Fiction

Topics vary from year to year. Examples: the romance in America; the short story; realism and naturalism; the city novel; fiction of the thirties. Writing intensive. 4 cr.

749. Major American Authors

Intensive study of two or three writers. Examples: Melville and Faulkner; Fuller, Emerson, and Thoreau; James and Wharton; Dickinson and Frost. Writing intensive. 4 cr.

750. Special Studies in American Literature

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. Writing intensive. 4 cr.

751. Medieval Epic and Romance

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. 4 cr.

752. History of the English Language

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. 4 cr.

753. Old English

Introduction to Old English language and literature through the reading of selected poetry and prose. 4 cr.

754. Beowulf

A reading of the poem and an introduction to the scholarship. Prereq: ENGL 753. Writing intensive. 4 cr.

755. Chaucer

Troilus and Criseyde, in the context of medieval continental literature by Boccaccio and other influences. Writing intensive. 4 cr.

756. Chaucer

The Canterbury Tales in its original language. Writing intensive. 4 cr.

758. Shakespeare

A few plays studied intensively. Live and filmed performances included as available. Writing intensive. 4 cr.

759. Milton

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. 4 cr.

#763. Continental Backgrounds of the English Renaissance

Major philosophers, artists, and writers of the continental Renaissance (in translation): Petrarch, Ficino, Pico, Vives, Valla, Castiglione, Machiavelli, Luther, Calvin, Rabelais, Montaigne, Cervantes, Erasmus, and Thomas More, as representative of the early English Renaissance. (Not offered every year.) Writing intensive. 4 cr.

764. Prose and Poetry of the Elizabethans

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. 4 cr.

765. English Literature in the 17th Century

Major writers of the 17th century, including Donne, Jonson, Herbert, Bacon, and Hobbes. (Not offered every year.) Writing intensive. 4 cr.

767. Literature of the Restoration and Early 18th Century

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. 4 cr.

768. Literature of the Later 18th Century

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. 4 cr.

769. English Romantic Period

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. 4 cr.

770. English Romantic Period

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. 4 cr.

771. English Victorian Period

The English Victorian Period-Fiction, nonfiction and poetry from 1832-1900. Money, Science, and Love. Authors include the Bronte's, Dickens, Hardy, Wilde, Tennyson. (Not offered every year.) Writing intensive. 4 cr.

772. English Victorian Period

The English-Victorian Period-Fiction, nonfiction and poetry from 1832-1900. Art, Decadence, and Empire. Authors include the Bronte's, Dickens, Hardy, Wilde, Tennyson. (Not offered every year.) 4 cr.

773. British Literature of the 20th Century

Poets and novelists of the modernist and postmodernist periods. W.B. Yeats, James Joyce, Virginia Woolf, E.M. Forster, D.H. Lawrence, and other modernists. Writing intensive. 4 cr.

774. British Literature of the 20th Century

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. 4 cr.

775. Irish Literature

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.) 4 cr.

#778. Brain and Language

Introduction to neurolinguistics, a study of how language is related to the structure of the brain. Biological foundations of linguistic universals and language acquisition. Examination of evidence from aphasia and from normal language use. Writing intensive. 4 cr.

779. Linguistic Field Methods

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. 4 cr.

780. Drama of Shakespeare's Contemporaries

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. 4 cr.

781. English Drama, 1660-1800

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 nondramatic spectacle, and the political and social significance of drama. Writing intensive. 4 cr.

782. Modern Drama

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. 4 cr.

783. English Novel of the 18th Century

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. 4 cr.

784. English Novel of the 19th Century

Representative novels from among Austen, Scott, Dickens, Thackeray, Emily Bronte, Charlotte Bronte, Trollope, George Eliot, Hardy, and Conrad. Writing intensive. 4 cr.

#785. Major Women Writers

Intensive study of one or more women writers. Selections vary from year to year. Writing intensive. 4 cr.

786. 20th Century British Fiction

Traces the development of the novel from the turn of the century to the present day. Representative novels by Lawrence, Joyce, Conrad, Woolf, West, Forester, Huxley, Waugh, Murdoch, Burgess, and Lessing. Writing intensive. 4 cr.

790. Special Topics in Linguistics

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. 4 cr.

791. English Grammar

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. 4 cr.

792. Teaching Secondary School English

Methods of teaching language, composition, and literature in grades 7-12. Required of all students in the English teaching major. Open to others with permission. Writing intensive. 4 cr.

793. Phonetics and Phonology

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. 4 cr.

794. Syntax and Semantic Theory

Relationship of grammar and meaning as 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. (Also offered as LING 794.) Prereq: a basic linguistics course or permission. Writing intensive. 4 cr.

795. Independent Study

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 16 credits. Writing intensive. 1 to 16 cr.

797, 798. Special Studies in Literature

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. 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. Writing intensive. 2 to 6 cr.

Environmental Engineering (ENE)

(For program description, see page 61.)

Professors: Dale P. Barkey, Russell T. Carr, Michael R. Collins, Ihab H. Farag, Nancy E. Kinner, James P. Malley, Virendra K. Mathur, Palligarnai T. Vasudevan

Research Professor: T. Taylor Eighmy

Associate Professor: Thomas P. Ballesterio

Research Associate Professor: Kevin H. Gardner

400. Environmental Engineering Lectures I

Introduction to the profession, the environmental engineer as planner, designer, problem solver, and interdisciplinary team player; and the goals of the environmental engineering curriculum with the municipal processes emphasis. Lectures by faculty and practitioners. Introduction to computer skills required for environmental engineering. Engineering ethics. Cr/F. 1 cr.

401. Environmental Engineering Lectures II

Introduction to the concept of integrated design and project planning and management in environmental engineering. Field trips to environmental engineering projects. Prereq: ENE 400. Cr/F. 1 cr.

520. Environmental Pollution and Protection: A Global Context

Introduction to environmental science and engineering and the anthropogenic causes of environmental change. Emphasis on 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. 4 cr.

521. Seminar

Introduction to the fundamentals of environmen-

tal and occupational health, water quality modeling, and atmospheric systems and air pollution control. Prereq: ENE 520, MATH 426, CHEM 404, PHYS 407. 1 cr.

608. Industrial Process and Design

Introduction to 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 608.) Writing intensive. 4 cr.

612. Unit Operations Laboratory I

Selected experiments in fluid mechanics, heat transfer, and unit operations, with emphasis on environmental engineering. Writing intensive. 3 cr.

613. Unit Operations Laboratory II

Selected experiments in mass transfer, stagewise operations, thermodynamics, and kinetics with emphasis on environmental engineering. Writing intensive. 3 cr.

643. Environmental Sampling and Analysis

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, ENE 520; or permission. Special fee. Lab. Writing intensive. 4 cr.

645. Fundamental Aspects of Environmental Engineering

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 will participate in a design project that involves an oral presentation and written report. Prereq: CHEM 404, CIE 642, ENE 520; or permission. Writing intensive. 4 cr.

656. Environmental Engineering Microbiology

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 environmental parameters on environmental engineering microbial processes. Laboratories will focus on microbiological methods and laboratory scale biological treatment experiments. Prereq or Coreq: ENE 645; or permission. Special fee. Lab. Writing intensive. 4 cr.

696. Field Experience

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. 1 cr.

697. Internship

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). 2 cr.

709. Fundamentals of Air Pollution and Its Control

The origin and fate of air pollutants. Fundamen-

tals of atmospheric meteorology, chemistry, and dispersion phenomena. Control of air pollutants and the related equipment. Current issues. Prereq: MATH 527; CHEM 404. Lab. 4 cr.

739. Industrial Wastewater Treatment

Engineering consideration of the origin, characteristics, and treatment of industrial wastewater; the theory and application of unit operations unique to the treatment and disposal of industrial wastes. Prereq: ENE 645 or permission. 3 cr.

740. Public Health Engineering

Proper application of environmental engineering and sanitation principles in disease prevention and control is discussed. Special emphasis will be given to rural communities and areas of the world where communicable and related diseases have not yet been brought under control, and to what can happen in the more advanced countries when basic sanitary safeguards are relaxed. Topics covered: vector-borne diseases and control, safe water supply development and treatment, and on-site wastewater disposal systems. Prereq: MATH 425, ENE 520. 3 cr.

742. Solid and Hazardous Waste Engineering

A thorough examination of the problems which exist in hazardous and solid waste management will be presented in terms of the current regulations and engineering approaches used to develop solutions. Topics will 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 will be used throughout the course to highlight key concepts and provide real-world examples. Pre- or Coreq: ENE 645 or permission. 3 cr.

744. Physicochemical Treatment Design

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 or permission. Special fee. Lab. 4 cr.

746. Bioenvironmental Engineering Design

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 or permission. Writing intensive. 4 cr.

747. Introduction to Marine Pollution and Control

Introduction to 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. 3 cr.

748. Solid and Hazardous Waste Design

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 alterna-

tive evaluation, permits, scheduling and economic analysis will be required from each group. Prereq: ENE 742 or permission. Writing intensive. 4 cr.

749. Water Chemistry

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 will be presented. Prereq: CHEM 404 or CHEM 405. 4 cr.

752. Process Dynamics and Control

Dynamic behavior of chemical engineering processes described by differential equations; feedback control concepts and techniques; stability analysis; application in pollution control. Lab. 4 cr.

753. Marine Pollution at Shoals Marine Laboratory

Effects of pollutants in the marine environment discussed from the perspectives of elementary physical and chemical oceanography and biological processes. Covers sources and effects of marine pollutants; oil spill impact and clean-up procedures; ocean outfall disposal; shipboard wastewater treatment; marine disposal of sludge, solid waste, and dredge spoils; and radioactive waste disposal. Hands-on lab exercises test both low-level pristine marine water and high-level saline wastewater for chemical and microbial parameters. Conduct dye current studies. Class participates in the continuing assessment of the environmental impact of the Shoals Marine Laboratory domestic sewage system. Field trips to Seabrook nuclear power plant and State of N.H. oil pollution control unit. Daily and evening lectures, labs, and fieldwork. Prereq: ZOOL 674 or permission. (Not offered for credit if civil or environmental engineering major.) 4 cr.

772. Physicochemical Processes for Water and Air Quality Control

Origin and characterization of pollutants. Controls, including filtration, sedimentation, coagulation and flocculation, adsorption and adsorption. Applied fluid mechanics, mass transfer, and kinetics. Thermal pollution, chemical treatment, oil spills on water, and aeration. Lab. 4 cr.

788. Project Planning and Design

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. 4 cr.

795. Independent Study

A limited number of qualified seniors will be permitted to pursue independent studies under ENE faculty guidance. Seniors may write terminal thesis reporting the results of their investigations. May be repeated. Prereq: permission of ENE faculty member involved. 1 to 4 cr.

797. Special Topics

Advanced or specialized topics not normally covered in the regular course offerings. May be repeated but not in duplicate areas. Prereq: permission. 1 to 4 cr.

Environmental and Resource Economics (EREC)

Department of Resource Economics and Development

(For program description, see page 85; see also course listings under Community Development.)

Chairperson: Alberto B. Manalo

Professors: Lyndon E. Goodridge, John M. Halstead, Bruce E. Lindsay

Associate Professors: Alberto B. Manalo, Douglas E. Morris

Assistant Professor: Kelly L. Giraud

Instructor: Mary Adamo Robertson

Extension Educator: Michael R. Sciabarra

403. World Resources

Overview of status of the world's environmental and natural resources and factors, including social values, customs and preferences, social, cultural and political institutions, population growth, economic growth and development, and government policies that influence people's use of those resources. Emphasizes a global perspective and economic and social dimensions of natural resource use. 4 cr.

411. Environmental and Resource Economics Perspectives

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. 4 cr.

501. Agriculture and Natural Resource Product Marketing

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.) 4 cr.

504. Business Management for Natural Resource Firms

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. 4 cr.

#512. Gulf of Maine Economic Resources

Topics include fisheries management, oil and gas recovery, and ocean minerals mining. Lab and fieldwork will include opportunity to observe and interview those professionally involved in harvesting marine resources in the Gulf of Maine. Offered as a one-week course at the Shoals Marine Laboratory. Prereq: Introductory economics course or permission. (Summers only.) 1 cr.

525. Statistical Methods and Applications

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 student who have completed ADM 430; BIOL 528; ADMN 420; HHS 540; MATH 639; MATH 644; PSYC 402; SOC 502. 4 cr.

572. Introduction to Natural Resource Economics

Introduction to 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. 4 cr.

595, 596. Problems in Natural and Agricultural Resources

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. 2 to 4 cr.

600. Field Experience

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. 1 to 4 cr.

#604. Financial Concepts for Natural Resource Firms

Financial decision theory, risk management, investment analysis, financial statement analysis, and asset appraisal techniques with direct application to agricultural and natural resource firms. Prereq: EREC 504. Lab. 4 cr.

606. Land Economics Perspectives: Uses, Policies, and Taxes

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. 4 cr.

608. Environmental Economics for Non-Economists

This course will examine different aspects of natural resource allocation and protection of environmental quality from an economic standpoint. The course will examine the economic factors which lead to environmental problems such as air and water pollution, the common property problem, and other areas where existing markets do a less than satisfactory job of resource allocation. Economic incentives for alleviating these environmental problems will also be surveyed. Specific topics covered will include benefit cost analysis, valuation of "nonmarket" goods, policy tools which have economic bases, and sustainable development. Where possible, guest lecturers from other disciplines and selected films will be used to present alternative viewpoints and stimulate discussion. Class participation is encouraged and expected. Students completing this course will gain an overview of key issues in environmental economics, and how economics can be used as an aid in policy decisions regarding natural resources. Prereq: EREC 411, ECON 401 or their equivalent

or permission. Does not count toward major requirements for EREC electives. 4 cr.

611. Marine Resource Economics

Economic overview of the marine environment; interactions/ conflicts surrounding this multiple-use resource. Economics of fisheries; marine recreation; offshore facilities; aquaculture; waste disposal. Prereq: EREC 411 or equivalent or permission. (Offered every other semester.) 4 cr.

627. Community Economics

Economic factors affecting community and local government decisions. Emphasis on use of economic theory for decision making and community problem solving. Prereq: EREC 411 or equivalent. 4 cr.

633. Economics of Travel and Tourism

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.) 4 cr.

676. Economics of Water Use and Quality Management

Economics of water use; role of government and policy agencies, water supply and demand, economic impact of water and water quality standards, alternatives in quality management, externalities, and methods of evaluation. Prereq: elementary biological or physical science (or WARM 504); EREC 411 or equivalent. 4 cr.

708. Environmental Economics

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. 4 cr.

710. Seminar

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. 2 to 4 cr.

715. Linear Programming and Quantitative Models

Solving applied economic problems using linear and nonlinear techniques with emphasis on problem specification and interpretation of model results. Unit of analysis includes individuals, firms, or communities as they address contemporary problems dealing with resource allocation, product distribution, and whole-firm organization. Computer applications on both mainframe and personal computers utilized for managerial decision making. Project required. Prereq: permission. Writing intensive. 4 cr.

756. Rural and Regional Economic Development

Concepts and methods of delineating regional economies, methods of measuring activity, regional development, and public policies. Emphasis on empirical research studies. Prereq: intermediate economic theory or permission. Writing intensive. 4 cr.

775. Research Methods

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. 4 cr.

795. Investigations

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. 2 to 4 cr.

799. Senior Thesis/Honors

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. 4 cr.

European Cultural Studies (ECS)

(For program description, see page 38.)

400. Europe

ECS 400 is the introductory course for the European Cultural Studies major. The course outlines the general patterns of change and explores some of the local themes and variations in different parts of Europe. Students will become aware of the social, political, literary, artistic and cultural issues that contributed to Europe's identity formation. Special fee. 4 cr.

500. Proseminar

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. 4 cr.

799. Senior Thesis

In this course students will work with their advisers and peers to formulate their topic, consider appropriate approaches, locate relevant resources, and write a thesis. The course will culminate in the defense of the thesis before a committee of three ECS faculty members. Prereq: ECS 500. Writing intensive. 4 cr.

Family Studies (FS)

(For program description, see page 70.)

Chairperson: Kristine M. Baber
Associate Professors: Kristine M. Baber, Elizabeth M. Dolan, Barbara R. Frankel, Larry J. Hansen, Michael F. Kalinowski, Kerry Kazura, Victor R. Messier
Assistant Professors: Soyeon Park, Corinna Jenkins Tucker
Instructor: Roberta L. White

525/525H. Human Development

Developmental information from conception through death; theoretical perspectives and research methods in human development; emphasis on student's communication and analytical skills. 4 cr.

545. Family Relations

Theories and research relating to the family and its role in individual development. 4 cr.

553. Personal and Family Finance for Family Life Professionals

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. 4 cr.

#555. Management and Decision Making

Theories of management, information processing, and decision making in the allocation of resources. 4 cr.

623. Developmental Perspectives on Infancy and Early Childhood

Integrative view of the developing child from conception through childhood within the family context. Prereq: FS 525. 4 cr.

624. Developmental Perspectives on Adolescence and Early Adulthood

Developmental information from pubescence through early adulthood; the concept of identity and influences on identity formation. 4 cr.

635. Teaching and Learning in Early Childhood Settings

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. 4 cr.

641. Parenting Across the Life Span

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. 4 cr.

653. Family Economics

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. 4 cr.

695. Independent Study

Scholarly project in the area of child, family, and consumer studies. Regular conferences with supervising faculty required. Prereq: approval of departmental faculty. 1 to 6 cr.

697. Special Topics

Focused examination of a particular theoretical, methodological, or policy issue. May be repeated. Prereq: permission. Writing intensive. 1 to 6 cr.

707. Practicum

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. Cr/F. 1 to 6 cr.

708. Advanced Nursery School Practicum

Supervised position within the UNH Child and Family Center nursery school programs: A) Videotape assistant; B) Assessment assistant; C) Toddler program assistant; D) Assistant for three-

five-year-olds. May be repeated up to a total of 8 credits. Prereq: FS 623; 635; permission. Special fee. Cr/F. 1 to 6 cr.

709. Advanced Child Development Practicum

Supervised positions within the UNH Child Study and Development Center child care programs: A) Videotape assistant; B) Assessment assistant; C) Infant assistant; D) Toddler assistant; E) Assistant for three- to five-year-olds; F) Kindergarten assistant; G) Health issues assistant. May be repeated up to a total of 8 credits. Prereq: FS 525; 623; 635; or permission. Special fee. Cr/F. 1 to 6 cr.

710. Community Internship

Supervised position in community early childhood settings. A) Infant-toddler assistant; B) Preschool-child care assistant; C) Kindergarten assistant. May be repeated up to a total of 8 credits. Prereq: permission. Cr/F. 1 to 6 cr.

733. Supervising Programs for Young Children

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.) 4 cr.

734. Curriculum for Young Children

Designing and implementing developmentally appropriate activities for young children; assessing the effectiveness of activities; evaluating materials and equipment. Prereq: FS 525; 623; 635; permission. (Spring semester only.) Writing intensive. 4 cr.

743. Families, Schools, and Community

Designed to emphasize the critical value of effective family-school-community partnerships in enhancing the education of young children. The literature assessing the interactive nature of the parent and school resources with cultural influences is examined. Current models of family-school-community partnerships are explored. Students will participate in parent/school/community activities within early childhood education centers and schools. Prereq: permission. Writing intensive. 4 cr.

746. Human Sexuality

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. Prereq: permission. 4 cr.

750. Contemporary Issues in Adolescent Development

This seminar focuses on contemporary adolescents and their development within the contexts of families, schools, and the larger community. The course will familiarize students with major theoretical perspectives regarding adolescent development and provide an overview of current research on critical issues facing adolescents, their parents, and professionals who work with adolescents. Problems and risks will be addressed, but the major emphasis will be on maximizing strengths and opportunities. 4 cr.

757. Race, Class, Gender, and Families

This seminar explores the intersection of race, class, and gender in family life in the United States. Theory, research, and other relevant literature 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. 4 cr.

760. Family Programs and Policies

Analyses 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. 4 cr.

771. Observation and Assessment of Young Children

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.) 4 cr.

772. International Approaches to Child Advocacy

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. 4 cr.

773. International Perspectives on Children and Families

An investigation of historical and modern conceptions of children and families in selected African, Asian, European, and Latin countries. Emphasis will be placed on the contribution of these populations to the changing ethnic portrait of America. Prereq: seniors only; permission. Writing intensive. 4 cr.

782. Family Internship

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. Coreq: FS 792, 760. Cr/F. IA (continuous grading). 6 cr.

785,786. Seminar for Student Teachers

These seminars supplement the student teaching experience and effect a transition to the profession of teaching for those students admitted to the early childhood certification option. 2 cr.

788. Student Teaching Young Children

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. 8 cr.

792. Family Internship Seminar

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 pro-

gram; permission. (Fall and spring semester.) IA (continuous grading). Writing intensive. Coreq: FS 782. 2 cr.

794. Families and the Law

Exploration of laws effecting families and the interaction of family members with each other and with society. Prereq: FS 545; permission of the instructor. 4 cr.

797. Advanced Special Topics

Highly focused examination of a particular theoretical, methodological, or policy issue. Prereq: permission. Writing intensive. 1 to 6 cr.

799. Honors Senior Thesis

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. 2 to 4 cr.

French (FREN)

Department of Languages, Literatures, and Cultures

(For description of courses, see page 186. For program description, see LLC/French, page 41.)

Genetics (GEN)

(For program description see pages 80 and 88.)

Professors: Ann C. Bucklin, Clyde L. Denis, Thomas P. Fairchild, Thomas D. Kocher, J. Brent Loy, Subhash C. Minocha, Robert L. Taylor, Jr., Robert M. Zsigray

Associate Professors: John J. Collins, Thomas M. Davis, Anita S. Klein, G. Eric Schaller, William K. Thomas, Louis S. Tisa

Assistant Professor: Estelle M. Hrabak

#702. Genetics Lab

An experimental approach to understanding the fundamental principles of heredity. Theoretical aspects of genetics hypothesis testing, data analysis, and techniques of isozyme and DNA electroporesis and polymerase chain reaction (PCR). In lab, students conduct mating and mutagenesis experiments with plants, animals, and yeast; do human DNA fingerprinting; and employ techniques of DNA isolation, electrophoresis, PCR, cytogenetics, and statistical analysis to generate and interpret genetic data. Prereq: BIOL 604 or equivalent. Special fee. (Also offered as BIOL 702.) 4 cr.

705. Population Genetics

An exploration of the forces affecting the frequency and distribution of allelic variation in natural populations. The relative role of mutation, selection, random drift and inbreeding and structuring genetic variation. Quantification of the genetic structure of populations. Prereq: BIOL 604. (Also offered as ZOOL 705.) Special fee. Lab. (Not offered every year.) 4 cr.

706. Human Genetics

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. Prereq: BIOL 603 or ANSC 612. (Not offered every year.) (Also offered as ANSC 706.) 3 cr.

711. Genomics and Bioinformatics

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 of a range of bioinformatics approaches—the computer applications used in genome analysis. Prereq: BIOL 604. (Also offered as BCHM 711 and MICR 711.) Lab. 4 cr.

715. Molecular Evolution

Rates and patterns of evolutionary change in biomolecules. Forces affecting the size and structure of genomes. Molecular mechanisms of organismal evolution. Emphasis on integrating evidence from biochemistry, molecular genetics and organismal studies. Methods for reconstructing phylogeny from molecular sequences. Prereq: BIOL 604. Some knowledge of statistics is recommended. (Also offered as ZOOL 715.) Special fee. Lab. (Not offered every year.) 4 cr.

723. Quantitative Genetics

Analysis of continuous variation in populations simultaneously segregating at multiple loci. Genetic and nongenetic factors and the complex interactions between them. Models and methods of analysis, for both theoretical and practical applications. Prereq: BIOL 604; BIOL 528 strongly suggested. (Also offered ZOOL 723.) Special fee. Lab. (Not offered every year.) 4 cr.

753. Cytogenetics

Chromosome structure, function, and evolution. Eukaryotic genome organization. Theory of, and laboratory techniques for, cytogenetic analysis in plants and animals. Prereq: BIOL 604. Special fee. Lab. (Also offered as PBIO 753. Not offered every year.) 4 cr.

754. Laboratory in Biochemistry and Molecular Biology of Nucleic Acids

Application of modern techniques to the analysis of biomolecules, with an emphasis on nucleic acids; includes DNA isolation and analysis, cloning, sequencing, and analysis of gene products. No credit if credit has been received for MICRO 704. Prereq: BCHM 658/659; 751, or permission. (Also offered as BCHM754 and PBIO 754.) Special fee. Not offered every year. Writing intensive. 5 cr.

766. Environmental Genomics

Environmental genomics uses existing and developing high throughput genomic-scale technologies to investigate ecological and evolutionary theory, and so provides a more complete understanding of how organisms respond to environmental change at the molecular genetic level. Course covers an array of systems involved in this emerging field, with the central aim of understanding the effects of environmental change on genome structure, gene expression, and adaptive evolutionary change. Prereq: BIOL 604. (Also offered as BCHM 766.) 4 cr.

771. Molecular Genetics

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: BCHM 658 or 751; BIOL 604; or permission. (Also offered as BCHM 771.) 4 cr.

772. Evolutionary Genetics of Plants

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: DNA techniques, sequence analysis programs, phylogenetic trees. Special fee. Prereq: BIOL 604 or equivalent; PBIO 412 or BIOL 411/412 or equivalent. (Also offered as PBIO 772.) 4 cr.

774. Plant Biotechnology and Genetic Engineering

Plant transformation and regeneration, gene isolation and identification, structure and regulation of plant genes, current applications of plant genetic engineering, environmental and social implications. Prereq: BIOL 604 or permission. (Also offered as PBIO 774.) 3 cr.

775. Plant Biotechnology and Genetic Engineering Lab

Techniques for genetic transformation and selection of plants, analysis of foreign gene expression, and plant cell and tissue culture. Coreq: PBIO or GEN 774. (Also offered as PBIO 775.) Special fee. (Not offered every year.) 2 cr.

782. Developmental Genetics

The molecular genetic basis of metazoan development. Focuses on how genes direct the process and how this problem is analyzed in model organisms using molecular genetic approaches. Topics include: control of cell division, maternal factors, cell-cell interactions, and differential gene expression. Prereq: BIOL 604; BCHM 658 or 751. (Also offered as BCHM 782. Not offered every year.) 3 cr.

795. Investigations

Independent Study/Research in various areas of genetics. A) Transmission Genetics; B) Molecular Genetics; C) Population and Quantitative Genetics. Prereq: permission. May be repeated to a maximum of 4 credits. 1 to 4 cr.

Geography (GEOG)

(For program description, see page 38.)

Chairperson: Alasdair D. Drysdale

Professor: Alasdair D. Drysdale

Associate Professor: Barry D. Keim

Assistant Professor: John B. Strait

401/401H. Regional Geography of the Western World

Major culture areas of the Western world and the unique interaction of human and physical phenomena that produces the distinctive character of these areas. Emphasis on the manner in which people of different cultures have made use of the opportunities and solved the problems existing in the major regions occupied by Western culture: Europe, Russia, the Americas, and Australia and New Zealand. 4 cr.

402/402H. Regional Geography of the Non-Western World

Major culture areas of the non-Western world and the unique interaction of human and physical phe-

- nomina that produces the distinctive character of these areas. Emphasis on 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. 4 cr.
- 473. Elements of Weather**
Basic principles of weather phenomena and the physical processes underlying these phenomena. Emphasis on weather patterns of New England. Lab. 4 cr.
- 512. Geography of Canada**
Examines the natural and human landscapes of Canada from both a topical and regional perspective. Emphasis will be placed on understanding the national character and regional uniqueness of this country, as well as its role in the world. 4 cr.
- 513. Geography of the United States**
Geographical diversity of the U.S.: its physical setting, historical development, and contemporary spatial organization. Distinctive character and problems of major American regions; recent changes in economic, demographic, and social conditions. (Not offered every year.) 4 cr.
- #514. Geography of Canada and the United States**
Historical and regional geography of Canada and the United States. Geographical diversity of the two countries; the development of distinctive culture regions; physical setting; resource base; settlement; population growth; economic development. Contemporary issues and problems. The particular relationship between the two countries. 4 cr.
- 520. Geography of Latin America and the Caribbean**
Explores a broad geographical understanding of Latin America and the Caribbean as a distinct region of the world. The course will incorporate discussions focusing on both the physical and human geography of the region, as well as on selected regional problems and issues. 4 cr.
- #531. Geography of Western Europe and the Mediterranean**
Regional and topical analysis of Western Europe and the Mediterranean. The geographical diversity of Europe in the context of physical setting and historical development. Present-day problems. (Not offered every year.) 4 cr.
- 540. Geography of the Middle East**
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.) 4 cr.
- 541. Geography of Japan**
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. 4 cr.
- 545. Geography of Southeast Asia**
Spatial similarities, differences, and interrelationships between places and peoples will be explored within the states of the region. Emphasis on the cultural, demographic, political, and economic expressions in these places and the complex blending of ethnicity and policy, cooperation and disassociation. 4 cr.
- 570. Climatology**
General survey of climate classification and the geographical distribution of climate types, interpretation and applications of climate data, and climate change over geologic time and issues of global warming. (Not offered every year.) 4 cr.
- 572. Physical Geography**
Basic principles underlying the study of landforms. Emphasis is place on their spatial distribution and the processes that shape the landscape. May be repeated. Special fee. (Not offered every year.) 4 cr.
- 573. Biogeography**
The course 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. The course will give equal emphasis to ecology (biomes, climates, soils), evolution (migration, speciation, dispersal), and applied biogeography and plant geography. 4 cr.
- 581. Human Geography**
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. 4 cr.
- 582. Economic Geography**
Investigation of 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. 4 cr.
- 583. Urban Geography**
Spatial structure of cities and the city system. Emphasis on 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.) 4 cr.
- 584. Political Geography**
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. 4 cr.
- 585. Social Geography**
Introduces and explores the field of social geography, or the study of human spatial behavior and the derived geographical patterns from the point of view of society. Focuses on the geographical or spatial dimensions of our population's symbolic interactions, including thematic considerations of spatial behavior as a form of social interaction and the ways that social and geographical systems of identity operate together. (Also offered as SOC 585.) 4 cr.
- 590. Introductory Cartography**
Map design, usage, and production; uses a broad range of map sources (aerial photography, remote sensing, geographic information systems, and traditional maps) as a basis for discussion. Includes several sessions using desktop mapping tools, as available. 4 cr.
- #610. Geography of New England**
The distinctive physical setting of New England, its settlement and development during the past three centuries, and the present-day problems and opportunities of the region. One Saturday field excursion near end of term. Special fee. (Not offered every year.) 4 cr.
- 658. Introduction to Geographic Information Systems**
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. Permission. (Also offered as NR 658.) 4 cr.
- 673. Environmental Geography**
Survey of the interactions between humans and earth's physical environments. Attention focused on the geographical distribution of environmental problems. Topics include resource utilization, economic factors, population growth, food supplies, and air and water pollution. (Not offered every year.) 4 cr.
- 685. Geography of Population and Development**
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. 4 cr.
- 686. World Economy and Globalization**
Emphasis is on the spatial development of the world economy and the evolution into today's "globalized" economy. Topical emphasis will include the processes of global economic production changes, the role of transnational corporations, and the role of the state in globalization. 4 cr.
- 757. Photo Interpretation and Photogrammetry**
Practical and conceptual presentation of techniques for using remote sensing, specifically aerial photographs, in natural resources. Includes photo measures of scale, area, parallax and object heights; flight planning; photo geometry; an introduction to the electromagnetic spectrum; and photo interpretation and mapping. Concludes with an introduction to digital remote sensing including multi-spectral scanners, radar, and thermal imagery and a brief discussion of geographic information systems (GIS). Applications to forestry, wildlife, land-use planning, earth sciences, soils, hydrology, and engineering. Prereq: algebra. Special fee. Lab. (Also listed as NR 757.) 4 cr.
- 759. Digital Image Processing for Natural Resources**
Introduction to practical remote sensing including multi-spectral 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 application. Use of ERDAS

image processing software. Knowledge of PCs and DOS required. Prereq: GEOG 757 or equivalent and permission. (Also listed as NR 759.) 4 cr.

760. Geographic Information Systems in Natural Resources

Introduction to 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.) 4 cr.

795. Special Project

Readings, library, archival, and fieldwork. Primarily for geography seniors. Prereq: permission. 2 or 4 cr.

796. Special Topics

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. 4 cr.

#797. Seminar

Exploration of geography as a research discipline. Definition and investigation of research problems. Primarily for geography seniors. 4 cr.

Geology

(See *Earth Sciences*, page 152.)

German (GERM)

Department of Languages, Literatures, and Cultures

(For descriptions of courses, see page 187. For program description, see LLC/German, page 42.)

Gerontology (GERO)

(For program description, see page 102)

Adviser: Elizabeth L. Crepeau

600. Introduction to Gerontology

Introduction to the study of normal aging and to the applied practice of service to the elderly. Primarily for minors but open to other students. Writing intensive. 4 cr.

795. Independent Study

Practical experience with elderly populations under supervision of designated faculty. 4 cr.

Greek (GREK)

Department of Languages, Literatures, and Cultures

(For descriptions of courses, see page 188. For program description, see LLC/Greek, page 42.)

Health and Human Service, School of (HHS)

(See *School of Health and Human Services*, page 69.)

450. Making Babies: Technology, Nature, and Social Context

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 will be explored. 4 cr.

510. AIDS: Health, Ethics, and Social Agenda

AIDS has become one of the most important health issues of our time. This course explores the medical, policy, financial, and ethical issues raised by society's efforts to respond to this "crisis". (Also offered as INCO 404S.) Writing intensive. 4 cr.

540. Statistics for Health and Human Service Professionals

A conceptual and analytical approach to the use of statistics in the health and human service professions. Emphasis on 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 639, 644; PSYC 402; SOC 502. Special fee. 4 cr.

698. Special Topics

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; I, M-Z) Interdisciplinary. Prereq: permission. Cr/F. 1 to 4 cr.

740. Collaborative Services for Children with Special Needs

Teachers and therapists need to collaborate to provide quality services for children and youth when working in a school setting. Designed for students in any professional area who plan to work with children, this course focuses on team development to plan integrated education and related services for children with a variety of special needs including autism/PDD, ADHD, learning disability, cerebral palsy, speech and language disorders, and multiple disabilities. Students will learn team development skills, how to collaborate with other professionals to write an IEP and provide services, and how to address needs frequently seen in common pediatric conditions. Prereq: junior level or above. 4 cr.

798. Special Topics

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; I, M-Z) Interdisciplinary. Prereq: permission. 1 to 4 cr.

Health Management and Policy (HMP)

(For program description, see page 71.)

Chairperson: John W. Seavey

Professors: James F. McCarthy, Jeffrey Colman Salloway, John W. Seavey, Lee F. Seidei, Robert S. Woodward

Associate Professors: Marc D. Hiller, James B. Lewis

Research Associate Professor: Michele R. Salloway

Research Assistant Professor: Tamara A. Martin

Instructor: Robert J. McGrath

400. Introduction to Health Management and Policy

Acquaints students to the administrative roles, functions, settings, and professional expectations of health management professionals. Provides an overview of health care organizations and services. Students visit selected health care organizations and talk with professionals. 2 cr.

401/401H/401W. United States Health Care Systems

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. 4 cr.

402. Health Management and Policy Critical Issues

The roles, functions, settings, and professional expectations of Health Management Professionals. The course includes an exploration of key topic areas of health management and policy, including financing the health care system, the public health system, and function, the political process, as well as current areas of interest. Prereq: HMP 401 major or permission. Coreq: HMP 501. 4 cr.

430. Alternative Medicine and Health

An overview of several systems of medicine and health that employ a framework different from industrialized Western medicine for understanding the nature and causes of disease and approaches to treatment. To better understand the validity or legitimacy of alternative systems, we will also examine current research on the outcomes, effectiveness and efficacy of the various systems. 4 cr.

501. Epidemiology and Community Medicine

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. Special fee. Lab. 4 cr.

505. Public Health: History and Practice

The main purpose of this course is to blend a broad overview of the historical development of public health with important areas of contemporary public health practice. The course traces the history and practices of public health from classical times, through the Middle Ages, the Renaissance, and European Enlightenment. Special emphasis is placed on the historical evolution, development, and future of public health in the United States. The latter includes the organiza-

tion of public health in the U.S., its major functions and practices, its infrastructure, its programs and services, and its future challenges. 4 cr.

569. Human Behavior and the Public Health

This course 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. 4 cr.

600. Special Topics

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. 1 to 4 cr.

621. Pre-practicum Seminar

Preparation for field practicum experience, orientation to experiential learning and competency development. Prereq: major. 2 cr.

622A-C. Field Practicum

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. 622A, Field Practicum in Organizational Analysis: analysis of assigned health care agency, from external and internal viewpoints. Coreq: 622B; 622C. Cr/F. 622B, Field Practicum in Management Skills Development: development of the basic quantitative and interpersonal skills required for a health services manager. Coreq: 622A; 622C. Credit/Fail. 622C, Field Practicum in Project Analysis: demonstration of knowledge and analysis of specific problem-solving skills required during internship. Coreq: 622A; 622B. Cr/F. 1 cr.

624. Post Practicum Seminar

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. 2 cr.

630. Health Issues Seminar I

Discussion of current issues in the field of health management, health policy and public health. Prereq: major or permission. 1 cr.

631. Health Issues Seminar II

Discussion of current issues in the fields of health management, health policy and public health. Prereq: major or permission. 1 cr.

642. Health Economics

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.) 4 cr.

710. Financial Management for Clinicians

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. 4 cr.

711. Health Systems Research I

This course introduces students to intermediate techniques for data manipulation and analysis for the health care field. The course also introduces methods for survey research and large data set manipulation and analysis. There will be a lab section utilizing a statistical software package where students will perform tasks from a large national data set. Prereq: introduction to statistics. Special fee. 4 cr.

712. Health Systems Research II

This course introduces students to decision science and applies decision making to health systems. It teaches the techniques of health care management, epidemiological analysis, and policy analysis as they relate to the decision making process. There will be a lab section with applied exercises. Prereq: HMP 711. Lab. Special fee. 4 cr.

721. Managing Health Care Organizations

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. 4 cr.

723. Health Planning

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. 4 cr.

730. Managed Care

This course provides an overview of managed care and includes such topics as: 1) The types of managed care organizations and their historical development; 2) The health care delivery system and reimbursement; 3) Medical management; 4) Operational management in managed care; 5) Managed care in the public sector; and 6) Regulation and managed care. 4 cr.

#734. Health Law

Concepts and principles of law as these affect medical and administrative decision making in health care institutions and the ability to discern issues that warrant advice and/or assistance of legal counsel. Topics covered include corporations and antitrust, property law, patients' rights under law, and malpractice. Prereq: major or permission. 4 cr.

740. Health Care Financial Management

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. Special fee. 4 cr.

742. Strategic Management for Health Care Organizations

Application of managerial methods involving financial, marketing, and operational analysis to health management. Case studies. Prereq: major or permission; HMP 740. Lab. Special fee. 4 cr.

744. Ethical Issues in Health Management and Medicine

Ethical theories and decision-making models; patients' rights and professional responsibilities; social justice and resource allocation; critical issues facing clinicians, managers, and health policy makers; managerial versus medical care conflicts. Prereq: major or permission. Writing intensive. 4 cr.

746. Health Policy

Analysis of the public policy process, the development of health policies in the United States, and discussion of specific health policy issues. Prereq: major or permission. 4 cr.

748. Health Policy Analysis

Public policy outputs analyzed for effectiveness, efficiency, and equity, focusing on public policies in the United States. Prereq: major or permission. Lab. Special fee. 4 cr.

#750. Comparative Health Care Systems

Analysis and comparison of world health problems and delivery systems using nations with different cultures, political and economic systems, and stages of economic development. Methods for developing and evaluating health care systems. 4 cr.

#755. Long Term Care Management and Policy

Analyzes significant contemporary management and public policy issues associated with the aging population and the continuum of long-term care in the United States. Emphasis on costs associated with and approaches to financing, accessibility, delivery, and quality of home-based, community-based, and institution-based health care services. Prereq: major or permission. 4 cr.

796. Independent Study

In-depth study with faculty supervision. Prereq: permission of major adviser and faculty in the area concerned. 2 to 4 cr.

798H. Honors Project/Research Design

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. 2 cr.

799H. Honors Project/Research

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. 4 cr.

History (HIST)

(For program description, see page 39.)

Chairperson: J. William Harris

Professors: Jeffrey M. Diefendorf, Ellen Fitzpatrick, David Frankfurter, Cathy A. Frierson, Jan V. Golinski, J. William Harris, Francis D. McCann, Jr., Robert M. Menzel, Janet L. Polasky, Harvard Sitkoff

Affiliate Professors: Stephen H. Hardy, Laurel Ulrich, William R. Woodward

Associate Professors: Funso Afolayan, W. Jeffrey Bolster, Kurk Dorsey, Eliga H. Gould, Yan Lu, Gregory McMahon, Lucy E. Salyer, Marc L. Schwarz

Assistant Professors: Nicoletta F. Gullace, Julia E. Rodriguez, Jennifer D. Selwyn, Cynthia J. Van Zandt, Ethel Sara Wolper

Lecturers: Robert E. Stiefel, Brian Weiser

Group I. American History

405/405H/405W. History of Early America

America from the early age of European discovery to the mid-19th century. Emphasis on 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. Not open to majors or minors who elected HIST 410. 4 cr.

406/406H/406W. History of the Modern United States

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. Not open to majors or minors who elected HIST 410. 4 cr.

410/410H. Historical Survey of American Civilization

Topical survey, within broad chronological divisions, of the development of American civilization since 1600. Not open to majors or minors who have elected HIST 405 or 406. Writing intensive. 4 cr.

505. African American History

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. 4 cr.

506. African American History

See description for HIST 506. Reconstruction to the present. Writing intensive. 4 cr.

507. Native Peoples of the Americas

Indian societies of the American continents, their reactions to, and interaction with, the Europeans who invaded and conquered them. Emphasis on North America. 4 cr.

509. Law in American Life

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). 4 cr.

511. History of New Hampshire

From presettlement times to the present, empha-

sizing the use of locally available materials and sources. 4 cr.

566. Women in American History

Key changes in women's roles in the past three centuries with an emphasis upon the peculiarities of the American setting. How, for example, were women's lives affected by the frontier; the intersection of Europe, African, and Native American cultures; religious diversity; the problem of defining citizenship in a democratic republic? Students will sample recent scholarship in women's history and study a wide variety of documents produced by women. 4 cr.

567. History of Canada

Covers the development of Canada from first contacts to the modern era, with an emphasis on the twentieth century. Particular focus is on Canada's position between Great Britain and the United States, Anglo-French tensions internally, and the shifting place of the First Nations in Canadian society. 4 cr.

603. European Conquest of America

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. 4 cr.

605. Revolutionary America, 1750-1788

Examines the social, political, and cultural transformation of thirteen British colonies into the United States, up to the adoption of the Constitution. 4 cr.

606. History of the Early Republic

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. 4 cr.

#607. Religion in American Thought and Life

Interdisciplinary study of American religious experience and its relationship to other aspects of American culture, taught by a team of three specialists, each in a different discipline: American intellectual and cultural history, American literature, and American church history. Central emphasis on several transforming themes of the 19th century and their effects upon the interplay of religion and society. (Also offered as ENGL 607, HUMA 607, and RS 607.) Writing intensive. 4 cr.

608. Arts and American Society: Women Writers and Artists, 1850-Present

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. 4 cr.

609. Special Topics in American Legal History

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. 4 cr.

610. American Studies: New England Culture in Changing Times

A team of three instructors from history, literature, and art investigates major contributions New England has made to American life. Focus 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 ARTS 610, ENGL 610, HUMA 610.) Not for art studio major credit. Writing intensive. 4 cr.

611. Civil War Era

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. 4 cr.

612. Emergence of Industrial America

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. 4 cr.

615. 20th Century America

U.S. after 1900; cultural, political, and social factors causing major changes in American life. Progressivism through the New Deal. 4 cr.

616. 20th Century America

U.S. after 1900; cultural, political, and social factors causing major changes in American life. World War II to present. 4 cr.

617. Vietnam War

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. 4 cr.

618. American Environmental History

This course 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. 4 cr.

619,620. Foreign Relations of the United States

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. 4 cr.

621,622. History of American Thought

Significant American thinkers considered in their social context. Dividing point at 1860. 4 cr.

#623. Early American Social and Cultural History

This course is designed to give students the opportunity to explore some of the recent findings of scholars who have studied Early American social and cultural history. It 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. The course will include 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. 4 cr.

624. Topics in Modern United States Social History

Advanced study of topics in U.S. social history since the Age of Jackson. Topics will vary; may include such examples as 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. 4 cr.

625. Southern History and Literature since the Civil War

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. 4 cr.

#626. Muslims in America

Exploration of history of Muslim communities in the United States with the purpose of examining how these communities created spaces for Muslim practice and community formation. 4 cr.

772. Studies in Regional Material Culture

An introduction to 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. 4 cr.

Group II. European History**435/435H/435W, 436/436H/436W. Western Civilization**

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. 4 cr.

521. Origins of Modern Science

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. 4 cr.

522. Science in the Modern World

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. 4 cr.

523. Introduction to the History of Science

Introduces the role of science in Western culture,

from the ancient world to the 20th century. Covers important themes of the development of the physical and biological sciences, and indicates their place in broader social and cultural changes. No specific technical background is required. 4 cr.

537. Espionage and History

Introduction to 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. 4 cr.

540. Foundations of Medieval History: 300-1300 CE

Introduction to 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. 4 cr.

559,560. History of Great Britain

History of Great Britain from the earliest times to the present; from social, constitutional, economic, political, and intellectual perspectives. Designed for history students as well as those interested in literature, Western political and social systems, American studies, education, and prelaw. 4 cr.

563. Introduction to Russian Culture and Civilization

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. 4 cr.

565. Women in Modern Europe

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. 4 cr.

639. Christian Monasticism in the Medieval West

A multi-faceted exploration of Christian monastic life in Western Europe from its origins in pre-Christian history, through the early Desert Fathers and Mothers, St. Augustine and St. Benedict, to its flowering in the Cluniac, Cistercian, and mendicant reforms. The course will focus on the intellectual, artistic, and pastoral aspirations and achievements of medieval monastics. 4 cr.

640. Holy War in the Holy Land: The Medieval Crusades

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. 4 cr.

641. Europe after the Black Death

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 covered 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. 4 cr.

642. Religious Conflict in Early Modern Europe

Religious, social, and political maps of Europe were profoundly and permanently altered in the sixteenth and seventeenth centuries due to the split of the Protestant churches from the Roman Catholic church initiated in 1517 by Martin Luther. Explores the background to the Protestant Reformation of the sixteenth century and investigates the various personalities—the Protestant and Catholic reformers, the princes, artisans and peasants, the Anabaptist radicals—that shaped this era of religious change and conflict. Also explores the important effects of religious change on European society and culture at that time, including changes in gender roles, family life, and popular cultural practices such as magic and witchcraft. 4 cr.

643. British Empire

This course examines the cultural and social history of the British Empire from the nineteenth century to the period of de-colonization after 1945. Looking at issues of racial "otherness," gender difference, and popular participation in the culture of Empire, students will be asked to think about the appeal of the Empire for British men and women as well as its devastating impact upon the peoples of Africa and Asia. There will be a strong emphasis on reading, class discussion and written assignments. 4 cr.

644. Victorian Britain

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 will 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 will attempt to uncover the many-faceted culture, society and political life of Victorian Britain. The instructor will place a strong emphasis on reading, class participation and writing. 4 cr.

647. Early Modern France

An exploration of the culture and politics of early modern French society. Popular culture, religion, gender relations, the family, state-building, political theory, and revolution will be emphasized. Primary documents in translation will be read and discussion encouraged. 4 cr.

648. Modern France

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. 4 cr.

649. Comparative Topics in the History of Early Modern Europe

Topics will vary, but may include enlightenment and revolution; the peasantry; gender and family; crime and deviance; science and society. May be repeated for a maximum of 8 credits. 4 cr.

#650. History of European Socialism

Socialist thought in Europe in the 19th and 20th centuries. Examines Utopian Socialism, the development of Marxism, the emergence of the New Left and new socialist developments in the late 20th century. 4 cr.

651. Topics in European Intellectual History

Exploration of such major developments as the Renaissance, the Reformation, ancient world views and cosmologies, and the relationship between gender and intellectual history. Includes topics up to the Scientific Revolution. Since topics vary, students should check the department newsletter or office for course theme in any given term. May be repeated as topics change. 4 cr.

652. Topics in European Intellectual History

Exploration of such major developments as the Enlightenment, Russian intellectual history, and the relationship between gender and intellectual history. Includes topics since the Renaissance. Since topics will vary, students should check the department newsletter or office for course theme in any given term. May be repeated as topics change. 4 cr.

654. Topics in History of Science

Advanced study of a selected topic in the history of European science since the Renaissance. 4 cr.

#655. British History, 1688-1832

Examines British history from the Glorious Revolution to the passage of the First Reform Bill. Topics include the consolidation of parliamentary democracy, the rise of the middle-class family, and the emergence of a broad-based consumer society. We will also consider the integration of England, Scotland, and Ireland into a single British state, as well as the consequences of Britain's growing imperial power in North America, India, and Africa. 4 cr.

656. 20th Century Europe

World War I, European totalitarianisms, World War II, the loss of European primacy and the search for a new Europe. 4 cr.

659. History of Modern Spain and Portugal

Iberian states and their peoples from the coming of liberalism to the present. Failure of Iberian liberalism and liberal government. Political and social change, imperial and intellectual movements, influence of Western European thought and activity. 4 cr.

661, 662. England in the Tudor and Stuart Periods

Political, religious, socioeconomic, and intellectual forces for change at work in England from the accession of Henry VII to the revolution of 1688-89. 4 cr.

#663. Russia: Origins to 1905

Russia from its foundations through the Revolution of 1905. Political, social, and economic developments; intellectual and ideological currents. 4 cr.

664. Russia: Modernization through Soviet Empire

The challenges of modernization, experience and legacy of Leninist and Stalinist revolutions. Soviet consolidation, and decline through the Gorbachev era. 4 cr.

#667. Germany from the Late Medieval Period Through the Reign of Frederick the Great of Prussia

Concentrates on the political, economic, and social structure of the Holy Roman Empire, the Reformation in Germany, the Thirty-Years War, and the rise of Prussia. 4 cr.

#668. Germany from 1786 to 1918

Concentrates on the end of the Holy Roman Empire and Napoleonic domination of much of Germany, the Prussian Reform Era, industrialization, the revolutions of 1848, national unification under Bismarck, the second Empire, and World War I. 4 cr.

669. Germany from 1918 to Present

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. 4 cr.

#789. Seminar in the History of Science

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. 4 cr.

Group III. Non-Western History and Ancient History

421. World History to the 16th Century

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. 4 cr.

422/422H. World History in the Modern Era

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. 4 cr.

483. History of World Religions

Introduction to 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. 4 cr.

484. Patterns in World Religions

Introduction to 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. 4 cr.

531. Americas: Introduction to Latin America and the Caribbean

The thirty-three countries of the region are important trading partners and resource suppliers for the United States. Examines the history, culture, politics, economics, social structures, and the international relationships of this region. Ranges from the macro-level discussion of economics, to personal and family issues, to key moments in history, to aspects of local and transnational cultures. Individual community and country examples illustrate larger processes affecting the whole region. Stereotypes and generalizations challenged by stressing the human face of national development, military rule, democratization, migration, urbanization, color, class, identity, women's roles, religion, popular culture, sovereignty, revolution, and the impact of migrants from the region on the United States. 4 cr.

532. Modern Latin America

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. 4 cr.

575. Ancient Near East

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. 4 cr.

576. Hebrew Bible in Historical Context

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. 4 cr.

577. New Testament in Historical Context

A study of the collection of writings known as the New Testament as both literature and historical documentation. Assigned readings from primary and secondary sources will stress the historical, social, religious, and literary backgrounds of gospels, Paul's letters, and the Apocalypse, and will include a variety of early Christian texts left out of the canonical New Testament. Other more general themes are: the formation of the Christian canon, the division of the Jesus-movement from Judaism, the status of Jesus in his own time, the nature of parables, the end of the world, and the authority of women in early churches. Emphasis on the historical understanding of sacred scripture. (Also offered as RS 577.) Writing intensive. 4 cr.

579. History of China in Modern Times

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. 4 cr.

580. History of Japan in Modern Times

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. 4 cr.

#583. Mystic and Saint in Islam

Examination of how and why a cult of Sufi saints became such a significant part of religious practice in medieval Islamic Egypt and Anatolia. 4 cr.

585. Venture of Islam: 6th-15th Century

The origins and expansion of Islam and the development of the Muslim community from the time of Muhammed until the Islamic empires of the 16th century. Attention is given to religious and artistic as well as political developments. 4 cr.

586. Islam in the Modern Age, 15th Century to present

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. 4 cr.

587,588. History of Africa South of the Sahara

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. 4 cr.

#589. Islam in Africa

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. Emphasis on 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. 4 cr.

#590. City in History

The pre-industrial and modern city as a philosophical and cultural institution, with emphasis on city design and architecture. Certain great cities, such as Athens, Florence, Paris of 1900, and Berlin of the 1920's, dealt with in detail. 4 cr.

601. Seminar in Religious Texts

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.) 4 cr.

631. History of Brazil

Brazil has the fifth largest territory, the sixth largest population, and the eighth largest industrial economy in the world. Its colorful history has many distinctive features: the only country in the Americas to have been the capital of a European monarchy and then to have its own emperor for most of the last century; an outwardly peaceful image masking internal violence and turmoil; a suspicion of foreigners balanced by a desire to be

accepted by them as equals; seemingly benevolent racial attitudes that serve to keep people of color on society's lower range; a tremendous cultural creativity that has given the world samba, film star Carmen Miranda; composer Heitor Villa Lobos, songwriter Antonio Carlos Jobim, poet Vinicius de Moraes, and novelist Jorge Amado. Includes an examination of the roles of various elites; political, social, economic, military, cultural, and religious. HIST 531, 532 recommended. 4 cr.

632. Latin American History: Topics

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. 4 cr.

675. Early History of Ancient Greece

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. 4 cr.

676. Classical and Hellenistic Greek Worlds

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. Emphasis on original sources including Herodotus, Thucydides, the Athenian playwrights, and Plato. Examination of 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. 4 cr.

677. Roman Republic

Covers pre-Roman Italy, the Etruscans, and the foundation of the Republic. Rome's expansion through the Punic Wars and relations with the Hellenistic kingdoms. 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. 4 cr.

678. Roman Empire

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. 4 cr.

681. Modern China Topics

Problems in modern Chinese history from 1800 to the present. Topics may vary. Students will read translated primary sources, analyze literary works, and write critical essays and a research paper. History 579 is recommended. 4 cr.

684. History of Southern Africa since 1652

Examination of 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 dy-

namics 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. 4 cr.

#685. Modern Middle East

From the 18th century to the present. Problems created by modernization and reform of the traditional society; conservative reaction to reform, impact of nationalism, and appearance of new ideologies. 4 cr.

#686. States and Societies in Precolonial West Africa

An in-depth exploration of the nature and dynamics of state formation processes in West Africa. Focuses on major states such as Ghana, Mali, Songhai, Asante, Dahomey, Oyo, Benin, Borno and the Hausa states. Through a critical analysis of primary and secondary sources, film footage and video documentaries, the course examines the significance of such issues as oral tradition, migrations, religion, art, slavery, gender, trade, state, kingship and warfare in African history. 4 cr.

688. African Religions

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. 4 cr.

Group IV. Special Courses**425/425H/425W. Foreign Cultures**

Introduction to the culture of a particular nation or region; preparation for experiencing a foreign culture. Consult department for listing of topics. 4 cr.

497/497H/497W. Explorations in Historical Perspectives

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. 4 cr.

500. Introduction to Historical Thinking

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. 4 cr.

595A-G,596. Explorations

See department listings for semester topic. 1 to 4 cr.

600. Advanced Explorations

See department listings for semester topic. Barring duplication of subject, may be repeated for credit. 1 to 4 cr.

665. Themes in Women's History

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. 4 cr.

666. Environmental History of Northwest Atlantic Commercial Fisheries

After centuries of groundfishing 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. 4 cr.

#670. Historical Thinking for Teachers

Examines the sources, methods, and interpretive strategies of the historian. Emphasis on texts and topics relevant to the middle- and high-school classroom. Designed for history teachers as well as individuals in the Master of Arts in Teaching (M.A.T.) program. 4 cr.

#682. Cults and Charisma

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.) 4 cr.

690. Introduction to Public History

Introduction to the theory, methodology, and practices of public historians. Examines the history and contemporary practices of historians whose research and scholarship is aimed at public audiences through the creation of diverse media and interpretive frameworks. Encourages interdisciplinary thinking about history. Cr/F. 4 cr.

691. Internship

Supervised internship with a governmental agency, private corporation, philanthropic institution, library, archives, museum, historical society, or other institution seeking individuals interested in historical research. Cr/F. 4 cr.

695. Independent Study

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. For students showing a special aptitude in history who desire to study an area or subject for which no appropriate course is offered. Prereq: permission. 4 to 8 cr.

698. Internship in Museum Studies

Supervised position with a museum, historical society, archive, or other history related site. Cr/F. 4 cr.

771. Museum Studies

Introduction to theory, methods, and practice of museum studies. Examination of various museum functions, as well as contemporary historical controversies. 4 cr.

774. Historiography

Analysis of ancient and modern historians. Open to undergraduates with permission. (Not offered every year.) 4 cr.

775. Historical Methods

Contemporary historical methods. Required of all entering Ph.D. candidates; open to undergraduate with permission. (Not offered every year.) 4 cr.

780. Special Topics in Museum Studies/Material Culture

Study of a selected topic related to museum studies or material culture. May be repeated for course credit with permission of the undergraduate adviser. 3 cr.

787. Quantitative Methods and Computers for Historians

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.) 4 cr.

796. Research Internship

Intensive collaborative experience in research for undergraduate majors. Students will gain professional skills while assisting a faculty member on a continuing research project. Permission Required. 2 to 4 cr.

797. Colloquium

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. Writing intensive. 4 cr.

799. Senior Thesis

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. 4 cr.

Hospitality Management (HMGT)

(For program description, see page 100.)

Chairperson: Raymond J. Goodman, Jr.

Professor: Raymond J. Goodman, Jr.

Associate Professors: Joseph F. Durocher, Jr., Udo Schlenrich, Emery H. Trowbridge

Affiliate Assistant Professor: Sylvia H. Marple

401. Hospitality Industry: Historical Perspectives and Distinguished Lecture Series

Review the broad spectrum of the hospitality industry from an historical perspective, in concert with current 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 in-

clude, 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. 4 cr.

403. Introduction to Food and Beverage Management

Focuses on the basic principles of food and beverage operations management. During weekly laboratory sessions in the New England Center for Continuing Education, students experience both the front of the house and back of the house activities. Application of classroom principles further enhanced through industry guests, field trips, participation in gourmet dinner productions, and a class managed and produced catered function. Prereq: permission. Writing intensive. 4 cr.

554. Lodging Operations Management

Focus on management history, planning, organizing, leadership, and current and future management issues. The course 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. Prereq: HMGT 401 and 403. 4 cr.

567. Food and Beverage Operations Management

Integration of operations management principles and techniques. Presentation of large-scale gourmet dinners; act as managerial consultants to on-campus food service facilities. The lab provides an experiential setting for the application of such principles as marketing, operations management, accounting and organizational behavior through the planning, organizing, coordinating, and execution of weekend food service events. Prereq: HMGT 403. Lab. 4 cr.

595. Internship I

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. 1 to 12 cr.

600. Hospitality Marketing Management

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. Writing intensive. 4 cr.

603. Service Industries Management

Provides broad understanding of managerial issues in the operation of service firms, as distinct from the consumer product or manufacturing firms, e.g., lodging, restaurants, health care, banking, and education. Examines, from the viewpoint of the service firm manager, the role services play in the economy, delivery systems, encounters,

technology, human resources, productivity, and quality issues, along with the concept of service. 4 cr.

618. Uniform Systems for the Hospitality Industry

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: ACFI 502; 503. 4 cr.

625. Hospitality and Employment Law

Tort and contract liability in the hospitality industry. Emphasis on a managerial approach to solving or avoiding potential problems including employment law issues that arise in any business environment; wrong termination, compensation rules, affirmative action, employment discrimination, sexual harassment, and issues involving privacy in the workplace. 4 cr.

635. Hospitality Human Resource Management

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. Writing intensive. 4 cr.

655. Hospitality Finance and Development

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. Emphasis on 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: HMG 618. 4 cr.

661. Meetings and Conventions

Strategic and logistical considerations in managing the planning, development, marketing, and implementation of meetings, conferences, and conventions. 4 cr.

681. Resort Management

Complexities of developing and managing various types of resort properties. Emphasis on time-share properties and recreation elements of full service resorts. Writing intensive. 4 cr.

685,686. Study Abroad

Open to students studying abroad in the discipline as approved by the hospitality management program director. Cr/F. 1 to 16 cr.

695/695W. Independent Analysis

Study and research project for honor students to advance knowledge in lodging and food services fields. Prereq: junior standing and permission. 2 to 12 cr.

696. Supervised Student Teaching Experience

Participants are expected to perform such func-

tions 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. 1 to 8 cr.

698. Topics

Special topics and developments in lodging, food services, and other hospitality industries. Prereq: junior standing and permission. Course may be repeated when topics change. 1 to 4 cr.

703. Strategic Management in the Hospitality Industry

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: all Group B courses. Writing intensive. 4 cr.

750. Senior Operations Seminar

Allows students to experience and participate in the planning and decision-making process of a full-service hotel; to contribute to and understand the intricacies of managing change while gaining a sensitivity to interdepartmental coordination. Class meets at major metropolitan hotels. Prereq: permission. 4 cr.

756. Hospitality Franchising

Designed to help the student acquire an understanding of franchising as a system of distribution and business expansion. Franchising will be studied from both the perspectives of the franchisee and the franchiser. In addition, economic, financial, and legal issues associated with franchising will be covered. By the end of the course, students will acquire the skills and sources of information that would permit sound assessment of the business opportunities available in franchising. Prereq: MKTG 651 or HMG 600. (Also offered as MKTG 756.) 4 cr.

761. Hospitality Design

Design principles and components for front and back of the house hospitality environments will be presented and applied to case studies and class projects. 4 cr.

771. Beverage Management

Examination of purchasing, evaluation, storage, service, and control of alcoholic beverages. Emphasis on wines, although beer, ale, distilled spirits, liqueurs, and mixed drinks are examined. Enrolled students must be at least 21 years old. Prereq: permission. 4 cr.

772. Senior Living Industries Management

Designed for hospitality majors, gerontology interdisciplinary minors, and any other students interested in studying the demographic realities leading to career and business opportunities in a wide range of disciplines as relates to aging Americans and mature adults worldwide. A significant element of this course will address issues in retirement facilities management as well as to introduce students to the fastest growing market segment in the developed countries of the world for whom products and services are being created, designed, and managed. 4 cr.

777. Casino Management

History, development and management of casinos

and gaming. Emphasis on 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. Prereq: permission. 4 cr.

795. Internship II

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. 1 to 12 cr.

799. Honors Thesis/Project

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. 4 to 8 cr.

Humanities (HUMA)

(For program description, see page 40.)

Coordinator, Humanities Program: David M. Richman

Associate Coordinator, Humanities

Program: Catherine M. Peebles

Core Faculty: David S. Andrew, Art and Art History; Donna B. Brown, Humanities; Warren R. Brown, Political Science; Willem A. deVries, Philosophy; Patricia A. Emison, Art and Art History; Michael K. Ferber, English; Jan V. Golinski, History; Edward T. Larkin, Languages, Literatures, and Cultures; Ronald D. LeBlanc, Languages, Literatures, and Cultures; Gregory McMahon, History; Robert M. Mennel, History; Catherine M. Peebles, Humanities; David M. Richman, Theatre and Dance; Charlotte Elizabeth Witt, Philosophy

401. Introduction to the Humanities

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. 4 cr.

#480A/480B. What a Text Can Teach

Students examine selected classic texts in the humanities with faculty members representing the arts, music, literature, and philosophy. Through three modules and a team-taught symposium, students investigate how each of these forms of expression contributes to human knowledge and to an understanding of the human being. Not for HUMA major credit. Writing intensive. 4 cr.

500. Critical Methods in the Humanities

Critical analysis of works in the humanities. Fo-

cuses on major texts, evaluation, of secondary literature, research writing, criticism. Required of all HUMA majors. Writing intensive. 4 cr.

Students enrolling in HUMA 510, 511, 512, 513, 514, or 515 must designate a discussion section in only one of four fields—arts, English, history, or philosophy—corresponding to and satisfying one of four general education categories. To satisfy the general education requirement in fine arts, students should register for 510A, 511A, 512A, 513A, 514A, or 515A; in works of literature and ideas, 510B, 511G, 512B, 513B, 514B, or 515B; in historical perspectives, 510C, 511C, 512C, 513C, 514C, or 515C; in philosophical perspectives, 510D, 511D, 512D, 513D, 514D, or 515D. For students who complete the entire sequence of HUMA 510, 511, 512, and 513, enrolling in different discussion sections at each time, a fifth general education requirement (in foreign culture) will be waived, although additional credit hours will not be granted. The following Humanities sections are writing intensive: HUMA 510A, 510B, 510C, 510D, 511A, 511B, 511C, 511D, 512A, 512B, 512C, 512D, 513A, 513B, 513C, 513D.

510/510A-D. Ancient World: An Interdisciplinary Introduction

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. 4 cr.

511/511A-D. Medieval World: An Interdisciplinary Introduction

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. 4 cr.

512/512A-D. Renaissance and Early Modern: An Interdisciplinary Introduction

Exploration of 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. 4 cr.

513/513A-D. Modern World: An Interdisciplinary Introduction

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. 4 cr.

514/514A-D. 20th Century, 1900-1945: An Interdisciplinary Introduction

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 cru-

cial innovations in the sciences. Students study the works of such figures as Picasso, Woolf, Einstein, Freud, and Wittgenstein. 4 cr.

515/515A-D. 20th Century, 1945-1999: An Interdisciplinary Introduction

This course 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. 4 cr.

592. Special Topics in the Humanities

Special topics; offered occasionally. May be repeated up to a maximum of 8 credits. 2 to 4 cr.

#607. American Character: Religion in American Life and Thought

Interdisciplinary study of American religious experience and its relationship to other aspects of American culture, taught by a team of three specialists, each in a different discipline: American intellectual and cultural history, American literature and American church history. Central emphasis on several transforming themes of the 19th century and their effects upon the interplay of religion and society. (Also offered as ENGL 607, HIST 607, and RS 607.) Writing intensive. 4 cr.

608. Arts and American Society: Women Writers and Artists, 1850-Present

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. 4 cr.

609. Ethnicity in America: The Black Experience in the 20th Century

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. 4 cr.

610. Regional Studies in America: New England Culture in Changing Times

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 HIST 610, ENGL 610, and ARTS 610.) Not for art studio major credit. Writing intensive. 4 cr.

650. Humanities and the Law: The Problem of Justice in Western Civilization

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. 4 cr.

651. Humanities and Science: The Nature of Scientific Creativity

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. 4 cr.

698. Independent Study

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. 4 cr.

700. Seminar

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. Writing intensive. 4 cr.

730. Special Studies

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. 4 cr.

798. Research Seminar

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: junior standing; permission. Writing intensive. 1 cr.

799. Research Seminar

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. 3 cr.

Hydrology

(For program description, see pages 60; for courses, see Earth Sciences.)

Coordinator: S. Lawrence Dingman

Intercollege Courses (INCO)

222. First Year Seminar

A mandatory, non-credit course for entering freshmen who have graduated from high school within the last three years, to be completed during the first semester of the freshman year. The goals of the course are to enhance academic success, to facilitate social adjustment to the Thompson School and University environment, and to improve student retention. The course will cover those academic and social areas essential to getting new students on track and to linking student to School and University support services before the student encounters difficulties. Cr/F.

401. War

Nature and experience of modern warfare and its historical development; social and biological roots of war; national security and defense concepts and issues; the nuclear age and weapons of mass destruction; the post-Cold War age; philosophical issues. 4 cr.

#402/402H. Peace

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. 4 cr.

404/404B-Y. Honors: Introductory Seminar

Introductory course required of all honors program students. A general education course with sections offered in all general education groups except Group 1 and 2. Some sections carry a special fee. Writing intensive. 4 cr.

410. College

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. 2 cr.

444. First Year Seminar

Introduction to the University and its resources, including instruction on study skills, time management, crisis management, and conflict resolution; academic responsibility; general education requirements and the value of a liberal arts education. Exposure to the University's academic and social support services including its libraries and computer facilities. Cr/F. 1 cr.

450. Introduction to Race, Culture and Power

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.) 4 cr.

480. Arts in Society

Brings students into relationship with classical visual and performing arts. Students attend lectures about the arts and live performances of music, theatre, and dance; take trips to visit museums; and view architecture. Students read relevant materials and write about each art work experienced. Special fee. 4 cr.

#501. Nautical Science

This course applies selected scientific theories to the operation of a sailing vessel at sea. The concepts of the physics of sailing, navigation (coastal piloting, celestial, and electronic), naval architecture, ship construction and stability, and marine engineering systems are taught from their bases in physics, mathematics, and astronomy. This course provides students with the theoretical foundation necessary to operate the S.S.V. *Westward* and the S.S.V. *Corwith Cramer* at sea, and is typically taken as part of "Sea Semester." Cr/F. 3 cr.

#520. World Scientific Cultures

Designed to prepare students in all majors to understand the international dimensions of science and technology. The course will introduce students to global issues in science through study of the history, sociology, and politics of science. In an era when virtually all branches of scholarship involve international collaboration, very few stu-

dents are aware of the international dimensions of their fields of study. Toward those ends, the students will consider the place of science and technology in the modern world from a number of different intellectual perspectives and for a number of different cultures through four topics. This will contribute to knowledge of and perspectives within a diversity of traditions, including the interaction of social and scientific notions of race and gender. The course will acquaint students with these issues, perspectives and methodologies of the social and cultural study of science. 4 cr.

555. Peer Education

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. Cr/F. 1 to 3 cr.

585,586. Foreign Exchange

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. 1 to 16 cr.

595/595W. Winterim Topics

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. 1 to 4 cr.

596. Summer Topics

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. 1 to 4 cr.

604H. Honors Senior Thesis

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. 4 or 8 cr.

655,656. London Program

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. 1 to 18 cr.

657. Budapest Program in Justice Studies

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. 16 cr.

685,686. Study Abroad

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. 4 to 16 cr.

698. Summer Research Project

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. 8 cr.

699. McNair Summer Internship

McNair Fellows; not graded; Summer only. cr.

796. Touching the Limits of Knowledge: Cosmology and Our View of the World

A seminar analyzing the paradoxes and limits of scientific knowledge and religious understanding, their compatibility or lack of it with respect to contemporary cosmology. 1 cr.

International Affairs (IA)

Center for International Education
(For program description, see page 103.)

401. International Perspectives: Science, Business, and Politics

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. 4 cr.

485. Introduction to Canadian Studies

Introduction to Canadian Studies is an interdisciplinary, cross-college course covering a range of regional and Canada-wide perspectives on subjects in history, politics, geography, language, en-

vironment, economics, social and health care systems, recreation, arts and culture, gender, ethnicity and indigenous peoples. The course is a requirement for the Canadian Studies minor, but is open to all interested students. 4 cr.

501. Global Issues in International Affairs
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. 4 cr.

#520. World Scientific Cultures
Introduction to global issues and international dimensions of science and technology through study of history, sociology, and politics of science. Lecture/lab. IA (continuous grading). 4 cr.

599. Special Topics
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. 4 cr.

685-686. Foreign Experience
Dual majors will register for IA 685-686 for foreign experience situations not covered by the foreign language departments' Study Abroad (685-686). Most commonly the foreign experience consists of study in a non-English-speaking country for a year, a semester, or a summer (8 weeks). It should be in a country where the language spoken is the one the student presents to satisfy his/her foreign language requirement. The University Committee on International Studies will consider exceptions to this rule upon petition explaining reasons for the alternative experience. Prereq: permission. Special fee. Variable transfer credit. (Financial aid requires a minimum of 6 credits.) Cr/F. 16 cr.

695. Internship
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. 2 to 4 cr.

699. Topics
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. 4 cr.

701. Seminar
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. 4 cr.

Italian (ITAL)

Department of Languages, Literatures, and Cultures

(For program description, see LLC/Italian, page 42; for faculty listing, see page 185.)

Japanese (JPN)

Department of Languages, Literatures, and Cultures

(For department information, see page 40; for faculty listing, see page 185.)

Justice Studies (JUST)

(For program description, see page 29.)

550-551. Mock Trial
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. Special fee. 2 cr.

601. Field Experience
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. Cr/F. 4 cr.

695. Special Topics
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. 4 cr.

Kinesiology (KIN)

(For program description, see page 73.)

Chairperson: Heather Barber
Professors: Ronald V. Croce, Michael A. Gass, Stephen H. Hardy

Associate Professors: Heather Barber, Robert W. Kenefick, John P. Miller, Timothy J. Quinn, Neil B. Vroman, Steven C. Wright
Assistant Professors: Karen E. Collins, David G. Edwards, Daniel R. Sedory, Deborah A. Sugerman, Erik E. Swartz

Instructors: Michelle A. Grenier, Laurie Gullion, Karen N. Henny, Kenneth T. Hult, James Miller, Jr.
Adjunct Faculty from the Departments of Intercollegiate Athletics:
Adjunct Faculty: James H. Boulanger, Edmund Datti

The Major Program

Prospective kinesiology majors should refer to page 73 for information regarding the major programs.

Program Fees

Fees are charged for off-campus activities such as backpacking, canoeing, mountaineering, rock climbing, and for courses that use special equipment. For specific course requirements, prerequisites, and fees, consult the department chair.

410. Cardiopulmonary Resuscitation
Appropriate actions for survival from cardiac arrest and foreign body airway obstruction. Recognition of the early warning signs of cardiovascular disease. Leads to certification by the American Heart Association. Special fee. Cr/F. .5 cr.

500. Historical and Contemporary Issues in Physical Education
Physical education is initially discussed in historical and philosophical terms to lay the foundation for later discussions pertaining to recent issues and trends within the field. This course is open to KIN students in the pedagogy option, undeclared HHS students, and undeclared Liberal Arts students. 4 cr.

#501. First Aid: Responding to Emergencies
Covers the nationally accredited American National Red Cross First Aid—Responding to Emergencies and BLS-CPR professional rescuer course. May not repeat for credit. Cr/F. 2 cr.

505. Prevention and Care of Athletic Injuries
This course is a primer in athletic injury, care, prevention and rehabilitation. It is 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. 4 cr.

521. Theory of Coaching Basketball
Individual and team offense and defense; rules of the game. Problems in team handling and conditioning. Prereq: permission. 2 cr.

#522. Theory of Coaching Football
Systems of play; team and individual offensive and defensive fundamentals; theory and strategy of team play; coaching methods, physical conditioning; rules. 2 cr.

#523. Theory of Coaching Hockey
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. 2 cr.

#525. Theory of Coaching Soccer
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. 2 cr.

527. Scientific Foundations of Health and Fitness
Designed to provide students with practical, scientific, entry-level information relative to physical conditioning, health, and wellness from childhood through adulthood. Students will be given theoretical information which will be followed by practical, hands-on experiences offered through laboratory experiences. Special fee. Writing intensive. 4 cr.

528. Theory of Coaching Track and Field
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. 2 cr.

#529. Theory of Coaching Gymnastics

Theory, practical teaching methods, and officiating. Construction of gymnastic routines, from elementary to international level. Prereq: permission. 2 cr.

#530. Theory of Coaching Swimming and Diving

Philosophy, historical development, and psychological theories of coaching. Mechanical and kinesiological aspects of the competitive strokes and required optional dives, low and high board. 2 cr.

#531. Theory of Coaching Field Hockey

Analysis of field hockey coaching techniques. New systems of play; use of interval training for pre-season conditioning and in-season practices. Prereq: permission. 2 cr.

#532. Theory of Coaching Racquet Sports

Through and in-depth knowledge of the administration and coaching of major racquet sports: badminton, racquetball, squash, and tennis. Prereq: permission. 2 cr.

533. Basic Scuba

Full semester in the fundamentals of scuba diving. Through a progressive series of classroom lectures and pool sessions, the students will gain the knowledge and skill necessary to conduct themselves with competence underwater. A high emphasis is placed on 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. Cr/F. 3 cr.

#560. Psychology of Sport

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. 4 cr.

565. Principles of Coaching

An overview of 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 will be addressed. 4 cr.

585. Emergency First Responder

Standards of practice that conform to the content of the U.S. Department of Transportation curriculum for First 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 New Hampshire First Responder Certification Examination. Prereq: KIN: Athletic Training; KIN: Exercise Science; HHS: undeclared. Lab. Special fee. 4 cr.

607. Biology of Aging

Biological mechanisms of the aging process, with special emphasis on human aging; changes due to chronic disease. 4 cr.

652. Clinical Kinesiology

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. 4 cr.

653A. Musculoskeletal Assessment

Principles and methodology of joint range of motion, body mechanics, and muscle strength evaluation. Uses muscle palpation, goniometry, manual muscle testing, hand-held dynamometry, electromyography, and human prosections to facilitate understanding of musculoskeletal anatomy and assessment. Special fee. Prereq: ZOOL 507-508. Coreq: KIN 652. 2 cr.

653B. Biomechanical Analysis of Movement

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: ZOOL 507-508. Coreq: KIN 652. 2 cr.

668. Ergogenic Aids in Sports

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 will be an introduction in the use of sports ergogenic and their use in athletic competition. Prereq: Sophomore, Junior or Senior standing. 2 cr.

684. Emergency Medical Care: Principles and Practices

Based on the curriculum established by the U.S. Department of Transportation for Emergency Technician (EMT-Basic), 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-Basics. Passage of both these examinations will lead to national certification as an EMT-Basic. Prereq: department approval. Coreq: KIN 685. 3 cr.

685. Emergency Medical Care: Principles and Practices Lab

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 EMTs Examination. Prereq: department approval. Coreq: KIN 684. Special fee. 2 cr.

693. Teaching Assistantship

A) Physical Education Pedagogy; B) Exercise Leader; C) Outdoor Education; D) Science Labs; E) Cardiac Rehabilitation. 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. 2 cr.

696. Independent Study

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. 2 to 4 cr.

699H. Honors Project

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. 4 cr.

706. Neurology

Development, morphology, internal configuration, physiology, histology, function, and pathology of the human nervous system. Prereq: ZOOL 507-508 or equivalent. Coreq: KIN 707. Special fee. 4 cr.

707. Neurology Lab

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 equivalent. Coreq: KIN 706. Cr/F. 1 cr.

#725. Motor Control Issues in Dysfunction

In-depth analysis of current motor control/learning theories from the fields of neurophysiology, psychology, and motor development as they relate to normal and pathological movement. Cognitive, anatomical, biomechanical, and physiological variables constraining movement organization discussed, as is application of basic research findings for appropriate therapeutic approaches to motor dysfunction. Prereq: kinesiology and neurology or motor learning or equivalent. Lab. 4 cr.

730. Research Diving Techniques

This course will take previously certified divers with the "need" to assist, or conduct research underwater, and train them in the methods; and specific techniques of scientific diving programs. This course will progressively build upon the basic diving skills until the student is knowledgeable and competent. The course will culminate with a small research project formulated and implemented by the students. Prereq: SCUBA certification, department approval. Special fee. (Also offered as ZOOL 730.) 4 cr.

735. Advanced Scuba

Classroom, pool, and open-water "hands-on" application in advanced diving techniques. The student's diving ability will progress 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. 4 cr.

#742. Diagnostic Motor Assessment

Overview of diagnostic and prescriptive procedures used in special physical education. Psychomotor assessment instruments used by practitioners in the field are described that can be applied when discerning level of performance in children with special needs. Prereq: measurement procedures in physical education. Lab. 3 cr.

#744. Medical and Exercise Issues of Disabling Conditions

Study of disabilities caused by anomalies found in the neurological, cardio respiratory, sensory, and musculoskeletal systems. Addresses exercise and programming techniques necessary for physical and motor development relative to present physiological functioning. Prereq: kinesiology or exercise physiology or equivalent. 3 cr.

#760. Applied Research in Teaching and Coaching

Pertinent research findings in sport psychology, sport sociology, exercise physiology, biomechanics and kinesiology, and motor learning and development. Prereq: KIN 504 or equivalent; permission. 4 cr.

798. Special Topics

New or specialized courses not normally covered in regular course offerings. May be repeated up to 8 credits. Prereq: departmental approval. 1 to 4 cr.

Athletic Training**506. Concepts of Athletic Training for the Professional**

Introductory course on 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. Coreq: KIN 507. 4 cr.

507. Concepts of Athletic Training Lab

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 1 cr.

658. Athletic Training for the Professional I

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; ZOOL 507-508. Coreq: KIN 658L. Writing intensive. 4 cr.

658L. Athletic Training for the Professional I Lab

Techniques and practice for performing test and assessment procedures for athletic injuries. Prereq: KIN 507. Coreq: KIN 658. 1 cr.

659. Athletic Training for the Professional II

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; ZOOL 507-508. Coreq: KIN 659L. Writing intensive. 4 cr.

659L. Athletic Training for the Professional II Lab

Techniques and practice for performing test and assessment procedures for athletic injuries. Prereq: KIN 507. Coreq: KIN 659 1 cr.

660. Therapeutic Exercise in Athletic Training

Rationale, use, and application of exercise in athletic injury rehabilitation. Basic components of designing and implementing rehab programs. Assessment of physical/injury status. Prereq: KIN 652; 653A. Coreq: KIN 661. 4 cr.

661. Therapeutic Exercise in Athletic Training Laboratory

Students learn and practice psychomotor techniques associated with rehabilitative and conditioning exercise. Coreq: KIN 660. 1 cr.

662. Therapeutic Modalities in Athletic Training

Rationale, use, and application of therapeutic modalities in athletic injury rehabilitation. Prin-

ciples of electrophysics and biophysics. Physiological effects on body tissues, indications and contraindications, and clinical applications. Prereq: KIN 506; 507. Coreq: KIN 663. 4 cr.

663. Therapeutic Modalities in Athletic Training Laboratory

Students use and practice with the devices, machines, and techniques associated with the treatment and rehabilitation of athletic injuries. Coreq: KIN 662. 1 cr.

665. Laboratory Practicum in Athletic Training

Minimum of 200 hours of experience in the approved athletic training clinical sites under the supervision of a N.A.T.A.-certified athletic trainer. Cr/F. 665A, Level I: General athletic training room assignment and/or low-risk sport. Prereq: KIN Athletic Training majors. 665B Level II: Assist with moderate- or high-risk sport. Prereq: KIN Athletic Training majors. 665C Level III: Assignment to moderate-risk sport as a primary student. Prereq: KIN Athletic Training majors. 665D Level IV: Assignment to high-risk sport as primary student. Prereq: KIN Athletic Training majors. 665E Level V: Off-campus internship. Prereq: KIN Athletic Training majors. 2 cr.

667. Pharmacology for Athletic Training

This course is an introduction in 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. 2 cr.

710. Organization and Administration of Athletic Training Programs

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. 4 cr.

715. Seminar in Athletic Training

Career issues and special topics in athletic training. Students required to submit and present a term project on assigned topic. 4 cr.

718. Career Preparation in Athletic Training

Designed to give students the methods to integrate the course knowledge and skills learned in the prerequisite courses into practical applications as the students prepare to graduate. Advanced knowledge and skills will be 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. 4 cr.

Exercise Science**620. Physiology of Exercise**

Acute and chronic effects of exercise. Muscle physiology, respiration, cardiac function, circulation, energy metabolism, and application to training. Prereq: ZOOL 507-508. 4 cr.

621. Exercise Laboratory Techniques

Administration of graded exercise tests on treadmill, cycle ergometer, and stepping bench. Monitoring physiological variables during the graded exercise test. Calculation of metabolic data resulting from the test. Prereq: KIN 620; KIN Exercise Science majors. Special fee. Writing intensive. 3 cr.

650A. Internship in Exercise Science

Experiential learning in an agency that offers

physical activity programs of prevention, intervention, and rehabilitation. An 8-credit internship will require a minimum of 600 hours experience. Activities include graded exercise testing, exercise prescription, and exercise leadership. Must have completed all requirements for the option. Cr/F.

704. Electrocardiography

This course is designed to provide students exposure regarding basic interpretation and identification of electrocardiograms (ECGs). Included in this is 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. 4 cr.

705. Topics in Applied Physiology

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. 4 cr.

720. Science and Practice of Strength Training

This course is 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 will be highlighted. Included in this will be 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. 4 cr.

724. Metabolic Adaptations to Exercise

Overview of the metabolic processes that occur during exercise and metabolic changes that occur as a result of exercise training. Topics covered 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. 4 cr.

736. Fitness and Graded Exercise Testing and Prescription

This course is 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. 4 cr.

737. Personal Training and Exercise Leadership

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. 4 cr.

794. Practicum in Cardiac Rehabilitation

Designed to provide students practical and theoretical experience in all aspects involving cardiac

rehabilitation exercise programs. Prereq: KIN 704; permission. 3 cr.

Outdoor Education

540. Top Rope Rock Climbing

Provides students with an understanding of the equipment, techniques, and procedures necessary to safely setup and manage top rope rock climbing and rappelling sites. Specific topics include: anchor construction, belay methods, climbing technique, and site selection and management. Prereq: KIN OE majors. Special fee. Lab. 2 cr.

541. Management of Initiatives and Challenge Courses

Management of adventure initiatives and challenge courses as an educational and therapeutic medium with a variety of populations. Focus on skill development, processing techniques, rescue skills, evaluation techniques, and applications to specific client groups. Prereq: KIN Outdoor Education majors. Special fee. Lab. 4 cr.

543. Winter Backpacking Skills

Provides an introduction to the leadership of winter expeditions. Students develop an understanding of winter trip planning and organization, winter nutrition and equipment, snow shoeing and/or backcountry skiing, cold weather injuries, snow shelter construction, winter camping, and group management on winter backpacking trips. Additional topics may include ice climbing and basic mountaineering skills. Prereq: KIN OE major, KIN 551. Special fee. Lab. 2 cr.

545. High Angle Rescue

Provides students with the skills necessary to perform self and group rescues in a variety of steep terrain and high angle environments. Specific topics include: knots for rescue, rope ascension, assisted/counterbalance rappelling, aid climbing, haul systems, and litter lowering and raising in vertical environments. Prereq: KIN OE majors, KIN 547, or equivalent experience. Special fee. Lab. 2 cr.

546. White Water Canoeing

A basic introduction to white water canoeing skills. Students will gain a basic understanding of the equipment, techniques, and procedures to conduct canoeing activities in flat water, moving water, and white water environments. Emphasis is on development of individual paddling skills, safe and conscientious paddling, and group management on moving water and white water. Prereq: KIN Outdoor Education majors, KIN 552. Special fee. Lab. 3 cr.

547. Lead Rock Climbing

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. Focus is 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 OE major, instructor permission. Special fee. Lab. 3 cr.

548. High Altitude Mountaineering

An introduction to mountaineering and alpine climbing skills. Students develop an understanding of glacier travel, snow and ice climbing, hazard evaluation, crevasse rescue, mountain weather and altitude considerations, and leadership in

mountain environments. Prereq: KIN OE major, instructors permission. Special fee. 4 cr.

550. Outdoor Education Philosophy and Methods

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. 4 cr.

551. Adventure Programming: Backcountry Based Experiences

Introduction to the leadership of land-based backpacking programs. Students will 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. Prereq: KIN Outdoor Education majors. Special fee. Lab. 3 cr.

552. Adventure Programming: Water Based Experiences

Introduction to the leadership of canoe expeditions. Students will 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 Outdoor Education majors, KIN 551. Special fee. Lab. 3 cr.

650B. Internship in Outdoor Education

Experiential learning in a setting appropriate to the major option and to student's objectives. An 8 credit internship will require a minimum of 600 hours experience; fewer credits will require proportionally fewer hours. Outdoor Education: Provides an appropriate transition from undergraduate education and future employment in the field of outdoor education. Generally done after students have completed all other requirements for the option. Prereq: junior/senior major; permission. Cr/F. May be repeated up to a maximum of 12 credits, with no more than 8 credits taken in any given semester. 2 to 8 cr.

681. Theory of Adventure Education

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 OE major, KIN 682. Special fee. Writing intensive. 4 cr.

682. Outdoor Leadership

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, 684, 685; OE majors. Special fee. 4 cr.

686. Wilderness Emergency Medical Care

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: current EMT-Basic

and CPR certifications; KIN Outdoor Education majors. Special fee. 4 cr.

687. Leadership Practicum

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 (i.e., current issues in risk management, conflict resolution, social justice issues, adaptive programming). Prereq: KIN 682; KIN OE major. Lab. 4 cr.

#782. Therapeutic Applications of Adventure Programming

Examines the use of adventure activities as elements of therapeutic treatment plans. Incorporates theoretical seminars and associated practical experiences. Prereq: KIN 550 or 681; KIN Outdoor Education majors. 4 cr.

#784. Programs in Outdoor Education

Provides students with an understanding of outdoor education program models currently being used, analyzing the principles underlying curriculum development and strategies for implementing such models. Prereq: KIN Outdoor Education majors. 4 cr.

786. Organization and Administration of Outdoor Education

Study of administration of outdoor education programs using a variety of organizational models. Students develop and, through simulated experiences, manage a program. Field experience. Special fee. KIN Outdoor Education majors. Writing intensive. 4 cr.

#787. Philosophical Foundations of Adventure Education

This course will examine the writings of thinkers such as Plato, Rousseau, and John Dewey and discuss their applications to the field of adventure education. Topics will include learning theory, human nature, aims of education, critical analysis and evaluation techniques. Prereq: permission required. 4 cr.

Physical Education Pedagogy

500. Historical and Contemporary Issues in Physical Education

Topics include relationship to medicine, social reform, and education; growth of the profession and its linkage to cognate fields of knowledge; current legal, ethical, and political issues in exercise, sport, and physical training. Prereq: KIN Physical Education Pedagogy or department approval. 4 cr.

504. Skill Analysis and Assessment

In skill analysis, pre-service teachers in physical education will develop an ability to observe accurately, analyze the correctness of movement, diagnose errors in performance, and provide learners with appropriate feedback and remediation to correct errors in sport and movement. In addition, assessment in physical education will be explored. This course has two purposes: 1) for pre-service teachers to learn to analyze and diagnose sport and movement of performance at various developmental levels, and 2) to develop a working knowledge of assessment in physical education. KIN Physical Education Pedagogy majors only. 4 cr.

563. Middle School and Secondary Physical Education Pedagogy

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. 4 cr.

600. Movement Fundamentals

Includes content relevant to teaching elementary physical education. Students learn how to perform fundamental movement skills, design lessons based on skill themes, and the relationship of both to the content areas of educational dance and gymnastics. Prereq: department approval. 4 cr.

601. Lifetime Sports

This course is designed to provide students with knowledge of lifetime activities and sports. Students will gain knowledge of activity patterns among youth and adults and an understanding of physical education programming designed to meet lifestyle changes. Instruction in lifetime activities will include fitness training, winter recreational sports, badminton, tennis, and golf. 3 cr.

602. Adventure Activities

Provides teachers with the technical, physical, and teaching skills necessary to instruct adventure activities, initiatives, ropes course management, and orienteering. Prereq: KIN Physical Education Pedagogy majors. Special fee. 3 cr.

603. Team Sports

Provides teachers with the technical, physical, and pedagogical skills necessary for instructing team sports, including soccer and volleyball. Prereq: KIN Physical Education majors. 3 cr.

604. Modern Dance

Introduction to dance in education. The course will begin with a focus on defining dance in art and in society. The focus will turn more intensively to the history, goals, and current curriculum in dance education. 4 cr.

606. Middle School and Secondary Physical Education Practicum

Students will apply knowledge of middle and secondary content and develop critical thinking skills through practical observing/teaching experiences in a school setting. Additionally, focused weekly seminars will facilitate discussions pertaining to the theory and practice of teaching. Each student will be assigned a cooperating teacher and a University supervisor to facilitate their practical experiences in a chosen school. Prereq: KIN 563; KIN Physical Education Pedagogy majors. Writing intensive. 4 cr.

608. Track and Field

Students acquire the foundational skills and learn about teaching strategies specific to the sport. Prereq: department approval. 1.5 cr.

609. Gymnastics

Students acquire foundational skills and learn about teaching strategies specific to the sport. Prereq: department approval. 1.5 cr.

675. Motor Development and Learning

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 Physical Education Pedagogy majors; family studies majors. 4 cr.

692. Elementary Physical Education Pedagogy Planning, implementing, and evaluating a move-

ment-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 Physical Education Pedagogy majors; KIN 600, 675. 4 cr.

781. Inclusion in Physical Education

This course will provide a foundation in developing the skills and dispositions needed to meet the educational needs of students with disabilities in the physical education setting. Content will include an overview of legal issues, disabilities, inclusion, the least restrictive environment, and the IEP process of writing goals and developing appropriate assessments. 4 cr.

783. Elementary Physical Education Practicum

Students will apply knowledge of elementary school content and develop critical thinking skills through a field experience in an elementary physical education program. As preservice teachers, students will observe, design, and teach physical education lessons under the supervision of a cooperating teacher and University faculty. 4 cr.

Sport Studies

561. History of American Sport and Physical Culture

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. 4 cr.

562. Introduction to Sports Information

Basic concepts of sports information related to preparation of material for public relations including radio, television, and publications. Includes guest lecturers and work in the UNH Sports Information Office. 4 cr.

580. Sport Industry

An overview of 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 will be some comparison to other countries. 4 cr.

650C. Internship in Sport Studies

Experiential learning in a setting appropriate to the major option and to student's objectives. An 8 credit internship will require 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. 2 to 8 cr.

740. Athletic Administration

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. 4 cr.

741. Social Issues in Contemporary Sports

Investigation of interrelationships among sport, culture, and society in an attempt to understand better 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. 4 cr.

743. Sport Marketing

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. 4 cr.

747. Sport Broadcasting

The course is an introduction to today's sport broadcasting business for future sport business professionals. Topics include the relationship between electronic media and the sport industry and a survey of today's media environment including radio, television, the Internet and emerging technologies. Other topics include demographics, market research, audience measurement, legal issues, production techniques, and contract negotiations. Readings, lectures, discussions, and opportunities for practical application. Prereq: department approval. 4 cr.

750. Theories of Motivation in Sport and Exercise

Social cognitive theories of achievement motivation as they relate to sport and exercise participation. Special attention will be directed at social interactions in sport. Prereq: PSYC 401; permission. 4 cr.

761. Senior Seminar Sport Studies

Discussions of sport studies topics, such as gambling, aggression, media, gender, race, class. Students will consider different disciplinary approaches to these topics and develop projects to advance knowledge related to their interests. Prereq: KIN: Sport Studies majors; permission. Writing intensive. 4 cr.

770. Psychological Skills in Performance

Provides essential elements of psychological skills training in performance. Focuses on mental aspects that enhance or inhibit physical performance. Theory, direct skill acquisition, and skill application are all integral to this course. Topics include: progressive relaxation, meditation, hypnosis, goal setting, and stress inoculation testing. Special fee. Prereq: PSYC 401 or KIN 780. 4 cr.

775. Sports Writing

Introduction to basic concepts and skills of sports writing, emphasizing regular beat coverage of sports. Students learn how to write columns, advance, game, and feature stories; to develop and retain sources; and to conduct interviews. Sports journalism history and research into the representation of gender, race, and class in the print sports media examined. 4 cr.

780. Psychological Factors in Sport

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. 4 cr.

#790. Social and Health Issues in Sport Psychology

Current trends in social and health psychology as they pertain to the competitive sports environment. Includes adherence motivation, bulimia, and anorexia in athletes, self-theory, exercise and depression, and substance abuse in sports. Prereq: PSYC 401 or KIN 671. 4 cr.

Languages, Literatures, and Cultures (LLC)

(For department note, see page 40.)

Coordinator: Juliette M. Rogers, French

Professors: Barbara T. Cooper, French; F. William Forbes, Spanish; Ronald D. LeBlanc, Russian; Nancy Lukens, German

Associate Professors: Nadine S. Berenguier, Russian; Arna Beth Bronstein, German; Roger S. Brown, Spanish; John M. Chaston, Russian; Aleksandra Fleszar, Spanish; Janet Gold, German; Edward T. Larkin, Spanish; Lina Lee, French; Clare-Lise Malarte-Feldman, German; Mary E. Rhiel, French; Juliette M. Rogers, Classics

Assistant Professors: Stephen Andrew Brunet, Classics; Richard E. Clairmont, Spanish; Marco Dorfman, French; Piero Garofalo, Spanish; Lori Hopkins, Spanish; Monica Jato, Spanish; Stephen D. Johnson, Classics; Robert Scott Smith, Classics; Stephen M. Trzaskoma, Spanish
Adjunct Faculty: Nina Gatzoulis, Classics; Claire-Helene S. Gaudissart, French; Jacques R. Georges, French; Anna K. Sandstrom, French; Henry M. Smith, French; Katharine E. Stansfield, French

Chinese (CHIN)

401. Elementary Chinese

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. 4 cr.

402. Elementary Chinese

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. 4 cr.

503. Intermediate Chinese

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. 4 cr.

504. Intermediate Chinese

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. 4 cr.

Classics (CLAS)

(For program description, see LLC/Classics, page 40; for faculty listing, see page 185; see also course listings under Greek and Latin.)

401/401H. Classical Mythology

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. 401H is writing intensive. 4 cr.

#402. Hellenic and Roman Institutions

Lecture, discussion. Introduction to ancient Greek and Roman literature. Emphasis on the institutions from the earliest period to the end of the classical age. Open to all students. 4 cr.

405. Introduction to Greek Civilization

A broad historical exploration of Greek civilization. Topics covered 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. 4 cr.

406. Introduction to Roman Civilization

A broad historical exploration of Roman civilization. Topics covered 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. 4 cr.

#411, #412. Elementary Hittite

Elements of grammar, reading of simple prose. Special fee. 4 cr.

413, 414. Elementary Sanskrit

Elements of grammar, reading of simple prose. Special fee. 4 cr.

421. Major Greek Authors in English

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. Writing intensive. 4 cr.

422. Major Roman Authors in English

Major classical authors such as Plautus, Terence, Cicero, Catullus, 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. 4 cr.

500. Classical Mythology: Topics in World Literature

Topics will be chosen which 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. 4 cr.

#506. Introduction to Comparative and Historical Linguistics

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.) 4 cr.

525. Greek and Latin Origins of Medical Terms

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, preveterinary, nursing, medical technology, and other students in the biological and physical sciences. Open to all students. 4 cr.

595, 596. Topics

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. 4 cr.

603. Fall of the Roman Republic

Introduction to the political background of Cicero's career and study of the role played by the greatest of Roman orators in the constitutional crisis of the last century of the Republic. Open to all students. Writing intensive. 4 cr.

604. Golden Age of Rome

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. Writing intensive. 4 cr.

#621, #622. Masterpieces of Greco-Roman Culture in English

More advanced study of the writings of classical civilization centered on a single theme and taught in the Socratic method. For students with some classical preparation, although no knowledge of the Greek and Latin languages is required. Background for prelaw students as well as majors in English, History, Latin, Greek, modern languages, and political science. Writing intensive. 4 cr.

694. Supervised Practicum

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. 2 or 4 cr.

695, 696. Special Studies

Advanced work in classics. Research paper. Not open to freshmen and sophomores. 2 or 4 cr.

French (FREN)

(For description of courses, see page 186. For program description, see LLC/French, page 41.)

New students will be initially assigned to the proper course on the basis of a placement test or AP scores. All courses are conducted in French unless otherwise noted. FREN 631 is the first course counting toward a major. Students educated in French-speaking countries may not register for courses below the 700 level without permission. No UNH or transfer credit will be

given for elementary-level college courses in French if the student has had two or more years of French in secondary school within the past seven years.

401-402. Elementary French

Conducted in French. For students without previous training French. Aural comprehension, speaking, writing, reading. Labs. (No credit for students who have had two or more years of French in secondary school; however, any such students whose studies of French have been interrupted for a significant amount of time should consult the department chairperson about possibly receiving credit. 401-402 taken together satisfies the foreign language requirement. Special fee. 4 cr.

425. Introduction to French Studies

Taught in English, designed for students interested in exploring the history, literature, and culture of France and other French-speaking countries. Learning by means of guest speakers, and multimedia. Prepares for FREN 401-402. Does not satisfy B.A. foreign language requirement, but does satisfy the general education requirement(s) for foreign culture and the prerequisite for the French studies minor. Special fee. (Offered spring semesters and occasional summer semesters.) Writing intensive. 4 cr.

426. Introduction to Francophone Studies

Taught in English, designed for students interested in exploring the history, literature, and culture of Quebec and French-speaking Canada. Learning by means of lecture, discussion, guest speakers, and multimedia. Prepares for FREN 401-402 and 526. Does not satisfy B.A. foreign language requirement, but does satisfy the prerequisite for the French studies minor. Special fee. Writing intensive. 4 cr.

500. Selected Topics in World Literature

Topics will be chosen which 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. 4 cr.

501. Intensive Review of French

Conducted in French, the course emphasizes the active use of French through speaking, reading, and writing. Review of basic grammar. Labs and films. Designed primarily for those whose study of French has been interrupted for a significant amount of time and for those who have had two years of high school French. Special fee. 4 cr.

503/503H-504/504H. Intermediate French

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. 4 cr.

521. French Prose in Translation

Works affecting French thought from the Renaissance to the modern period. Readings, discussion, papers in English. Not for major credit. Special fee. (Not offered every year.) Writing intensive. 4 cr.

522. French Drama in Translation

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.) 4 cr.

525. Introduction to French Civilization and Culture

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 Special fee. (Not offered every year.) Writing intensive. 4 cr.

526. Introduction to Francophone Cultures

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. 4 cr.

582. Study Abroad in Paris

Study with the University of Delaware program in Paris, France. For students who have completed FREN 501 or 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. 1 to 16 cr.

585. Intermediate Language Study in France

Equivalent to FREN 503, requires four weeks of intensive study of French language and culture at the Centre International d'Etudes des Langues (CIEL) in Brest, France. Prereq: FREN 501 or French 4 in a U.S. high school, with a grade of C+ or better and permission. Special UNH administrative fee and DCE registration fee. Student responsible for personal and travel expenses, and tuition costs in France. Special fee. (Offered summers only.) 4 cr.

586. Intermediate Language Study in France

Equivalent to FREN 504, requires four weeks of intensive study of French language and culture at the Centre International d'Etudes des Langues (CIEL) in Brest, France. Prereq: FREN 503 or 585 with a grade of C+ or better and permission. Special UNH administrative fee and DCE registration fee. Student responsible for personal and travel expenses and tuition costs in France. Special fee. (Offered summers only.) 4 cr.

595. French Practicum

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. 2 cr.

631, 632. Advanced French Conversation and Composition

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. 4 cr.

651/651H. Readings in French Literature

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. 4 cr.

652/652H. Readings in French Literature

See description for FREN 651. May be taken before or after FREN 651. Writing intensive. 4 cr.

675. Topics in French Civilization

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. 4 cr.

676. Topics in Francophone Culture

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. 4 cr.

677. France in the European Union

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. 4 cr.

682. Study Abroad in Paris

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. 1 to 16 cr.

683. Advanced Language Study in France

Equivalent to FREN 631, 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 504 with a grade of C or better and permission. Special UNH administrative fee and DCE registration fee. Student responsible for personal and travel expenses and tuition costs in France. Special fee. Offered summers only. 4 cr.

684. Advanced Language Study in France

Equivalent to FREN 632, 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 504 or FREN 683, with a grade of C or better and permission. Special UNH administrative fee and DCE registration fee. Student responsible for personal and travel expenses and tuition costs in France. Special fee. (Offered summers only.) 4 cr.

685-686. Junior Year at the University of Burgundy

Studies at the University of Burgundy (in Dijon, France) for juniors who have completed their sophomore year at UNH and have passed with a grade of B or better FREN 631-632, FREN 651 & 652. Students are expected to take French courses in each semester of their freshman and sophomore years. Attendance required at orientation sessions during the second semester of sophomore year. Interested students should consult the director of the program. Prereq: permission. (Not for graduate credit.) Special fee. Cr/F. 16 cr.

762. 17th Century French Literature

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered fall semester in alternate years.) Writing intensive. 4 cr.

765. 18th Century French Literature

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered spring semester in alternate years.) Writing intensive. 4 cr.

775. 19th Century French Literature

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered fall semester in alternate years.) Writing intensive. 4 cr.

782. 20th Century French Literature

Prereq: FREN 651 and 652 or equivalent. Special fee. (Offered spring semester in alternate years.) Writing intensive. 4 cr.

785. Topics in Francophone Literatures

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. 4 cr.

790. Advanced Language and Style

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. 4 cr.

791. Methods of Foreign Language Teaching

Objectives, methods, and techniques in teaching foreign languages from elementary grades through college. Discussion, demonstration, preparation of instructional materials, microteaching of the language skills. Prereq: permission. Not for major or minor credit. (Fall semester only.) 4 cr.

795, 796. Special Studies in French Language and Literature

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.) 1 to 4 cr.

798. Seminar in French Literature

Topics chosen by the instructor. May be repeated for credit barring duplication of material. Prereq: FREN 651, 652; permission. (Not offered every year.) 4 cr.

799. Honors Senior Thesis

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. 2 cr.

German (GERM)

(For program description, see LLC/German, page 42; for faculty listing, see page 185.)

New students will be initially assigned to the proper course based on their scores on the College Board Achievement Test or number of years of previous study. New students are encouraged to present scores on the German Advanced Placement (AP) Test for UNH course credit and for placement at an advanced level. No transfer or UNH credit can be given for elementary German (401-402) if the student has had two or more years of that language in secondary school unless a significant amount of time has elapsed since completion of the last course. Students may petition the German program to be admitted to the 400-level courses for credit. Students considering a major or minor in German should consult with the program as early as possible to plan a meaningful sequence of study and to discuss options for studying abroad. All courses are conducted in German unless otherwise indicated.

401-402. Elementary German

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. 4 cr.

440. Cultural Approaches to Film and Fascism

Taking a transnational perspective, this course examines the phenomenon of fascism through its cinematic representation. "Fascism and Film" analyzes definitions of fascism, narrative representations of fascism and the role of propaganda in fascism. Special fee. 4 cr.

500. Selected Topics in World Literature

Topics will be chosen which introduce students to major themes and genres. (Also offered as CLAS 550, FREN 500, ITAL 500, PORT 500, RUSS 500, SPAN 500.) May be repeated for credit. Credit/Fail. Writing intensive. 4 cr.

#501. Review of German

Refresher course for those whose study of German has been interrupted or who have had no more than two years of high school German. Emphasis on oral-aural practice; review of basic structures; reading and writing to develop active command of the language. Lab. Special fee. 4 cr.

503-504. Intermediate German

Review of grammar; practice in oral and written expression; readings and cultural material. Prereq: GERM 401-402 or equivalent. Labs. Special fee. 4 cr.

#520. Women in German Literature and Society (in translation)

A study of representative works by and about women in German society from the 18th century to the present. Texts discussed include fiction, fairy tales, autobiography, interviews, poetry, diaries, historical essays, and film, as well as selected critical works on the history of German feminism and feminist aesthetics. May be taken for major credit. Special fee. 4 cr.

#521. Major German Authors in English

Selected masterpieces of the 18th, 19th, and 20th centuries by authors such as Goethe, Mann, Kafka, Hesse, Bachmann, by authors such as Goethe, Heine, Mann, Kafka, Hesse, Bachmann, Koeppen, Brecht, Frisch, Wolf, and Durrenmatt. Readings and discussions in English. May be taken for major credit. Special fee. 4 cr.

#523. Women and German Film

Acquaints students with major German film texts. Asks gender-specific questions about German film history, male and female film makers, the construction of sexuality through film images and narrative, and the impact of feminism on these. In English. Special fee. 4 cr.

524/524H. Special Topics in German Film

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. 4 cr.

525/525H. Introduction to German Culture and Civilization

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. 4 cr.

585. Rosenheim Summer Program: A Review of German

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. The course is conducted during the summer in Rosenheim, Germany. Special fee. Prereq: one year of college, elementary German or equivalent; permission. 4 cr.

595. Internship

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 2-4 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. 2 to 4 cr.

601. Introduction to German Literature

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. 4 cr.

624. Topics in German Cultural Studies

Exploration in depth of a specific topic in German cultural history, using the interdisciplinary methods of cultural studies. Texts and discussion are in English. May be repeated to a maximum of 8 credits. 4 cr.

#630/630H. German Narrative Forms

Textual studies based on works from one of the following prose genres: novel; novella; autobiography; fairy tale; short prose (short story, parable, documentary prose, feuilleton). Focus on the nature and characteristics of the genre, thematic and stylistic features of each text, and the diverse cultural, political, gender, or national perspectives that generate these forms. Special fee. 4 cr.

631/631H. Advanced Communications Skills I

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. 4 cr.

632. Advanced Communications Skills II

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. 4 cr.

640. German Drama

Selected masterpieces of the German theatre from the 18th century to the present, including reception and performance history. Course may vary in emphasis from classical German tragedy and comedy to more modern forms such as didactic and

documentary plays, tragicomedy, and farce. Special fee. Writing intensive. 4 cr.

645/645H. Contemporary German Literature
Literary trends in the German-speaking countries since 1945. Analysis and interpretation of works by major authors. Special fee. Writing intensive. 4 cr.

685, 686. Study Abroad

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. 16 cr.

#720. Images of Women in German Literature
Reading and analysis of original texts by both male and female authors from the Middle Ages to the present with a view toward the changing representation and self-concept of women. Critical approaches to the literary canon. Prereq: GERM 504 or equivalent experience. Special fee. 4 cr.

#721/721H. German Culture and Civilization
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. 4 cr.

724/724H. Age of Goethe
Major literary movements between 1770 and 1832. Reading and analysis of selected works. Special fee. Writing intensive. 4 cr.

727. German Literature of the 19th Century
Major literary movements from Goethe's death to the unification of Germany by Bismarck (1832-1872). Reading and analysis of selected works. Special fee. Writing intensive. 4 cr.

728/728H. Modern German Literature
Major literary movements from 1872 to 1945. Reading and analysis of selected works. Special fee. Writing intensive. 4 cr.

791. Methods of Foreign Language Teaching
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-assisted instruction. Prereq: permission of instructor. Special fee. 4 cr.

795/795H, 796. Independent Study
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. 1 to 4 cr.

797, 798. Special Studies in German Language and Literature
Selected topics in language, culture, and literature. 2 or 4 cr.

Greek (GREK)

(For program description, see LLC/Greek, page 42; for faculty listing, see page 185; see also course listings under Latin and Classics.)

New students will be initially assigned to the proper course on the basis of their scores on the College Board Achievement Test or number of years of previous study. Transfer credit will not be given for elementary-level college courses in foreign languages if a student had two or more years of the foreign language in secondary school.

401-402. Elementary Classical Greek
Grammar, simple composition, and translation. For students without previous training in Greek. Special fee. 4 cr.

403-404. Elementary Modern Greek
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. 4 cr.

503-504. Intermediate Classical Greek
Readings from Xenophon, Plato, Herodotus, Euripides, and the New Testament. Prereq: GREK 402. Special fee. 4 cr.

505-506. Intermediate Modern Greek
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. 4 cr.

595, 596. Directed Reading in Greek
Independent study of a classical, Byzantine, or modern Greek author. May be repeated. Prereq: GREK 503-506, or equivalent. Special fee. 2 or 4 cr.

#631, #632. Greek Prose Composition
Review of Attic Greek grammar; study of Greek prose style; English to Greek translation. Prereq: permission. Special fee. 4 cr.

635-636. Third Year Modern Greek
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. 4 cr.

751, 752. Homer and the Archaic Period
Readings from the Iliad, the Odyssey, the Homeric hymns, Hesiod, Pindar, and the lyric poets. Prereq: permission. Special fee. 4 cr.

753, 754. Advanced Study in Athenian Literature
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. 4 cr.

791. Methods of Foreign Language Teaching
Objectives, methods, and techniques in teaching foreign languages from elementary grades through college. Discussion, demonstration, preparation of instructional materials, microteaching of the language skills. Prereq: permission. Special fee. 4 cr.

795, 796. Special Studies

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. Writing intensive. 4 cr.

Italian (ITAL)

(For program description, see LLC/Italian, page 42; for faculty listing, see page 185.)

401-402. Elementary Italian
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. 4 cr.

425. Introduction to Italian Studies
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. 4 cr.

500. Selected Topics in World Literature
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. 4 cr.

503-504. Intermediate Italian
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. 4 cr.

521. Italian Literature in Translation, 13th-16th Centuries
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. 4 cr.

522. Italian Literature in Translation, 18th-20th Centuries
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. 4 cr.

525. Italian Cinema
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. 4 cr.

595. Practicum

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. 2 cr.

631. Advanced Italian Conversation and Composition

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. 4 cr.

632. Advanced Italian Conversation and Composition

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. 4 cr.

651. Introduction to Italian Culture and Civilization I: Middle Ages, Renaissance, Baroque

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. 4 cr.

652. Introduction to Italian Culture and Civilization II: Age of Enlightenment, Romanticism, Modernism

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. 4 cr.

681/681A-B. Interdisciplinary Field Seminar in Italian Culture: Ancient and Medieval Italy

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. Coreq: ARTS 695I. 4 cr.

682/682A-B. Interdisciplinary Field Seminar in Italian Culture: Early Modern and Contemporary Italy

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. Coreq: ARTS 695I. 4 cr.

685, 686. UNH-In-Italy Study Abroad

Provides a unique opportunity to study abroad in Ascoli Piceno, Italy during the fall semester. Special fee. cr.

733. History and Development of the Italian Language

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. 4 cr.

795, 796. Independent Study in Italian Language and Literature

Individual guided study. Prereq: permission. 1 to 4 cr.

Japanese (JPN)

(For department information, see page 40; for faculty listing, see page 185.)

Transfer credit will not be given for elementary-level college courses in foreign language if a student has had two or more years of the foreign language in secondary school.

401-402. Elementary Japanese

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. 4 cr.

425. Introduction to Japanese Culture and Civilization

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. 4 cr.

503-504. Intermediate Japanese

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. 4 cr.

#631. Advanced Japanese

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. Special fee. 4 cr.

#632. Advanced Japanese

See description for JPN 631. 4 cr.

795, 796. Independent Study

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. 1 to 4 cr.

Latin (LATN)

(For program description, see LLC/Latin, page 42; for faculty listings, see page 185; see also course listings under Classics and Greek.)

New students will initially be assigned to the proper course on the basis of their scores on the College Board Achievement Test or number of years of previous study. Transfer credit will not be given for elementary-level courses in foreign languages if a student has had two or more of the foreign language in secondary school.

401-402. Elementary Latin

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. 4 cr.

501. Review of Latin

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. 4 cr.

502. Latin Syntax and Composition

A continuation of LATN 501. Intensive review of Latin syntax; introduction to reading and composition. Special fee. 4 cr.

503-504. Intermediate Latin

Review. Readings from Cicero, Caesar, Sallust, Livy, Catullus, Horace, Ovid, Plautus, Terence, and Seneca. Prereq: LATN 402 or equivalent. Special fee. 4 cr.

595, 596. Directed Reading

Independent study of a classical or medieval Latin author. May be repeated. Prereq: LATN 503, 504, or equivalent. Special fee. Cr/F. 2 or 4 cr.

631, 632. Latin Prose Composition

Grammar review; study of Latin prose style; English to Latin translation. Prereq: permission. Special fee. 4 cr.

751, 752. Cicero and the Roman Republic

Prereq: permission. Special fee. 4 cr.

753, 754. Advanced Studies in the Literature of the Golden Age

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. 4 cr.

755, 756. Advanced Studies in the Literature of the Silver Age

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. 4 cr.

791. Methods of Foreign Language Teaching

Objectives, methods, and techniques in teaching foreign languages from elementary grades through college. Discussion, demonstration, preparation of instructional materials, microteaching of the language skills. Prereq: permission. Special fee. 4 cr.

795, 796. Special Studies

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. 4 cr.

Portuguese (PORT)

(See LLC, page 40; for faculty listing, see page 185.)

401-402. Elementary Portuguese

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 401 and 402 together satisfies the foreign language requirement.) 4 cr.

500. Selected Topics in World Literature

Topics will be chosen which 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. Credit/Fail. Writing intensive. 4 cr.

503-504. Intermediate Portuguese

Conducted in Portuguese. Conversation and composition based on readings in contemporary Portuguese and Brazilian literature, especially theatre, which is closest to conventional language. A traditional grammar text supplements readings. Special fee. Lab. 4 cr.

595. Portuguese Practicum

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. 2 cr.

Russian (RUSS)

(For program description, see LLC/Russian, page 43; for faculty listing, see page 185.)

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 course for credit. In the 401-790 range, a grade of C or better is required to advance to the next course in the language series.

401-402. Elementary Russian

Oral-aural practice and written drills designed to achieve a mastery of basic grammatical patterns. Language lab and computer lab work. For students without previous training in Russian. Special fee. 4 cr.

425. Introduction to Russia: Contemporary Society and Culture

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. 4 cr.

426. Film and Communism

An examination through film of Soviet/Communist mythology from its birth to its deconstruction. Particular attention will be focused on the instructive nature of Soviet film (1917-1991) and the cultural idioms used in this medium. Taught entirely in English. Films, readings, lectures, discussion. No prerequisites. Special fee. 4 cr.

500. Selected Topics in World Literature

Topics will be chosen which 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. Credit/Fail. Writing intensive. 4 cr.

#502. Review Russian for Intermediate Students

Reviews the complete Russian declensional system, singular and plural, nouns, adjectives, possessives, and verb system (conjugations, aspectual usage, imperative usage and formation). Students successfully completing this (with a C or better) should be able to continue their study in RUSS 504. Prereq: RUSS 402 or equivalent; permission. Special fee. 4 cr.

503-504. Intermediate Russian

Continuation of RUSS 401-402. Review of Russian grammar, and practice in oral and written expression. Prereq: RUSS 402 or equivalent high school or college course with a grade of C or better. Special fee. 4 cr.

521. Survey of 19th Century Russian Literature in English

Selected masterpieces of 19th-century Russian literature. Pushkin, Gogol, Tolstoy, Dostoevsky, Chekhov, and others. Lectures and readings in English. Open to all students, including freshmen. Special fee. Writing intensive. 4 cr.

522. Survey of 20th Century Russian Literature in English

Selected masterpieces of 20th century Russian literature. Chekhov, Pasternak, Bely, Bulgakov, Solzhenitsyn, and others. Lectures and readings in English. Open to all students, including freshmen. Special fee. Writing intensive. 4 cr.

593. Major Russian Authors in English

In-depth discussion and analysis of a major Russian author or literary period. A different author or period offered each semester. Lectures and readings in English. Open to all students. Not for major credit; majors must register for RUSS 693. Special fee. Writing intensive. 4 cr.

601. Russian Conversation and Phonetics

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. 4 cr.

631, 632. Advanced Russian Conversation and Composition

Advanced spoken and written Russian designed to maintain aural-oral fluency; emphasis on translation and advanced grammatical structures. Prereq: RUSS 503-504 or equivalent with a grade of C or better. Special fee. 4 cr.

685, 686. Study Abroad

Studies at a Russian institution of higher learning. Interested students should consult with a Russian adviser. 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.) 16 cr.

691. Readings in Russian Literature

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. 4 cr.

693. Major Russian Authors

Same as RUSS 593, except that majors may do selected readings in Russian and conduct research assignments on a specified topic. Final projects required. Special fee. 4 cr.

721. Topics in Contemporary Russian Literature: From Chekhov to Post-Modernism

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. 4 cr.

725. Topics in Russian Culture and Society

Historical, geographical, social, political, intellectual and artistic developments in Russia which have influenced contemporary Russian society and culture. Readings, class discussions, and films. Conducted entirely in Russian. Special fee. Writing intensive. 4 cr.

733. History and Development of the Russian Language

Overview of the changes in sounds, structure, and vocabulary from Proto-Indo-European through Old Church Slavonic, Old Russian, to contemporary Russian. Readings in culture and civilization parallel to the chronology of the studied linguistic period. Prereq: grade of C or better in last Russian course taken. Special fee. 4 cr.

790. Advanced Language and Style

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. 4 cr.

791. Methods of Foreign Language Teaching

Objectives, methods, and techniques in teaching foreign languages from elementary grades through college. Discussion, demonstration, preparation of instructional materials, microteaching of the language skills. Prereq: permission. Special fee. 4 cr.

795, 796. Independent Study

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. 1 to 4 cr.

797, 798. Special Studies in Russian Language, Literature, and Culture

Selected topics in language, literature, and culture. Barring duplication of subject, may be repeated for credit. 2 or 4 cr.

Spanish (SPAN)

(For program description, see LLC/Spanish, page 43; for faculty listing, see page 185; see also course listings under Portuguese.)

New students will be assigned to the proper course on the basis of their scores on the departmental placement test or AP score. Credit will not be given for elementary-level college courses in foreign languages if a student has had two or more years of the foreign language in secondary school. No student educated in a foreign country or for whom Spanish is the native tongue will be permitted to register for any Spanish course numbered 649 or below, except 601. All courses are conducted in Spanish except where noted. In the 401-632 range, a grade of C or better is required to advance to the next course in the language series.

401-402. Elementary Spanish

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 a significant period of time should consult the chair about possibly receiving credit.) SPAN 401 is a prerequisite for SPAN 402 and cannot be taken separately without permission of instructor. 401-402 taken together satisfies the foreign language requirement. Special fee. 4 cr.

#407. Accelerated Spanish

Conducted in Spanish. SPAN 401-402 in one semester. Study of fundamental speech patterns, reading and writing to achieve a firm basis for active command of Spanish. Labs. Previous knowledge of Spanish is not required. (No credit for students who have had two or more years of Spanish in secondary school; students whose studies of Spanish have been interrupted for a significant period of time should consult the chair about possibly receiving credit.) Special fee. 8 cr.

500. Selected Topics in World Literature

Topics will be chosen which 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. 4 cr.

501. Review of Spanish

Conducted in Spanish. Emphasis on aural/oral practice; review of basic structure; reading and writing to develop active command of the language. Labs. Designed for those whose study of Spanish has been interrupted for a significant amount of time and for those who have had only two years of high school Spanish. Special fee. Satisfies the foreign language requirement. 4 cr.

503/503H, 504/504H. Intermediate Spanish

Conducted in Spanish. Emphasis on 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. 4 cr.

521. Spanish and Portuguese Literature in Translation

Major works by principal authors, such as: Camoens, Cervantes, Lope de Vega, Calderon, Eca de Queiroz, Unamuno, Ortega y Gasset,

Garcia Lorca, Casona, etc. Readings, discussions, papers in English. Does not count for Spanish major. May be repeated. Special fee. Writing intensive. 4 cr.

522. Latin American and Brazilian Literature in Translation

Major works by principal authors, such as Inca Garcilaso, Diaz del Castillo, Machado de Assis, Borges, Asturias, Neruda, E. Verissimo, Fuentes, Lenero, Guimaraes Rosa, and Jorge Amado. Readings, discussion, papers in English. Does not count toward Spanish major. May be repeated. Special fee. Writing intensive. 4 cr.

525/525H. Spanish Civilization and Culture

Historical, geographical, and artistic expressions of Spanish civilization that have formed the character of contemporary Spanish culture. Readings, slides, films, tapes, and records. Conducted in English. Majors must take either 525 or 526, but both may not be counted for major credit. Special fee. 4 cr.

526/526H. Latin American Civilization and Culture

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. 4 cr.

595. Practicum

Practical use of Spanish language or cultural skills outside the classroom through special projects. Prereq: SPAN 504. 2 cr.

601. Spanish Phonetics

Practical application of fundamental phonetic theory to spoken Spanish. Required of Spanish majors. Special fee. 4 cr.

631/631H, 632. Advanced Conversation and Composition

To maintain and perfect written and spoken Spanish through intensive classroom work, individual conferences, and laboratory sessions. Discussion and frequent papers in Spanish based on cultural and literary readings, audiotapes, and videos. Prereq: SPAN 504 or equivalent. Special fee. Writing intensive. Satisfies the foreign language requirement. 4 cr.

One course from SPAN 650, 651, 652, 653, 654 (or an equivalent course) is a prerequisite to all higher literature courses in Spanish.

650. Introduction to Critical Analysis

Methods and practice of literary criticism. Critical analysis of representative essays, fiction, poetry, and drama from Spain and Latin America. Frequent short papers. Required of Spanish majors; should be taken concurrently with or immediately following SPAN 632. Special fee. Writing intensive. 4 cr.

651, 652. Introduction to Spanish Literature and Thought

Reading and analysis of major works within the historical, cultural, and social background of the Iberian peninsula. Papers, discussion, and examinations in Spanish. Prereq: SPAN 631, 632. May be taken concurrently with SPAN 632 with permission of adviser. Special fee. Writing intensive. 4 cr.

653, 654. Introduction to Latin American Literature and Thought

Reading and analysis of major works within the historical, cultural, and social background of the New World. Papers, discussion, and examinations

in Spanish. Prereq: SPAN 631, 632. May be taken concurrently with SPAN 632 with permission of adviser. Special fee. Writing intensive. 4 cr.

685, 686. Study Abroad/Granada

Studies at a Spanish or Latin American university. 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.) 16 cr.

691, 692. Readings in Current Periodicals

Advanced practice in reading, speaking, and writing, based on current events in contemporary periodicals of the Spanish-speaking world. May be repeated. Pre- or Coreq: SPAN 632 or equivalent. Special fee. 2 cr.

#733. History of the Spanish Language

Evolution of the Spanish language from the period of origins to the present. Special fee. 4 cr.

752. Drama and Poetry of the Siglo de Oro

Social and historical background of the baroque period. Representative plays of Lope de Vega, Tirso de Molina, Calderon; lyric poetry of Lope, Gongora, and Quevedo; prose developments. Prereq: SPAN 652 or 654 or equivalent. Special fee. (Not offered every year.) 4 cr.

754. Age of Cervantes

Study of the major works of Cervantes and his contemporaries in the context of the historical, literary, and social currents of the times. Prereq: SPAN 652 or 654 or equivalent. Special fee. (Not offered every year.) 4 cr.

#755. Literature of the 19th Century

Larra, Espronceda, Becquer, Perez Galdos, and Blasco Ibanez. Romanticism, realism, and naturalism. Prereq: SPAN 652 or 654 or equivalent. Special fee. (Not offered every year.) 4 cr.

#756. Modern Spanish Poetry

Study of selected Spanish poets of the 18th, 19th, and 20th centuries in the context of historical, literary, and social currents of the time. Prereq: SPAN 652, 654, or equivalent. Special fee. (Not offered every year.) 4 cr.

#757. Spanish Drama of the 20th Century

Study of selected Spanish dramatic works of the 20th century in the context of the historical, literary, and social currents of the times. Prereq: SPAN 652, 654, or equivalent. Special fee. (Not offered every year.) 4 cr.

#758. Spanish Prose of the 20th Century

Novels, short stories, and essays, Unamuno, Baroja, Menendez Pidal, Ortega y Gasset, Julian Marias, Aranguren, Perez de Ayala, Gironella, and Cela; survey of contemporary prose. Prereq: SPAN 652, 654, or equivalent. Special fee. (Not offered every year.) 4 cr.

#771. Latin American Drama

From pre-Hispanic origins to the present, modern playwrights of Mexico and Puerto Rico. Prereq: SPAN 652, 654, or equivalent. Special fee. (Not offered every year.) 4 cr.

#772. Latin American Novel

Development from romanticism to the present; contemporary trends and techniques. Prereq: SPAN 652, 654, or equivalent. Special fee. (Not offered every year.) 4 cr.

773. Latin American Short Story

Representative authors; stress on 20th century. Principles of interpretation. Prereq: SPAN 652, 654, or equivalent. Special fee. (Not offered every year.) 4 cr.

#774. Major Latin American Authors

Works and lives of selected writers; pertinent historical circumstances. Prereq: SPAN 652, 654, or equivalent. Special fee. (Not offered every year.) 4 cr.

790. Grammatical Structure of Spanish

Overview of the grammatical structure of Spanish through in-depth analysis of both morphology and syntax, with emphasis on the meaningful contrasts within the Spanish language and the grammatical contrasts between Spanish and English. Special fee. 4 cr.

791. Methods of Foreign Language Teaching

Objectives, methods, and techniques in teaching foreign languages from elementary grades through college. Discussion, demonstration, preparation of instructional materials, microteaching of the language skills. Prereq: permission. Special fee. 4 cr.

795. Independent Study

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 major supervisor. 1 to 4 cr.

795K. Special Studies in Contemporary Latin American Literature

2 or 4 cr.

797. Special Studies in Spanish Language and Literature

A) History of the Spanish Language; B) Medieval Spanish Literature; C) Spanish Literature of the Renaissance; D) Spanish Literature of the Golden Age; E) Spanish Literature of the 18th and 19th Centuries; F) Spanish Literature of the 20th Century; G) Contemporary Spanish Literature; I) Latin American Literature of the 16th and 17th Centuries; J) Latin American Literature of the 18th and 19th Centuries; K) Latin American Literature of the 20th Century; M) Contemporary Latin American Literature; N) Structural and Applied Linguistics; O) Spanish Literary Criticism; P) Latin American Essay; Q) Latin America; S) Spanish Theatre; T) Spanish Poetry; U) Latin American Poetry; V) Galdos; W) Archetype Latin American Literature; X) Special Teaching Problems; Y) Spanish Civilization and Culture; Z) Latin American Civilization and Culture. Specialized courses covering topics not normally presented in regular course offerings. Prereq: permission of major supervisor. Special fee. Writing intensive. 2 or 4 cr.

798. Special Studies in Spanish Language and Literature

A) Historic Minorities of the United States; B) Portuguese; C) Hispanic Film; D) Introduction to Hispanic Linguistics; E) Hispanic Dialectology; F) Other. Specialized courses covering topics not normally presented in regular course offerings. Barring duplication of content, topic F may be repeated for credit. Prereq: permission of major supervisor. Special fee. 4 cr.

799. Senior Honors

For senior Spanish majors with a minimum cumulative grade-point average of 3.20 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. 4 cr.

Life Sciences and Agriculture (LSA)

(For program description, see page 78.)

400. Freshman Seminar

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. 1 cr.

Linguistics (LING)

(For program description, see page 43.)

505/505H. Introduction to Linguistics

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 505.) 4 cr.

#506. Introduction to Comparative and Historical Linguistics

Major language families (primarily Indo-European) and the relationships among languages within a family. Diachronic studies; methods of writing; linguistic change; glottochronology; etymological studies. Some language training and LING 505 desirable. (Also offered as CLAS 506.) 4 cr.

605. Introduction to Linguistic Analysis

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 505, or permission. (Also offered as ENGL 605.) 4 cr.

620. Applied Experience in Linguistics

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. 1 to 4 cr.

695. Senior Honors

Open to senior LING majors who, in the opinion of the department, have demonstrated the capacity to do superior work. Prereq: permission. 4 cr.

717. World Englishes

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 offered as ENGL 717.) 4 cr.

719. Sociolinguistics Survey

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: LING 505 or permission. (Also offered as ENGL 719.) 4 cr.

779. Linguistic Field Methods

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. 4 cr.

790. Special Topics in Linguistics Theory

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. 4 cr.

793. Phonetics and Phonology

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.) 4 cr.

794. Syntax and Semantic Theory

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. 4 cr.

795, 796. Independent Study

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. 1 to 4 cr.

Management (MGT)

(For program description, see page 99.)

Chairperson: Michael J. Merenda

Professors: Francine S. Hall, Allen M. Kaufman, Michael J. Merenda

Affiliate Professor: Joseph E. Michael, Jr.

Associate Professors: Carole K. Barnett, Ross J. Gittell, William Naumes, Rita Weathersby

Assistant Professor: Anthony T. Pescosolido

Affiliate Assistant Professor: Margaret Naumes

Adjunct Faculty: Eric Herr

580. Introduction to Organizational Behavior

Application of behavioral science concepts to work settings in profit and nonprofit organizations. Individual 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 MGT 611. Prereq: ACFI 501; ECON 401 or 402. 4 cr.

614. Organization Theory

Provides a framework and concepts for understanding the nature and functioning of organizations of various types: business, educational, health, social service. Enhances students' skills as organizational members and managers. Includes organization structure and design, the organization's external environment, innovation, change, technology, decision making, culture, and leadership for organizational learning. Case discussions, class exercises, fieldwork. Prereq: juniors and seniors only; prior study of organizational behavior or an equivalent is desirable. 4 cr.

647-648. Business Law I

Law of contracts, agency, sales, negotiable instruments, real and personal property, partnership and corporations, with application of the Uniform Commercial Code. Prereq: at least junior standing; permission. 4 cr.

701. Business, Government, and Society

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: all Group A and B courses. 4 cr.

#712. Managing Change and Conflict in Organizations

Examines the primary sources, processes, and outcomes of change over the course of the entire organizational life cycle. Covers dynamics of change in both small and large groups and sub-groups, including transitions that are predictable and planned, unforeseen and crisis-laden, resisted and embraced, catastrophic and generative in nature. Prereq: permission; prior study of organizational behavior or an equivalent is desirable. 4 cr.

713. Management Skills

Focuses on the role of the manager, particularly the interpersonal competencies required to work effectively with superiors and subordinates. Participants develop and critique their behavior in situations that involve interviewing, listening,

delegation, conflict management, performance appraisal, and handling problem employees. Includes written and verbal presentations, field study, and videotaping. Prereq: permission. Writing intensive. 4 cr.

732. Exploration in Entrepreneurial Management

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: permission. Writing intensive. 4 cr.

745. International Business

Issues and problems confronting managers in the international economy. Emphasis on problems of working across national borders rather than on those encountered within the framework of different national economies, cultures, and institutions. For individuals interested in working in a multinational enterprise. Prereq: permission. 4 cr.

755. International Management

Develops an understanding of international ventures and partnerships from the viewpoint of management, leadership, human resource management, and organizational structure and strategy. Emphasis on the impact of culture on business practices and on interpersonal skills and global perspectives needed for personal effectiveness in international and multicultural environments. Prereq: junior or senior standing. 4 cr.

#765. Total Quality Management

Integration of management aspects of quality improvement with methodologies and tools for problem-solving and implementation. Experiential team projects and hands-on in-class exercises are used to supplement and enhance extensive written and video cases, facility tours, and guest speakers. (Also offered as DS 675.) Prereq: DS 650 and MGT 611 or permission. 4 cr.

770. Strategic Human Resource Management

An examination of the overall role and functions of human resource management in relation to an organization's strategic planning process. Emphasis on human resource management policy, practice, and trends, the human resource executive as organizational change agent, and the human resource function's initiatives and responses to the changing nature of work. 4 cr.

785. Career Management

Develops individual career management skills, including corporate career development. Topics include concepts of career development; issues pertaining to career management in organizations. Helpful for students interested in human resource management. Prereq: juniors and seniors only; permission. 4 cr.

798/798A-C. Topics

Special topics; may be repeated. Prereq: permission. 798A-C courses are writing intensive. 4 cr.

Marketing (MKTG)

(For program description, see page 99.)

Chairperson: Jonathan Gutman

Professors: Charles W. Gross, Jonathan Gutman

Affiliate Professors: Frederick G. Crane

Assistant Professors: Ludwig A. Bstieler, Stefan G. Nicovich

Adjunct Faculty: Jacalyn L. Cillely

550. Survey of Marketing

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 non-business administration majors and minors. No credit for students who have had MKTG 651. Prereq: ACFI 501; ECON 401 or 402. 4 cr.

651A. Marketing

Covers marketing as the process of planning and developing goods and services to satisfy the needs of target customers: consumers, other businesses, and institutions. Focus on how marketing contributes to the firm's goals through product planning, pricing, promotion, and distribution policies. For non-business administration majors. Prereq: permission. 4 cr.

750. Strategic Marketing

Practical application of marketing principles taught in MKTG 651. Through case analysis, students will learn to apply marketing principles to the planning, organization and control of marketing activities in large national and multinational corporations and small businesses. Issues such as new product development, pricing policies, selection of domestic and international channels of distribution, and interrelationships between marketing, production and finance will be covered. Prereq: MKTG 651 and permission. MKTG 752 and/or MKTG 753 are recommended. 4 cr.

751. Advertising and Promotion

Course covers the development of advertising strategy based on an assessment of the firm's competencies, its competitive environment, and an understanding of target customer behavior. Topic coverage includes the creation and execution of advertisements and sales promotions, media planning, and budgeting. The course draws upon the marketing principles taught in MKTG 651. Prereq: MKTG 651 and permission. MKTG 752 and/or MKTG 753 are recommended. 4 cr.

752. Marketing Research

Formulating research objectives to solve marketing problems: qualitative and quantitative techniques for surveys and marketing experimentation; commonly encountered analyses and models of secondary and primary data to aid marketers in decision making; strengths and limitations of marketing research in the marketing process. Prereq: MKTG 651 or equivalent. 4 cr.

753. Consumer/Buyer Behavior

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: MKTG 651. Writing intensive. 4 cr.

#754. Retail Management

Analysis of managerial problems in retailing establishments. Focus is 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: MKTG 651. 4 cr.

755. Marketing of Services

The marketing of intangible offerings. Includes profit and nonprofit situations, retail and business-to-business settings, public and international services. Covers theory, service quality attainments, design and strategy, and implementation plans. Texts, case analysis, speakers, field work. Prereq: MKTG 651. 4 cr.

756. Franchising

Designed to help acquire an understanding of franchising as a system of distribution and business expansion. Franchising will be studied from both the perspectives of the franchise and the franchiser. In addition, economic, financial, and legal issues associated with franchising will be covered. By the end of the course, acquisition of skills and sources of information that would permit sound assessment of the business opportunities available in franchising. Prereq: MKTG 651. (Also offered as HMGT 756.) 4 cr.

757. Integrated Marketing Communication

Course provides balanced coverage of all marketing communication tools: advertising, sales promotion, public relations, direct marketing, personal selling, POP, packaging, sponsorships, licensing, customer service. The course gives special emphasis to the integration of these tools to send target audiences a consistent, persuasive message that promotes the organization's goals. Prereq: MKTG 651. 4 cr.

758. Marketing on the Internet

Examines the progress of the Internet for strategic and tactical aspects of marketing, selling, and the distribution of goods and services. The course aims at building a critical understanding of how Marketing on the Internet takes place and familiarizes student with the current tools and strategies needed for successful Internet Marketing. Students will learn through projects, case analyses, and active discussions of organizations' efforts to employ the Internet to enhance their traditional marketing activities. Prereq: MKTG 550 or 651. 4 cr.

760. International Marketing

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: MKTG 651. 4 cr.

761. Sales Management

Principles and methods of successful personal selling and management of the sales function. Exposure to selling experience in field of student interest; case studies, sales presentations; oral and written analyses of sales management issues. Prereq: MKTG 651. 4 cr.

762. Marketing Workshop

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: MKTG 651, MKTG 752 and/or MKTG 753 are recommended. 4 cr.

798/7698A-C/798W. Topics

Special topics; may be repeated. Prereq: a basic marketing course and permission. 798W is writing intensive. 4 cr.

Mathematics and Statistics (MATH)

(For program description, see page 63.)

Chairperson: Karen J. Graham

Professors: Kenneth I. Appel, Albert B. Bennett, Jr., Marie A. Gaudard, Liming Ge, Karen J. Graham, Donald W. Hadwin, Rita A. Hibscheiler, A. Robb Jacoby, Ernst Linder, Eric A. Nordgren, Samuel D. Shore, Kevin M. Short

Associate Professors: Kelly J. Black, David V. Feldman, William E. Geeslin, Edward K. Hinson, Berrien Moore III

Assistant Professors: Maria Basterra, Mitrajit Dutta, John B. Geddes, Sonia Hristovich, Linyuan Li, Yeping Li, Dmitri A. Nikshych

Instructor: Philip J. Ramsey

Lecturers: Zhaozhi Fan, Gertrud L. Kraut, Mehmet Orhon, Yitang Zhang

#300. College Algebra

Review of functions and topics in algebra. Functional domains and ranges, composition of functions, inverse functions. Algebraic fractions, exponential expressions, roots, and radicals, logarithmic, and exponential functions. Cr/F.

301. Elementary Math I

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 towards a bachelor's degree. 4 cr.

302. Elementary Math II

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. 4 cr.

305. Elementary Functions

Properties of elementary functions, including exponential and logarithmic, trigonometric and inverse trigonometric functions. May not be taken for credit toward a bachelor's degree. Prereq: MATH 302 or the equivalent. 4 cr.

418. Analysis and Applications of Functions

Analysis and applications of algebraic and transcendental functions, with special emphasis on exponential, logarithmic, and trigonometric functions. Graphical analysis. Written projects will be 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. Cannot receive credit if taken after receiving credit for MATH 424A or B or MATH 425. 4 cr.

#419. Evolution of Mathematics

Mathematics form antiquity to the present; origins of the various methods and branches. How and why such concepts as number and geometry evolved. Prereq: MATH 302 or the equivalent. Not offered for credit to mathematics majors. 4 cr.

420. Finite Mathematics

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. 4 cr. Note for calculus students: Students enrolling in MATH 424 are given a test on algebra during the first week of the semester. Those doing unsatisfactory work will be required to take MATH 418 before enrolling in MATH 424 or to complete review assignments in the Mathematics Center (MaC) concurrently with MATH 424.

424A. Calculus for Social Sciences

Real-valued functions and their graphs; derivatives and their applications; antiderivatives and areas; exponentials and logarithms; introduction to multivariable calculus and partial derivatives. CEPS majors not allowed. Primarily intended for majors in College of Liberal Arts and the Whittemore School. Prereq: MATH 418 or equivalent. 4 cr.

424B. Calculus for Life Sciences

Real-valued functions and their graphs; derivatives and their applications; antiderivatives and areas; exponentials and logarithms; introduction to multivariable calculus and partial derivatives. CEPS majors not allowed. Primarily intended for majors in College of Life Sciences and Agriculture. Prereq: MATH 418 or equivalent. 4 cr.

Note: Students who desire a two-semester calculus course are strongly advised to take MATH 425. Those students who successfully complete MATH 424A/B and subsequently wish to continue their study of mathematics with MATH 426 are required to successfully complete a supplementary module and examination on trigonometric calculus administered by the MaC Center. (Not offered for credit if credit is received for MATH 425.) 4 cr. (Spring semester only.)

425/425H. Calculus I

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. Enrollment in MATH 425H requires concurrent enrollment in PHYS 407H. Prereq: Completing MATH 418 with a grade of C or better or successfully passing the calculus placement test. (Not offered for credit if credit is received for MATH 424.) 4 cr.

426/426H. Calculus II

Second course in calculus of one argument, techniques and applications of integration, polar coordinates, and series. Enrollment in MATH 426H requires concurrent enrollment in PHYS 408H. Prereq: MATH 425. 4 cr.

525. Linearity I

Examination of 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 multi-dimensional, 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. 6 cr.

526. Linearity II

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. 6 cr.

527/527H. Differential Equations with Linear Algebra

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. 4 cr.

528. Multidimensional Calculus

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. 4 cr.

531. Mathematical Proof

Introduction to 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 426. Writing intensive. 4 cr.

532. Discrete Mathematics

Counting principles, (including permutations, combinations, pigeonhole principle, inclusion-exclusion principle); big-O relation; graphs, trees, and related topics. Prereq: MATH 531. 4 cr.

545. Introduction to Linear Algebra and Mathematical Proof

Introduction to mathematical writing and proof in the context of basic linear algebra. Designed to reinforce ideas seen throughout the mathematics curriculum. Centered on an intense study of vector spaces and linear systems, beginning with a brief study of linear system equations, progressing to a discussion of linear transformation and vector spaces. No credit if credit has been received for MATH 645. Prereq: MATH 426. Writing intensive. 4 cr.

601. Exploring Mathematics for Teachers I

This course will provide 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 will be 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 will model instructional techniques that can be adapted to the elementary curricula. Prereq: EDUC 500. No credit if credit is earned for MATH 621, 623, 721, and/or 723. CEPS majors not allowed. 4 cr.

602. Exploring Mathematics for Teachers II

This course will provide 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 will be 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 will model instructional techniques that can be adapted to the elementary curricula. Prereq: EDUC 500. No credit if credit earned for MATH 621, 721, 622, and/or 722. CEPS majors not allowed. 4 cr.

619. Historical Foundations of Mathematics

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. 4 cr.

621. Number Systems for Teachers

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. No credit offered toward mathematics major except for B.S. mathematics education-elementary and middle school options. Prereq: permission. 4 cr.

622. Geometry for Teachers

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. No credit offered toward mathematics major except for B.S. mathematics education-elementary and middle school options. Prereq: MATH 621 or permission. 4 cr.

623. Topics in Mathematics for Teachers

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. No credit offered toward mathematics major except for B.S. mathematics education-elementary and middle school options. Prereq: 621 or permission. (Offered in alternate years during spring semester.) 4 cr.

639. Introduction to Statistical Analysis

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, such as JMP or Minitab used. Offered primarily for mathematics majors at the sophomore level; engineering majors are urged to take MATH 644. No credit for students who have completed MATH 644. Prereq: MATH 426. 4 cr.

644. Statistics for Engineers and Scientists

Introduction to the design of controlled experiments and to 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. No credit for students who have completed MATH 639. Prereq: MATH 426. 4 cr.

645/645H. Linear Algebra for Applications

Fundamental notions of vector space theory, linear independence, basis, span, scalar product, orthogonal bases. The course 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 762.) 4 cr.

646. Introduction to Partial Differential Equations

Introduction to 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. 4 cr.

647. Complex Analysis for Applications

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.) 4 cr.

656. Introduction to Number Theory

Unique factorization, arithmetic functions, linear and quadratic congruences, quadratic reciprocity law, quadratic forms, introduction to algebraic numbers. Prereq: MATH 531. (Offered in alternate years.) 4 cr.

657. Geometry

Advanced approach to fundamental properties of Euclidean and other geometries. Prereq: MATH 531. Writing intensive. 4 cr.

#658. Topics in Geometry

Topics selected from among projective geometry, finite geometries, 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.) 4 cr.

696. Independent Study

Projects of interest and value to student and department. Prereq: permission of faculty supervisor and department chairperson. 1 to 6 cr.

698. Senior Seminar

Exploration of mathematical topics beyond the student's previous coursework. Focus on problem solving, generation of problems, and oral and written communication of mathematics. Prereq: senior standing in mathematics or mathematics education. 4 cr.

701. Exploring Mathematics for Teachers I

This course will provide perspective elementary teachers with the opportunity to explore and mas-

ter concepts involving number systems, and operations, data analysis and probability. Mathematical reasoning, problem solving and the use of appropriate manipulatives and technology will be 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 will model 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. No credit if credit earned for MATH 621, 721, 623, and/or 723. 4 cr.

702. Exploring Mathematics for Teachers II
This course will provide 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 will be 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 will model 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. No credit if credit earned for MATH 621, 622, 721, and/or 722. 4 cr.

703. Teaching of Mathematics, K-6
Methods of teaching; uses of manipulatives, models, and diagrams in instruction; purposes and methods of assessment; curriculum standards and goals; review and evaluation of textbooks and computer software; uses of calculators and computers; teaching reading and writing in mathematics. Prereq: MATH 621 or 721; EDUC 500; or permission. (Offered in alternate years during the fall semester.) 4 cr.

721. Number Systems for Teachers
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., M.A.T., certificate-only students, and in-service teachers. Prereq: permission. 4 cr.

722. Geometry for Teachers
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., M.A.T., certification-only students, and in-service teachers. Prereq: 721 or permission. 4 cr.

723. Topics in Mathematics for Teachers
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., M.A.T., certification-only students, and in-service teachers. Prereq: 721 or permission. (Offered in alternate years during spring semester.) 4 cr.

737. Statistical Methods for Quality Improvement
Introduction to scientific data collection and analysis with an emphasis on industrial applications. Topics include statistical process control (SPC), engineering process control, failure modes and effects analysis (FMEA), Six-Sigma concepts and methods, and confidence intervals and hypothesis testing. Use of a statistical software package is an integral part of the course; graphical data analyses are emphasized. Prereq: MATH 644, permission. 4 cr.

739. Applied Regression Analysis
Statistical methods for the analysis of relationships between response and input variables: Simple linear regression, residual analysis and model selection, multicollinearity, nonlinear curve fitting, categorical predictors, introduction to analysis of variance and covariance. Students will be introduced to programming in SAS. Prereq: MATH 639 (or 644) permission. Writing intensive. 4 cr.

740. Industrial Statistics and Design of Experiments
Emphasizes methods for solving complex problems, both in the industrial and research environments. Statistical process control, design of experiments, randomization and blocking, factorial designs, nested designs, fixed, random, and mixed effects models, fractional factorial designs, use of covariates, response surface methods. JMP software will be used extensively. Prereq: MATH 639 (or 644) permission. 4 cr.

741. Biostatistics and Life Testing
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. SAS or JMP, and SPlus will be used. Prereq: MATH 639 (or 644) permission. (Offered in alternate years.) 4 cr.

742. Multivariate Statistical Methods
Issues dealing with multivariate response data. Random vectors and matrices, multivariate normal distribution, Hotelling's T^2 , multivariate analysis of variance (MANOVA), principal components, cluster analysis, factor analysis, longitudinal data and repeated measures. SAS or SPlus will be used. Prereq: MATH 639 (or 644) permission. (Offered in alternate years.) 4 cr.

744. Design of Experiments II
Experimental design strategies and issues that are often encountered in practice. Topics include: Complete and incomplete blocking, partially balanced incomplete blocking (BIB), confounding, intra and inter block information, split plotting and strip plotting, repeated measures, crossover design strategies, Latin squares and rectangles, Youden squares, crossed and nested treatment structures, variance components, mixed effects models, analysis of covariance, optimizations, missing responses. Prereq: MATH 740 or permission. 4 cr.

745, 746. Foundations of Applied Mathematics
Basic concepts and techniques of applied mathematics intended for graduate students and advanced undergraduates in mathematics, engineering, and the sciences. Topics include

computational linear algebra, nonlinear differential equations, and partial differential equations. Methods examined include Fourier expansions and transforms, Laplace transforms, optimization techniques, linear spaces, eigenvalue analysis, Sturm-Liouville systems, numerical methods, conformal mapping, and residue theory. Prereq: MATH 527; 528 or equivalent. 4 cr.

747. Introduction to Nonlinear Dynamics and Chaos
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; 645. 4 cr.

753. Introduction to Numerical Methods I
Introduction to 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. 4 cr.

754. Introduction to Numerical Methods II
Introduction to the tools and methodology of scientific computing through the examination of interdisciplinary case studies from science and engineering. Emphasis on 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. 4 cr.

755. Probability and Stochastic Processes with Applications
Introduction to the theory, methods, and applications of randomness and random processes. Probability concepts, random variable, expectation, discrete and continuous distributions, stochastic processes, Markov chains, Poisson processes, moment-generating functions, convergence of random variables. Prereq: MATH 528 and 639; (or 644) permission. 4 cr.

756. Principles of Statistical Inference
Introduction to 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 resampling methods, decision theory. Prereq: MATH 755; or 528, 639, (or 644), and permission. 4 cr.

761. Abstract Algebra
Basic properties of groups, rings, fields, and their homomorphisms. Prereq: MATH 531 or 545. Writing intensive. 4 cr.

762. Linear Algebra
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. 4 cr.

764. Advanced Algebra
Topics selected from rings, modules, algebraic fields, and group theory. Prereq: MATH 761. (Offered in alternate years.) 4 cr.

767. One-Dimensional Real Analysis

Theory of limits, continuity, differentiability, integrability. Prereq: MATH 531, or 545. 4 cr.

776. Logic

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.) 4 cr.

#783. Set Theory

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.) 4 cr.

784. Topology

Open sets, closure, base, and continuous functions; connectedness, compactness, separation axioms, and metrizable. Prereq: MATH 531. 4 cr.

788. Complex Analysis

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.) 4 cr.

791. Teaching of Mathematics, 7-12

Methods for teaching middle and secondary school mathematics; survey of instructional materials; uses of models, calculators, and computers; integrating reading, writing, and problem solving into mathematics curricula; methods of assessment; theories of learning mathematics; review and evaluation of curriculum materials, software and instructional resources; and introduction to professional organizations and publications. Prereq: EDUC 500 or equivalent; MATH 426 permission. 4 cr.

796. Topics

New or specialized courses not covered in regular course offerings. Prereq: permission. May be repeated up to 8 credits. 4 cr.

441. Introduction to Engineering Design and Solid Modeling

Engineering design process and the language of graphical communication introduced via team design projects and laboratory exercises. Topics include sketching, 3-D visualization, computer aided design, solid modeling, projection theory, engineering drawings, report writing and oral communication. Writing intensive. 4 cr.

442. Manufacturing Engineering and Design

Introduction to basic manufacturing processes associated with mechanical, electrical, and electronic systems through classroom lectures, seminars, laboratory exercises, field trips, and student projects. Prereq: ME 441. Special fee. 4 cr.

503. Thermodynamics

Properties of a pure substance, work and heat, laws of thermodynamics, entropy, thermodynamic relations, cycles. Prereq: MATH 528. 3 cr.

523. Introduction to Statics and Dynamics

Overview of statics and dynamics; two- and three-dimensional force systems; laws of equilibrium; moments of area; volume; inertia; stresses and strains; particle and rigid body dynamics; fixed and moving reference frames; impulse-momentum principles; work-energy relationships. Prereq: MATH 426; PHYS 407. Not for ME majors. 3 cr.

525. Mechanics I

Introduction to 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: MATH 426; PHYS 407. Writing intensive. 3 cr.

526. Mechanics II

Introduction to strength of materials. Analysis of members under torsion, axial, shear and bending stresses, superposition of stresses, stability of columns. Prereq: ME 525. Writing intensive. 3 cr.

542. Mechanical Dissection and Design Analysis

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. Introduction to basic metal working operations. Prereq: ME 441. Coreq: ME 525 and permission. Special fee. No credit if credit received for ME 442. 4 cr.

561. Introduction to Materials Science

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: CHEM 403 or equivalent. Special fee. Writing intensive. 4 cr.

603. Heat Transfer

Analysis of phenomena; steady-state and transient conduction, radiation, and convection; engineering applications. Prereq: MATH 527, ME 608; CS 410 or 412. 3 cr.

608. Fluid Dynamics

Dynamics and thermodynamics of compressible and incompressible fluid flow; behavior of fluids

as expressed by hydrostatic, continuity, momentum, and energy equations. Prereq: ME 503. Coreq: ME 627. 3 cr.

627. Mechanics III

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. 3 cr.

629. Kinematics and Dynamics of Machines

Kinematic and dynamic analysis of mechanisms and their synthesis. Applications to reciprocating engines; balancing and cam dynamics are developed. Prereq: ME 627. Special fee. 3 cr.

643. Elements of Design

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. 3 cr.

646. Experimental Measurement and Data Analysis

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. Special fee. Writing intensive. 4 cr.

670. Systems Modeling, Simulation, and Control

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. Introduction to feedback control, stability, and performance criteria. Prereq: ECE 537, ME 608, MATH 527. Writing intensive. 4 cr.

695. Special Topics

Course topics not offered in other courses. May be repeated for credit. Lab. Prereq: permission. 2 to 4 cr.

696. Projects

Analytical, experimental, or design projects undertaken individually or in teams under faculty guidance. May be repeated for credit. 1 to 4 cr.

699. Engineering Internship

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. 1 cr.

701. Macroscopic Thermodynamics

Thermodynamic principles using an analytic, postulational approach and Legendre transformations to obtain thermodynamic potentials. Prereq: ME 503 or permission. 4 cr.

#702. Statistical Thermodynamics

Macroscopic thermodynamic principles developed by means of microscopic analysis. Prereq: ME 503. 4 cr.

705. Thermal System Analysis and Design

Engineering design of thermal systems that in-

Mechanical Engineering (ME)

(For program description, see page 66.)

Chairperson: Barbaros Celikkol

Professors: Kenneth C. Baldwin, Barbaros Celikkol, Barry K. Fussell, Todd Stuart Gross,

Robert Jerard, M. Robinson Swift

Associate Professors: James E. Krzanowski,

John Philip McHugh, David W. Watt

Assistant Professors: Gregory P. Chini, Brad Lee Kinsey, May-Win L. Thein, Igor I. Tsukrov

volve 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. 4 cr.

707. Analytical Fluid Dynamics

Kinematics of flow; constitutive relationships; development of the Navier-Stokes equations; vorticity theorems; potential flow. Prereq: ME 608. 4 cr.

708. Gas Dynamics

Study of one-dimensional subsonic and supersonic flows of compressible ideal and real fluids. Wave phenomena; linear approach to two-dimensional problems; applications in propulsion systems. Prereq: ME 608 or permission. 4 cr.

709. Computational Fluid Dynamics

Review of matrix methods; basics of finite differences, basics of spectral methods, stability, accuracy, Navier-Stokes solvers. Prereq: ME 603 or permission. Special fee. 3 cr.

#711. Coherent Optical Methods

Introduces electro-optic experimental techniques in mechanics. Optical fundamentals including elements of scalar diffraction theory, interferometry, holography, Doppler shifts, coherence, and laser speckle. Applications including mechanical strain measurements, vibrational mode determination, fluid pressure, temperature measurements, and fluid velocity measurements. Concepts from course are demonstrated in lab. Prereq: permission. 3 cr.

712. Waves in Fluids

General mathematical techniques are developed to analyze the linear and nonlinear dynamics of hyperbolic and dispersive wave systems. Emphasis is given to key physical concepts such as wave-generation mechanisms, wavelength and amplitude dispersion, group velocity and energy propagation, steady streaming, and mode interactions. Prereq: ME 608 or equivalent; MATH 527 and 528; MATH 646 is desirable; or permission. 3 cr.

723. Advanced Dynamics

Classical dynamics oriented to contemporary engineering applications. Review of particle dynamics. Hamilton's principle and the Lagrange equations. Kinematic and dynamics of rigid bodies, gyroscopic effects in machinery and space structures. Prereq: ME 627 or permission. 4 cr.

724. Vibration Theory and Applications

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. 4 cr.

727. Advanced Mechanics of Solids

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. 4 cr.

730. Mechanical Behavior of Materials

Elastic and inelastic behavior of materials in terms of micro- and macromechanics. 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. Special fee. 4 cr.

731. Fracture and Fatigue Engineering Material

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. Special fee. 4 cr.

735. Mechanics of Composite Materials

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. 4 cr.

#741. Nonlinear Systems Modeling

Modeling of hydraulic, pneumatic, and electromechanical systems. Solution methods including linearization and computer simulation of nonlinear equations. Development of methods of generalizing the nonlinear models for design purpose. Prereq: ME 670 or permission. 4 cr.

743. Satellite Systems, Dynamics, and Control

General satellite systems with emphasis on spacecraft dynamics and control. Course 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 will include attitude and orbit estimation, and automatic attitude control. Prereq: ME 670 or permission. Special fee. 3 cr.

744. Corrosion

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. Special fee. Lab. 4 cr.

747. Experimental Measurement and Modeling of Complex Systems

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. Special fee. Writing intensive. 4 cr.

755. Senior Design Project I

Part I of this two-part sequence emphasizes problem definition, analysis, development of alterna-

tive 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. Special fee. Lab. Writing intensive. 2 cr.

756. Senior Design Project II

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. Special fee. Writing intensive. 2 cr.

757. Coastal Engineering and Processes

Introduction to 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. Prereq: ME 608 or permission. (Also offered as CIE 757 and OE 757.) 3 cr.

760. Physical Metallurgy I

Introduction to physical metallurgy; dislocation thermodynamics of materials, diffusion, phase transformations, and strengthening mechanisms in solids. Prereq: ME 561 or permission. Special fee. Lab. 4 cr.

761. Diffraction and Imaging Methods in Materials Science

Introduction to x-ray diffraction and electron microscopy. Basic crystallography; reciprocal lattice; x-ray and electron diffraction; x-ray method transmission and scanning electron microscopy. Prereq: CHEM 403; PHYS 408; or permission. Special fee. Lab. 4 cr.

762. Electronic Properties of Materials

Introduction to the electronic properties of materials and their application in electronic devices. Crystallography, atomic bonding and energy band diagrams for semiconductors; intrinsic and extrinsic semiconductors; the p-n junction; diodes and transistors. Methods used in the manufacture of semiconductor devices, such as ion implantation, thermal oxidation, metallization, and packaging. Prereq: CHEM 403; MATH 527; PHYS 408; or permission. 3 cr.

763. Thin Film Science and Technology

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. Special fee. 4 cr.

770. Design with Microprocessors

Basic operation of microprocessors and microcontrollers is explained, and interfacing these devices to sensors, displays and mechanical systems is explored. Topics include: number systems, ar-

chitecture, 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. Special fee. Lab. 4 cr.

772. Control Systems

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. 4 cr.

773. Electromechanical Analysis and Design

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. 4 cr.

#781. Mathematical Methods in Engineering Science I

Complex variables, Fourier series and transforms, ordinary and partial differential equations, vector space theory. Prereq: MATH 527; 528; or permission. 4 cr.

783. Geometric Modeling

Topics covered include curves, surfaces, solids, analytic and relational properties, intersections, transformations, and solid modeling. Emphasizes applications in computer graphics and CAD/CAM systems. Prereq: CS 410; MATH 528; or permission. 4 cr.

785. Solid Mechanics in Manufacturing

Characterization of material properties will be studied with emphasis on plastic deformation. Also, numerical approaches to solve for the forces, stresses, and strains in manufacturing processes will be covered. In particular, two prominent mass production manufacturing areas, metal forming and cutting, will be examined. Prereq: ME 561; ME 627. 4 cr.

786. Introduction to Finite Element Analysis

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 electromagnetics devices, via both commercially available codes and student-written codes. Prereq: ME 526, 603 or permission. Lab. 4 cr.

795. Special Topics

New or specialized courses and/or independent study. May be repeated for credit. 2 to 4 cr.

797. Honors Seminar

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. 1 cr.

Medical Laboratory Science (MLS)

(For program description, see page 88.)

Affiliate Professor: Jocelyn F. Caple, M.D., Norman B. Levy, M.D.

Assistant Professors: Christine L. Bean, Sylvia Countway, Deena Small, Joyce Stone
Affiliate Assistant Professors: Lisa Baillargeon, Deborah Brough, Anne Burbank, Jill Polito, Rose Schwab, Susan Slack, M. Helyn Thomas, Kathleen Upton

401. Introduction to Medical Laboratory Science

Functions and responsibilities of medical laboratory science as a unit of the health team. Lectures, films, demonstrations, and field trips. Cr/F. 1 cr.

500. Introduction to Medical Laboratory Methods and Techniques

Overview of medical laboratory procedures routinely used to diagnose common diseases such as anemia, mononucleosis, heart disease, leukemia, and diabetes. Emphasis on the practical application of certain tests along with their theory and practice. Students learn proper techniques for use in a medical laboratory to assure accuracy and precision of patient results. Other topics include laboratory safety, instrumentation, and quality assurance. Prereq: CHEM 403-404 or CHEM 405. Special fee. Lab. 4 cr.

602. Seminar

Clinical case study presentations emphasizing the role of the laboratory in diagnosing and treating disease and in maintaining health. Prereq: senior MLS majors only or permission. Writing intensive. 2 to 4 cr.

610. Laboratory Management

Overview of laboratory management, supervision, and education. Lectures, discussions, and student projects cover financial operations, personnel management, marketing, information management and teaching skills. Prereq: senior MLS majors or permission. Writing intensive. 4 cr.

650A. Phlebotomy Theory

Procedures for blood collection by venipuncture and capillary puncture. Emphasis on professionalism, safety, equipment, laboratory orientation, and complications of the procedures. Students will observe all techniques and have a limited opportunity to perform them. Prereq: sophomore MLS majors only or permission. 2 cr.

650B. Phlebotomy Clinical Internship

Students obtain experience and proficiency in blood collection techniques at a health care facility (80-160 hours). Prereq: MLS 650A; or permission. Cr/F. 1 to 2 cr.

651. Clinical Serology

Introduction to serological procedures in diagnosing clinical disease. Review of immunological functions. Emphasis on diagnosis through serological lab tests of diseases/conditions such as infections, mononucleosis, inflammation and pregnancy. Special fee. 2 cr.

652. Clinical Hematology

Routine hematological procedures, both manual and automated. Analysis of white blood cells, red blood cells, and platelets; hemostasis techniques. Prereq: MLS major or permission. 3 cr.

652L. Clinical Hematology Lab

Prereq: MLS major or permission. Coreq: MLS 652. Lab. Special fee. 3 cr.

653. Clinical Immunohematology

Routine blood-banking procedures, including blood typing, antibody screening, cross-matching, and confirmatory testing on blood units. Prereq: MLS majors or permission. Special fee. 3 cr.

654. Clinical Chemistry

Laboratory safety, mathematics, introduction to instrumentation, and quality control. Clinical significance, evaluation, and performance of manual procedures. Includes analysis of plasma glucose, BUN, creatinine, electrolytes, enzymes, cholesterol, bilirubin, and uric acid determination. Prereq: CHEM 403-404; permission. 5 cr.

655. Urinalysis and Body Fluids

Covers routine and special tests on urine and other body fluids. Emphasis on physical, chemical, and microscopic analyses and their relationship to health and disease. Prereq: MLS majors; permission. Special fee. 3 cr.

696. Independent Study

In-depth studies under faculty supervision. Prereq: approval of the faculty the area concerned. Cr/F. 1 to 6 cr.

700. Toxicology

Overview of effects of environmental pollutants, medications, and abused substances on human health. Emphasizes the mechanisms, assessment and management of their toxicology. Prereq: one semester of organic chemistry, biochemistry, or permission. 4 cr.

720. Clinical Mycology and Parasitology

Laboratory identification and pathology of human mycology and parasitology infections. Also will include limited lectures in classification and diagnosis of clinically significant viruses. Prereq: MICR 602. Lab. 3 cr.

720L. Clinical Mycology and Parasitology Lab

Prereq: MICR 602 or permission. Special fee. 2 cr.

751. Advanced Clinical Microbiology Internship

Advanced clinical bacteriological procedures, fluorescent techniques, and special procedures. Mycology and parasitology identification and testing. Prereq: senior MLS majors only. Writing intensive. 5 cr.

752. Advanced Hematology Internship

Special hematology procedures including diagnostic staining, advanced hemostasis studies, and evaluation of blood cells in disease states. Prereq: senior MLS majors only. Writing intensive. 5 cr.

753. Advanced Immunohematology Internship

Advanced blood-banking procedures, including antibody identification, and component therapy. Principles and procedures for detecting disorders of cellular and humoral immunity. Prereq: senior MLS majors only. Writing intensive. 5 cr.

754. Advanced Clinical Chemistry Internship

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 MLS majors only. Writing intensive. 5 cr.

761. Clinical Microbiology Internship

Advanced instruction in clinical bacteriology, mycology, parasitology, and virology at local hos-

pital or reference laboratory. Isolation, identification, and antibiotic sensitivities for common pathogens are emphasized. Prereq: MICR 602; senior MLS majors only. 20 cr.

762. Clinical Hematology Internship

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: MLS 652; senior MLS majors only. 20 cr.

763. Clinical Immunohematology Internship

Advanced instruction in clinical immunohematology at a local hospital or reference laboratory. Pre-transfusion testing, donor screening, phlebotomy and component therapy emphasized. Prereq: MLS 653; senior MLS majors only. 20 cr.

764. Clinical Chemistry Internship

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: MLS 654; senior MLS majors only. 20 cr.

796. Biomedical Research Internship

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 adviser. 4 to 16 cr.

Microbiology (MICR)

(For program description, see page 89.)

Chairperson: Louis S. Tisa

Professors: Richard P. Blakemore, Aaron B. Margolin, Thomas G. Pistole, Frank G. Rodgers, Robert M. Zsigray

Associate Professor: Louis S. Tisa

Assistant Professor: Elise R. Sullivan

501/501H. Microbes in Human Disease

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? This course 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. Emphasis on 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. 4 cr.

503. General Microbiology

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. 5 cr.

504. Brewing and Industrial Microbiology Applications

Lectures and laboratories will address basic concepts of microbiology, chemistry, and biochemistry related to the brewing and food industries. The theoretical and practical approach will serve as an integrative learning experience. A hands-on course for students wishing to learn microbiology industrial applications and for those working in the field seeking to upgrade their sanitary microbiology skills. Topics will include: bacterial cell wall composition and Gram stain characteristics, the isolation, enumeration, and identification of spoilage bacteria, yeast fermentation and biochemistry, total and viable yeast counts, wild yeast, media selection and preparation and the role of *Lactobacilli* and *Pediococci* in beer and other foods. Biochemical testing procedures and the HACCP food safety system will also be emphasized. Prereq: MICR 503 or permission of the instructor. Special fee. 4 cr.

600. Field Experience

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. Prereq: permission. May be repeated to a maximum of 8 credit hours. Only 4 credit hours can be used toward the major. Cr/F. 1 to 4 cr.

602. Pathogenic Microbiology

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: MICR 503. Special fee. Lab. 5 cr.

603. Bacteriology of Food

Lectures and laboratories will address modern technical concepts of the 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, foodborne disease outbreaks, public health complications, isolation and identification of food spoiling microorganisms, and essentials for food safety and sanitation. Prereq: MICR 503 or equivalent. (Not offered every year.) 4 cr.

604. Bacteriology of Food Lab

This lab will address modern technical concepts of the microbiology, physiology, and biochemistry related to food sanitation. Special fee. 1 cr. Coreq: MICR 603.

651. Biotechnology Experience: Cell Culture and Biomanufacturing

Course begins by introducing the student to the proteins and companies of biotechnology and to current good manufacturing practices. Remainder of 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. (Also offered as ANSC 651.) 4 cr.

702. Infectious Disease and Health

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: MICR 700; permission. Special fee. Lab. (Not offered every year.) 5 cr.

704. Genetics of Prokaryotic Microbes

Expression and transfer of genetic elements (chromosomal and nonchromosomal) in prokaryotic microorganisms; consideration of factors influencing public health, industry, the environment, and society. Students earning credit for PBIO 754; BCHM 754; GEN 754 may not receive credit for MICR 704. Prereq: MICR 503; BCHM 658. Special fee. Lab. 4 cr.

705. Immunology

Introduction to the major cellular and molecular components of the immune system; examination of their development and production, their interactions with each other and with other systems in the body, and their regulation; exploration of their role in beneficial and harmful immune responses in humans and animals. Prereq: MICR 503. Special fee. Lab. 5 cr.

706. Virology

Principles of animal and selected plant and bacterial virology in relation to infection and disease. Emphasis on the molecular biology of viruses, viral replication, isolation, propagation, assay, pathogenesis, diagnosis, detection, epidemiology, and control. Prereq: MICR 503. 3 cr.

707. Marine Microbiology

Qualitative and quantitative evaluation of the physiological activities of microorganisms that influence the state of carbon, nitrogen, sulfur, iron, manganese, phosphorous, hydrogen, oxygen, and other elements in the sea and its sediments. Provides an understanding of the interrelationships between marine microorganisms and their surroundings by integrating microbiological phenomena with known aspects of physical, chemical, and biological oceanography. Introduces students to the primary scientific literature in marine microbiology, teaches each student how to think provocatively and concertedly, and convey those thoughts clearly and concisely in both oral and written form. Prereq: MICR 503. Writing intensive. 5 cr.

708. Virology Lab

Principles and practices of animal, selected plants, and bacterial virological methods for the propagation, detection and enumeration of viruses. Prereq: MICR 503. Coreq: MICR 706. Special fee. 2 cr.

710. Electron Microscopy and Microbial Cytology/Electron Microscopy Lab

Ultrastructure of eukaryotes, prokaryotes, and viruses. Role of bacterial appendages; cell membranes and cell walls; cytoplasmic inclusions; cell division and sporulation and virus ultrastructure. Preparative electron microscopy techniques for biological material described in detail. Practical applications of electron microscopy instrumentation together with theory of electron optics, and instrument function discussed. Lab. Prereq: MICR 503; permission. (Not offered every year.) 5 cr.

711. Genomics and Bioinformatics

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 of a range of bioinformatics approaches—the computer applications used in genome analysis. Prereq: BIOL 604. (Also offered as BCHM 711 and GEN 711.) Lab. 4 cr.

713. Microbes and the Environment

Physiological ecology as required to understand the roles of microbes in matter and energy flow through ecosystems. Structure and function of aquatic, terrestrial, and biotic habitats in which microbes are important, including life in biofilms. Consideration is given to (micro)biotic community interactions including syntrophy, consortial mixtures, and stable symbioses between prokaryotes and eukaryotes. Lab provides experience with methods of evaluating composition, structure, and activity of microbial communities including extraction of nucleic acids from the environment and ecological use of oligonucleotide probes. An important facet of both lab and lecture includes biochemistry of and enumeration methods for physiological groups of aerobic and anaerobic microbes (such as denitrifiers, sulfate reducers, metal reducers, homoacetogens, cellulolytics, nitrogen fixers, diverse extremophiles and autotrophs including nitrifiers, methanogens, and photosynthesis). Prereq: MICR 503. Special fee. Lab. 5 cr.

714. Water Pollution Microbiology

Application of general principles of microbial ecology to water pollution. Study of viruses, bacteria, algae, and parasites found in contaminated water: their genetics, physiology, occurrence, detection, and health implications in addition to the organic and inorganic chemistry of the water they are found in. Prereq: MICR 503. Special fee. Lab. (Not offered every year.) 4 cr.

717. Microbial Physiology

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, diversity of energy metabolism, and microbial cell differentiation. Prereq: MICR 503, BCHM 658 or 751; or permission. Special fee. Lab. Writing intensive. 5 cr.

718. Ethics and Issues in Microbiology

In conjunction with advances being made in the biological sciences is 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 will be presented and discussed in a format that encourages both an appreciation of established guidelines and an opportunity to critically examine them. Writing intensive. 3 cr.

#719. Prokaryote Biodiversity

By what means can we evaluate the composition and diversity of the prokaryotic world? What are the molecular techniques that have provided new ways of collecting taxonomic and phylogenetic data and of evaluating the evolutionary history of prokaryotes? How can we use molecular method-

ologies epidemiologically to track the distribution of particular strains of microorganisms? What characteristics distinguish each fascinating group of (known) prokaryotes? In addition to exploring these topics, students in this course will isolate new strains of microbes and will proceed to identify and characterize them by molecular and other methods. The laboratory will also enable students to learn how to examine natural habitats for the presence of particular prokaryotic groups in the absence of cultivating their representatives. Prereq: MICR 503. Special fee. Lab. 5 cr.

#720. Marine Microbial Ecology

Examines the fundamental role of marine microbial communities in the function of the biosphere. Lectures survey bacterial, protozoan, and micrometazoan assemblages from Arctic to deep sea vent communities. Laboratory exercises cover several principle techniques of field microbial ecology and explore the rich marine microbial environment surrounding the Isles of Shoals. Lab. (Summers only, at Shoals Marine Lab.) 4 cr.

751. Cell Culture

Theory and principles fundamental to the culture of cells in vitro. Introduction to techniques of preparation and maintenance of animal, plant, insect, and fish cell cultures. Application of cell culture to contemporary research in biological sciences. Prereq: MICR 503; permission. (Also offered as ANSC 751 and PBIO 751. No credit if credit received for MICR 751 of ANSCI 746.) Special fee. Lab. 5 cr.

#752. Mammalian Cell Culture

Basic concepts and techniques associated with the cultivation of mammalian cells in vitro, including media preparation, cell viability, transfer, cloning, cryopreservation; use of transformed cells harboring cloning vectors for production of bioproducts. (Also offered as ANSC 752. No credit if credit received for MICR 751 or ANSCI 746. Prereq: MICR 503. Special fee. Lab. 5 cr.

766. Plant-Microbe Interactions

Physical, chemical, genetic and molecular methods utilized by plant pathogens in interactions with plants, as well as plant defense mechanisms. Major groups of plant pathogens (bacteria, fungi, and viruses) will be discussed, as well as beneficial plant-microbe symbioses. (Also offered as PBIO 766.) 3 cr.

790. Laboratory Teaching Experience

Students will assist Graduate Teaching Assistants in preparing, presenting, and executing Microbiology Laboratory Laboratory. 1 to 4 cr.

795/795W. Problems

Special projects in microbiology. Research topics in immunology; virology; microbial genetics; pathogenesis; microbial ecology; microbial physiology; marine microbiology; detection of pathogens in shellfish. 1 to 8 cr.

Military Science (MILT)

Reserve Officers Training Corps

(For program description, see page 111.)

Professor of Military Science: Major Harry D. Prantl

Assistant Professors: Capt. Justin T. Chumak, Major Scott D. Silfies

401. Leadership Laboratory I

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.

402. Leadership Laboratory II

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.

413. Introduction to ROTC

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. 1 cr.

414. Introduction to ROTC II

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. 1 cr.

501. Self/Team Development I

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 schol-

arship 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. Coreq: MILT 401. 2 cr.

502. Individual/Team Military Tactics

Introduction to 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. Coreq: MILT 402. 2 cr.

550. Camp Challenge

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. Although incurs no military obligation, offers opportunities to earn a two-year scholarship and qualifies students to take MILT 601. 4 cr.

601. Leading Small Organizations I

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. 2 cr.

602. Leading Small Organizations II

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. 2 cr.

611. Seminar on Leadership and Management I
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. 2 cr.

612. Transition to Lieutenant

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. 2 cr.

695. Officer Internship

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. 1 to 4 cr.

Music (MUSI)

(For program description, see page 44; see also course listings under Music Education.)

Chairperson: Peggy A. Vagts

Professors: Christopher Kies, Nicholas N.

Orovich, John E. Rogers, David E. Seiler,

Robert Stibler, Peggy A. Vagts

Affiliate Professor: Clark Terry

Associate Professors: Michael J.

Annicchiarico, Mark S. DeTurk, Robert W.

Eshbach, David K. Ripley, Peter W. Urquhart,

Larry J. Veal

Assistant Professors: Daniel Beller-McKenna,

Andrew A. Boysen, Lori E. Dobbins, William

G. Kempster

Instructor: Marilyn L. McCoy

Lecturers: Thomas B. Keck, Arlene P. Kies

Adjunct Faculty: John Boden, Mimi Bravar,

Les Harris, Jr., Margaret Herlehy, David

Howse, John B. Hunter, Radmila A. Hvezda,

Christopher Kane, David Newsam, Janet E.

Polk, Mark Shilansky, Nancy Smith, Demetrius

Spaneas

History, Literature, and Appreciation

401/401H. Introduction to Music

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. 4 cr.

402/402H. Survey of Music History

The study of the development of musical styles and idioms in the context of selected historical and cultural aspects of Western civilization. 4 cr.

501, 502. History and Literature of Music

Styles, forms, and techniques of composition in Western music. Prereq: completion of MUSI 472 or MUSI 412; permission. 3 cr.

511. Survey of Music in America

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. 4 cr.

520-521. Diction for Singers I and II

Application of International Phonetic Alphabet (IPA) to English, French, German, and Italian. Emphasis will be on both written and spoken performance. 520 is a prereq for 521. 2 cr.

595. Special Topics in Music Literature

Open to music majors and non-majors; topics in areas not easily covered in historical courses. Prereq: permission. May be repeated for credit. 1 to 4 cr.

610. Popular Music and Rebellion in the 1960's

Examines the ways in which popular music helped form the youth culture, was used as an act of rebellion, and came to be a focal point of generational conflict and protest in the United States during the 1960s. 4 cr.

703. Music of the Renaissance

Works of the 15th- and 16th-century composers from Dunstable to Palestrina. Prereq: MUSI 501 and 502 or permission. Writing intensive. 3 cr.

705. Music of the Baroque

Music of Europe from de Rore to Bach. Prereq: MUSI 501 and 502 or permission. Writing intensive. 3 cr.

707. Music of the Classical Period

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. 3 cr.

709. Music of the Romantic Period

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-impressionist, and national styles in European music. Prereq: MUSI 501 and 502 or permission. Writing intensive. 3 cr.

711. Music of the 20th and 21st Centuries

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. 3 cr.

713. Art Song

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. 3 cr.

715. Survey of Opera

History of the genre from Monteverdi to the present. Prereq: MUSI 501 and 502 or permission. Writing intensive. 3 cr.

795. Special Studies

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. 1 to 4 cr.

Performance

All ensemble courses may be repeated (MUSI 441-462). With the exception of Bachelor of Music in Performance students, a maximum of 8 credits earned in ensemble may be used toward graduation.

441. Concert Choir

A mixed chorus that studies and performs classical and modern literature. Recommended for voice majors. Open to all students. 1 cr.

442. Chamber Singers

A specialized mixed chamber chorus which concentrates on the a cappella repertoire from the Renaissance to the present. Prereq: membership in Concert Choir; audition. 1 cr.

443. Women's Chorus

Open to all students interested in singing the finest literature in this medium. 1 cr.

448. Opera Workshop

Operatic singing, acting, and production techniques; performance of both complete operas and operatic excerpts. Prereq: audition. 1 cr.

450. Symphony

Presents several concerts during the year of repertoire ranging from the great, standard symphonic literature to large modern works. Prereq: audition. 1 cr.

452. Wind Symphony

Select wind ensemble which performs difficult classical and contemporary literature. Prereq: audition. 1 cr.

453. Symphonic Band

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. Prereq: audition. 1 cr.

454. UNH Marching Band

Open to all students; performs during football games. Rehearsals conclude at the end of the football season. 1 cr.

455. Piano Ensemble

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. 1 cr.

456. String Ensemble

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble. Prereq: permission. 1 cr.

457. Woodwind Ensemble

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble. Prereq: permission. 1 cr.

458. Brass Ensemble

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble. Prereq: permission. 1 cr.

459. Percussion Ensemble

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble. Prereq: permission. 1 cr.

460. Jazz Band

Two jazz bands perform a wide spectrum of big band literature. Prereq: audition. 1 cr.

461. Vocal Jazz Ensemble

Singers perform in small a cappella ensembles and with various jazz instrumental ensembles. Prereq: membership in Concert Choir; audition. 1 cr.

462. Pep Band

Rehearsal and performance of a broad range of band music at hockey and basketball games. 1 cr.

463. Jazz Combo

Groups of instrumentalists gain experience in the performance of literature for the smaller jazz ensemble. Prereq: permission. 1 cr.

464. Guitar Ensemble

Groups of instrumentalists gain experience in the performance of literature for the smaller ensemble. Prereq: permission. 1 cr.

467. Functional Piano

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. Special fee. 1 cr.

468. Voice Class

Basic instruction in voice for non-majors and music majors who are not majoring in voice. Prereq: permission. Special fee. May be repeated to a total of 2 credits. 1 cr.

In courses 536-564 and 736-764 (private instruction in performance) presentation and material used vary from pupil to pupil. The emphasis is on musical values and sound technique. As the student advances, repertoire is broadened to include works of all periods. One solo performance each semester may be required.

Private lessons are given weekly and are one hour or one half-hour in length; an hour master class is given weekly. One semester-hour credit may be earned with the half-hour lesson; two, three, or four semester hours of credit may be earned with the one-hour lesson. In general, only students in the bachelor of music in performance curriculum are allowed to register for private lessons of more than two credits. Five one-hour practice periods are expected for each credit of private study. The special semester fee for lessons is \$105 for 1 credit, \$210 for 2 credits, \$315 for 3 credits, and \$420 for 4 credits (this fee applies for courses numbered 541-564 and 741-764). The fee includes the use of a practice room for the required preparation.

Registration in courses of private instruction is generally restricted to music majors. Nonmajors may enroll on a space available basis, subject to approval by the Department of Music and the instructor. Students may register for credit in successive semesters.

536/736. Early Wind Instruments

Private instruction in Renaissance and Baroque wind instruments. Special fee. 1 to 4 cr.

541/741. Piano

Private instruction in piano. Special fee. 1 to 4 cr.

542/742. Harpsichord

Private instruction in harpsichord. Special fee. 1 to 4 cr.

543/743. Organ

Private instruction in organ. Special fee. 1 to 4 cr.

545/745. Voice

Private instruction in voice. Special fee. 1 to 4 cr.

546/746. Violin

Private instruction in violin. Special fee. 1 to 4 cr.

547/747. Viola

Private instruction in viola. Special fee. 1 to 4 cr.

548/748. Violoncello

Private instruction in violoncello. Special fee. 1 to 4 cr.

549/749. String Bass

Private instruction in string bass. Special fee. 1 to 4 cr.

550/750. Classical Guitar

Private instruction in classical guitar. Special fee. 1 to 4 cr.

551/751. Flute

Private instruction in flute. Special fee. 1 to 4 cr.

552/752. Clarinet

Private instruction in clarinet. Special fee. 1 to 4 cr.

553/753. Saxophone

Private instruction in saxophone. Special fee. 1 to 4 cr.

554/754. Oboe

Private instruction in oboe. Special fee. 1 to 4 cr.

555/755. Bassoon

Private instruction in bassoon. Special fee. 1 to 4 cr.

556/756. French Horn

Private instruction in French horn. Special fee. 1 to 4 cr.

557/757. Trumpet

Private instruction in trumpet. Special fee. 1 to 4 cr.

558/758. Trombone

Private instruction in trombone. Special fee. 1 to 4 cr.

559/759. Euphonium

Private instruction in euphonium. Special fee. 1 to 4 cr.

560/760. Tuba

Private instruction in tuba. Special fee. 1 to 4 cr.

561/761. Percussion

Private instruction in percussion. Special fee. 1 to 4 cr.

562/762. Jazz Piano

Private instruction in jazz piano. Special fee. Permission required. 1 to 4 cr.

563/763. Jazz Guitar

Private instruction in jazz guitar. Special fee. 1 to 4 cr.

564/764. Drum Set

Private instruction in drum set. Special fee. 1 to 4 cr.

731-732. Conducting

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. 731 is a prereq for 732. 2 cr.

Theory and Composition**411, 412. Fundamentals of Music Theory**

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. 4 cr.

471-472. Theory I

Introduction to 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. 471 is a prereq for 472. 3 cr.

473-474. Ear Training I

Laboratory exercises to develop aural skills; sight-singing and dictation. Students should register for MUSI 471-472 concurrently. Prereq: permission. 473 is a prereq for 474. 1 cr.

571-572. Theory II

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. 571 is a prereq for 572. 3 cr.

573, 574. Ear Training II

Laboratory exercises to develop aural skills further. Students should register for MUSI 571-572 concurrently. Prereq: MUSI 472; 474; permission. 1 cr.

771, 772. Counterpoint

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. 3 cr.

775-776. Composition

Construction of phrases, periods, and short compositions following classical models. Problems of text-setting. Prereq MUSI 572 and permission. 775 is a prereq for 776. 3 cr.

777. Advanced Composition

Continuation of MUSI 776. Individual compositional projects. Prereq: MUSI 776 and permission. May be repeated for credit. 3 cr.

779. Orchestration

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 and permission. 3 cr.

781/781W. Analysis: Form and Structure

Introduction to 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. 3 cr.

782. Analysis: Form and Structure

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 and permission. 3 cr.

785. Electronic Sound Synthesis

Computers and digital synthesizers, methods of sound synthesis using C sound, MIDI programming in Visual Basic, control programs for synthesizers, notation using computers (e.g., Finale for PC and Macintosh). 4 cr.

Music Education (MUED)

(For program description, see page 45; for faculty listing, see page 202; see also course listings under Music.)

540. Beginning Techniques in Voice

Basic techniques of voice production. Individual work is emphasized. This course is desirable for, but not restricted to, MUED majors. Prereq: permission. 2 cr.

595. Special Projects

Individual investigation, research, or study. Creative projects may be included. Prereq: permission. 1 to 4 cr.

741. Techniques and Methods in Choral Music

Problems in the organization and performance of high school, college, and community choruses. Techniques of choral conducting and rehearsal, repertory and materials. 2 cr.

743. Materials and Methods in Piano Music

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. 2 cr.

745, 746. Techniques and Methods in String Instruments

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. 2 cr.

747. Techniques and Methods in Woodwind Instruments

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. 3 cr.

749. Techniques and Methods in Brass Instruments

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. 2 cr.

751. Techniques and Methods in Percussion Instruments

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. 2 cr.

755. Vocal Pedagogy

A study of vocal anatomy, vocal function, and teaching methods, with an emphasis on application for singers and voice teachers. 2 cr.

763. Jazz Music Methods

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. 2 cr.

765. Instrumental Music Methods

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. 2 cr.

771. Marching Band Methods

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. 2 cr.

790. Teaching Elementary School Music

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. 3 cr.

791. Teaching Secondary School Music

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. 2 cr.

795. Special Studies

Allows upper-level students to explore individually or in groups areas related to their specific professional interests. Prereq: permission. 1 to 4 cr.

Natural Resources (NR)

(For program description, see page 78; see also course listings under Environmental Conservation, Forestry, Soil Science, Water Resource Management, and Wildlife Management.)

Chairperson: William H. McDowell

Professors: John D. Aber, John E. Carroll, Russell G. Congalton, Robert T. Eckert, Theodore E. Howard, John A. Litvaitis, William W. Mautz, William H. McDowell, Peter J. Pekins, Barrett N. Rock, Andrew A. Rosenberg

Research Professors: Patrick M. Crill, Changsheng Li, Frederick T. Short
Affiliate Professors: William B. Bowden, Christopher Eagar, C. Anthony Federer, Peter W. Garrett, Jeffrey H. Gove, James W. Hornbeck, William B. Leak, Lawrence Safford

Paul Edwin Sendak, Tim D. Smith
Associate Professors: Kimberley J. Babbitt, Mimi Larsen Becker, Paul C. Johnson, Thomas D. Lee, Jonathan R. Pennock, Richard R. Weyrick

Research Associate Professors: David M. Burdick, Stephen H. Jones

Affiliate Associate Professors: Brian T. Coffey, Linda S. Heath, David Y. Hollinger, Peter A. Maddison, Rakesh Minocha, Lawrence J. Prelli

Assistant Professors: Carl H. Bolster, Mark J. Ducey, Serita D. Frey, George C. Hurtt, Elizabeth A. Rochette

Research Assistant Professors: Jacqueline Ann Aitkenhead-Peterson, Andrew B. Cooper, Mary E. Martin

Affiliate Assistant Professors: Ria Brejaart, Willard N. Brownell, Jill L. Bubier, Richard Hallett, Roger J. MacGibbon, Marie-Louise Smith, Mariko Yamasaki

Adjunct Faculty: Bert Cohen, Richard J. DeSeve, Sidney A.L. Pilgrim

400. Professionals Perspectives in Natural Resources

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 serve to acquaint students with our faculty as well as to inform them of some of the exciting research being undertaken in the department. Students will also learn of opportunities for professional involvement. Required for all first-semester Natural Resources majors. Cr/F. 1 cr.

401. Introduction to Natural Resources

Overview of the history, politics, economics, ethics, and ecology involved with the conservation and management of living and non-living natural resources. Provides an introduction to the scientific basis for natural resource conservation and management. Labs designed to 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. Restricted to Department of Natural Resources majors, or by permission. Lab. Special fee. 4 cr.

410. Insects and Society

Insects and their relation to humans, their environments, and their activities. Special fee. Lab. 4 cr.

415. Global Biological Change

An introduction to 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. 4 cr.

425. Field Dendrology

Students will study forest trees in natural communities and urban settings. Identification and nomenclature of important North American trees and shrubs will be emphasized. Environmental factors influencing tree growth, combined with study of disturbance history, will provide the context for understanding why tree species grow where they do. Students will be introduced to the major forest regions of North America. Restricted to NR majors; others by permission. Special fee.

426. Wood Science and Technology

Wood microstructure and identification: physical, chemical, and mechanical properties; characteristics of wood including those produced by growth and form (i.e., knots, cross-grain) and those produced by degradation (i.e., stain, decay); log and lumber processing and quality evaluation; prepa-

ration of wood for use, including drying, gluing, and protection against degradation. Special fee. Lab. 4 cr.

433. Wildlife Ecology

Historical, biological, ecological, and sociological factors effecting the wildlife resource and its management. Concepts in populations, communities, habitat, and contemporary wildlife issues. Special fee. Lab. 4 cr.

435. Contemporary Conservation Issues and Environmental Awareness

An exploration of the impacts of technology and human activity on our environment and natural resources. Key conservation issues will be used as examples of past and present biological, social, and environmental conflicts. 4 cr.

501. Introduction to Soil Sciences

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. 4 cr.

502. Endangered Forests

Introduction to basic ecology, forestry, natural resources, and why forests are of value to humans. Discussion of threats to the forests, especially those caused by humans; topics include air pollution, destruction of tropical forests, over-cutting of forests, invasive species, wildfires, unplanned development, and global climate change. Special fee. Lab. Writing intensive. 4 cr.

503. Wetlands Resources

An introduction to the biology and ecology of a wide variety of wetlands with emphasis on northeastern coastal saltmarsh, estuarine, and freshwater ecosystems. Lectures and discussions focus on species composition, adaptations, biotic and abiotic interactions, wetland functional values, wetland creation and restoration efforts, and current policy and regulation issues. Field trips to selected wetlands are designed to emphasize and expose students to the major topics discussed. Prereq: one full year of college level biology. (Offered summers at the Shoals Marine Laboratory.) 2 cr.

504. Freshwater Resources

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. 4 cr.

506. Forest Entomology

Especially for forest majors. Structure, development, classification, and control of representative forest insects. Insect collection required. Special fee. Lab. Writing intensive. 4 cr.

527. Forest Ecology

An introduction to basic and applied ecology of forests, with emphasis on ecosystems 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: PBIO 412 or BIOL 411; and NR 425. (Open only to EC, FOR, PBIO, SOIL, WARM, and WILD majors.) Special fee. Lab. 4 cr.

542. Forestland Measurement and Mapping

Elementary measuring equipment and techniques; preparation of maps; public land survey; courthouse deed search. Two-week field session follow-

ing spring semester. (FOR, WARM, and WILD majors only.) Special fee. 2 cr.

544. Forest Biometrics

Sampling techniques basic to forest inventory, regression estimation used in deriving volume equations and predicting forest growth and yield. Field labs include plot and point sampling. Analyses made using microcomputers. Special fee. Lab. 3 cr.

566. Wildlife Law Enforcement I

Fundamentals of wildlife law enforcement, its history, values, and the philosophy of managing people in the outdoors. Lab. 3 cr.

599. Work Experience

Work in the field of forestry or water resources management; must be performed under professional supervision or approved by natural resources faculty. Students are responsible for arranging their own experience. Restricted to Forestry and Water Resources Management majors. Cr/F.

601. Environmental Conservation and Sustainable Living Internship

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. 4 cr.

602. Natural Resources and Environmental Policy

Contemporary natural resource and environmental policy problems/issues addressed from a policy sciences perspective with emphasis on domestic policy initiatives and their implementation toward sustainable resource use and a healthy environment. Public policies 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. Restricted to Department of Natural Resources juniors and seniors. Special fee. Writing intensive. 4 cr.

604. Watershed Hydrology

Course will focus on the basic principles underlying the physical processes of water movement at the watershed scale. Topics will include precipitation, soil infiltration, stream flow, open channel hydraulics, and groundwater movement. Labs will consist of problem sets and field trips in which hydrological processes will be quantified. Prereq: NR 504 and one semester of calculus. Special fee. Writing intensive. 4 cr.

607. Soil and Land Evaluation

Field and lecture course emphasizing application of USDA Soil Taxonomy and Soil/Land-use interpretations to soils, landscapes, parent materials. Students gain on-site practice in preparing detailed soil descriptions, classifications, and interpretations, and participate in collegiate soil judging meets. Prereq: NR 601. Special fee. Lab. 2 cr.

609. Soils and Community Planning

Using a town plan and soils map, student develop reports for multiple urban and rural land use—housing, sewage, recreation, transportation, runoff, etc. USDA soil classification system; Soil Conservation Service rating criteria; New Hampshire soils. Guest lecturers. 2 cr.

610. Coastal and Oceanic Law and Policy

Intended for persons interested in knowledge of or careers in management of marine or coastal resources, or in the natural sciences. The focus is on policy issues affecting oceans and coastlines and the tools available to government and policy leaders for coping with those issues. Issues examined include: (1) international concerns about control of coastal waters and access to resources of the water column and ocean floor; (2) water pollution and contamination of ocean resources; (3) protection for threatened and endangered species, including depleted fisheries; and (4) environmental impacts of the development and use of coastal areas. The legal tools and policy options available to government and concerned citizens for addressing these issues and controversies are examined. Class discussions on the status and history of applicable laws are accompanied by the analysis of policy concerns and the efficacy of various legal techniques. Students work in teams to develop strategy and to research positions in preparation for a negotiation exercise and a mock hearing. (Offered Summers at the Shoals Marine Laboratory.) 2 cr.

611. Soils and Environmental Quality

An in-depth look at soil as an environmental component. The role of soil in global nutrient cycling. Soil control of pollutant levels in air and water. Effect of pollutants on soil processes and the effect of soil processes on pollutants. Prereq: NR 501 or equivalent. Special fee. 4 cr.

615. Wildlife Habitats

Introduction to 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. 4 cr.

621. Field Description of Soils

Description of soils in the field. Application of soils properties to forestry, plant science, and community planning. Strong orientation to fieldwork. Prereq: NR 501 or permission. Permission required for water resources, soils, or forestry majors. Special fee. Lab. 3 cr.

629. Silviculture

Application of ecological knowledge to the control, establishment, composition, and growth of forest stands for economic purposes. Prereq: NR 425 and 527. Special fee. Lab. 3 cr.

630. Forest Harvesting and Silviculture

Harvesting and silviculture practices. Prereq: NR 629 or permission. Limited enrollment. Cr/F. (Not offered every year.) 2 cr.

636. Wildlife Techniques

Introduction to major behavioral, physical, and psychological characteristics of wild mammals and birds; application of field and laboratory techniques used to study these characteristics. Prereq: one course in general ecology and statistics. Weekend field trips required. Special fee. Limited to Wildlife majors and Minors. Permission. Writing intensive. 4 cr.

637. Practicum in Environmental Conservation

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. Lab. Cr/F. 4 cr.

643. Economics of Forestry

Intermediate-level analyses of supply and demand for forest-based goods and services, managerial economics, taxation, capital investments. Prereq: EREC 411 or ECON 402. 4 cr.

650. Principles of Conservation Biology

Overview of the major issues in conservation biology. Course lectures and discussions address three major themes: the importance of biological diversity, factors that determine levels of biological diversity, and the ways that expanding human populations can accommodate the requirements of wild plants and animals. Develops an appreciation for challenges encountered while maintaining or restoring local, regional, and global biological diversity. Prereq: one semester of biology, botany, or zoology. 4 cr.

652. Forest Resources Assessment

Aerial photo type mapping and forest resources inventory: type identification and delineation, map construction, cruise design, and forest resources inventory. Two-week field session following the spring semester. (NR majors, others by permission.) Prereq: NR 527 and 544. Special fee. 2 cr.

655. Vertebrate Biology

Introduction to systematics, behavior, physiology, and ecology of terrestrial vertebrates. Topics include reproductive systems, foraging strategies, and animal-habitat relationships. Some emphasis on New England species. Prereq: BIOL 411; 412; NR 527 or equivalent. Special fee. Lab. 4 cr.

658. Introduction to Geographic Information Systems

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 lab using ArcView 3.x GIS software. Permission. (Also offered as GEOG 658.) 4 cr.

660. Evolution, Biodiversity, and Community Ecology in Geographically Isolated New Zealand

From a bioregional perspective, students will investigate the geographical, biological and human ecological processes that have shaped the distribution of species and biotic communities in present day New Zealand. The biogeography and evolutionary history, including the impacts of human settlement of these unique islands will serve as a basis for field studies designed to develop student's conceptual knowledge and field skills (classification, mapping, habitat assessment, field identification, sampling) as they study community ecology of representative ecosystems and land/sea regimes and the effect of human influences on these systems. Integrated modules of lectures and field exercises. Prereq: junior/senior; permission. Coreq: NR 661, NR 662, NR 663. Fulfills UNH's GN5, Foreign Culture. Special fee. 5 cr.

661. Ecosystem Management and Restoration Ecology in New Zealand

Course will focus on ecological opportunities and constraints to be considered to ensure sustainable use of natural resources in Hauraki Gulf and the

Hauraki/Hunua catchment basin. Student investigations will compare resource planning and management in this ecosystem with those of native forests and the sub-alpine and West Coast ecosystems of South Island. Impacts of resource management on natural and human communities, conflicts among user groups and approaches for their resolution will be examined for forests, agricultural lands, near-shore marine areas, coastal zone and special wildlife management areas. Representatives of all key resource management agencies and interest groups will be engaged in the course. Students will develop field resource assessment skills and learn to set yield levels for specific resources. Prereq: junior/senior; permission. Coreq: NR 660, NR 662, NR 663. 4 cr.

662. Environmental Policy, Planning and Economics in New Zealand's Political Context

Seminar. Students will assess impacts of the N.Z. Resource Management Act of 1991 on the ecology, economy and socio-political environment in New Zealand with emphasis on examination of historical exploitation of N.Z. resources, indigenous use issues and conflicts, and options for attaining a more sustainable equilibrium between people and nature. Students will be exposed to diverse perspectives of Maori, businesses, the N.Z. Department of Conservation, and Metropolitan Regional Councils regarding custodianship of the natural heritage and the relative acceptability of proposed conflicts resolutions. Students will examine cases involving the Resource Consents Processes at district, regional, national levels and evaluation of various N.Z. institutions for their effectiveness in dealing with resource management issues. Prereq: junior/senior; permission. Coreq: NR 660, NR 661, NR 663. Special fee. 3 cr.

663. Applied Directed Research on Sustainable Resource Use in the Hauraki Basin, New Zealand

Working closely with faculty mentors, students will use the scientific method to develop and test hypotheses regarding selected resource issues in the Hauraki Basin. Experimental design, standardized data collection methods, and basic statistical and policy analytic methods will be used to investigate and develop a report on a resource issue of concern. Data analysis and communication (including writing) skill development will be stressed. Students will present findings at a scientific meeting which includes resource management and research collaborators, community groups and clients, including government agencies. Prereq: junior/senior; permission. Coreq: NR 660, NR 661, NR 662. Writing intensive. 4 cr.

670. Forest Fire Protection

Forest fire prevention, behavior, and effective control; weather phenomena; other aspects of forest damage; fire effects and use. Prereq: NR 527 or 629; NR 501. Special fee. Lab. 2 cr.

675. CEOP (Community Environmental Outreach Program) Projects

The Community Environmental Outreach Program matches students with an interest in environmental issues with community groups with environmental problems to be addressed. Students form consulting teams of from two to four students to work with the community during the academic year. (May be repeated for a maximum of 4 credits.) Prereq: permission. Cr/F. 2 to 4 cr.

677. North American Geocommons Studies in Sustainable Community Design

Provides a unique opportunity to combine academic and field studies with the learning of ecological design skills through participation in two or three small communities working towards sustainability. Students will learn to recognize and analyze the physical, social, economic, political, ethical and spiritual elements that make up sustainable communities. Governance policies will be examined relative to local ecosystems elements. Prereq: BIOL 541, permission. Coreq: NR 678, NR 679. Special fee. Lab. 4 cr.

678. North American Geocommons Problems in Human Relationships to Their Local Environment

Exploration of the relationships between people and their local environment. What factors determine the degree of care that people have for their places? Students will study the role of human history, language, education, physical landscape, society, and worldview on shaping human-place relations. They will try out ways of strengthening these connections through use of ecological footprint analysis, community-based social marketing, mindful awareness, and systems thinking. Prereq: BIOL 541, permission. Coreq: NR 677, NR 679. Lab. 4 cr.

679. North American Internship in Sustainable Development

A field-based experience combined with readings, dialogue, reflection, and a project paper introduces the student to the history, methods, and meanings of sustainable development. Emphasis is on the development of students' field skills. Students select, implement, and evaluate an internship project in sustainable development. Prereq: BIOL 541, permission. Coreq: NR 677, NR 678. Cr/F. 4 cr.

680. International Geocommons Studies in Sustainable Community Design

Provides a unique opportunity to combine academic and field studies with the learning of ecological design skills through participation in two or three small communities working towards sustainability. Students will learn to recognize and analyze the physical, social, economic, political, ethical, and spiritual elements that make up sustainable communities. Governance policies will be examined relative to local ecosystem elements. Prereq: BIOL 541, permission. Coreq: NR 681, NR 682. Special fee. Lab. 4 cr.

681. International Geocommons Problems in Human Relationships to Their Local Environment

Exploration of the relationships between people and their local environment. What factors determine the degree of care that people have for their places? Students will study the role of human history, language, education, physical landscape, society, and worldview on shaping human-place relations. They will try out ways of strengthening these connections through use of ecological footprint analysis, community-based social marketing, mindful awareness, and systems thinking. Prereq: BIOL 541, permission. Coreq: NR 680, NR 682. Lab. 4 cr.

682. International Geocommons Internship in Sustainable Development

A field-based experience combined with readings, dialogue, reflection, and a project paper introduces the student to the history, methods, and meanings of sustainable development. Emphasis is

on the development of students' field skills. Students select, implement, and evaluate an internship project in sustainable development. Prereq: BIOL 541, permission. Coreq: NR 680, NR 681. Cr/F. 4 cr.

690. Sustainability Analysis: Focus on Purchasing

Theory and practice of sustainability: a hands on course that introduces students to sustainability concepts through investigation of purchasing practices at UNH. Teaches skills in product investigation, censuring, and numerical analysis of both environmental and product costs. Working in groups, students survey and research products for sustainability impact; identify alternative products; prioritize choices based on environmental costs; and make recommendations that do not impact cost or performance. Prereq: permission. 3 cr.

692. Regional Case Study in Wolf Management

Wolf reintroduction into the North Woods of New England is highly controversial and requires inclusion of the eastern coyote to balance the discussion. Study the interaction of these top predators at Algonquin Provincial Park in Ontario for one week during spring break. Wild canid ecology, park administration, and endangered species protection. Open to all UNH students. Permission required. Special fee. Cr/F. 2 cr.

700. Critical Analysis of Water Resources Literature

Detailed consideration of current issues in water resource management in a seminar format. Emphasis on critical analysis of primary literature in environmental science relevant to water resources management. Special fee. Prereq: NR 703, or permission. 2 cr.

701. Ecological Values and Ethics

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. Prereq: permission. Writing intensive. 4 cr.

702. Workshops

Short-term courses (generally a few days to two weeks) offered off-campus by the A) Watershed Ecology and B) Sustainable Schools, as well as C) Nature Study covering a broad variety of environmental and natural resource topics. E) Community Mapping. May be repeated. Special fee required depending on topic. Cr/F. 1 to 4 cr.

703. Watershed Water Quality Management

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. 4 cr.

704. Soil Genesis and Classification

Processes involved in formation of soils, soil properties as reflectors of genetic processes. Classification systems of soils related to soil genesis and soil landscapes. Lab sessions illustrate concepts by examining soils in the field. Prereq: NR 501 or equivalent. Special fee. Lab. 4 cr.

705. Forest Soils

An introduction to basic and applied forest soils research, with emphasis on pedogenic and ecological development, carbon and nutrient cycling, and impacts of forest management and recent changes in atmospheric chemistry. Short papers based on assigned readings and an independent research project are required. Prereq: NR 501, NR 527, or permission. Writing intensive. 4 cr.

706. Soil Microbiology

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 (1) the biodiversity present in soil systems; (2) factors controlling microbial community composition and diversity; and (3) linkages between soil microbial communities, soil physical properties, and soil organic matter and nutrient cycling dynamics. Prereq: BIOL 412 or PBIOL 412, CHEM 545, or equivalent, or permission. Special fee. Lab. 4 cr.

709. Fire Ecology Seminar

Lectures, guest lectures, and student presentations dealing with the natural role of fires in wild land communities, fire adaptations in plant and animal species. Human responses to wild land fires and prescribed fire applications. Optional set of one-half to one-day field trips for an additional 1 credit. Prereq: basic ecology course; junior, senior. Special fee. (Not offered every year.) 2 or 3 cr.

710. Endangered Species Seminar

This seminar provides students with an interactive class of student presentations and guest lectures by endangered-species biologists. Emphasis is placed on biological, sociological, economic, and political factors that influence endangered-species policy. Prereq: basic ecology/biology; permission. Special fee. 2 cr.

711. Wetland Resource Management

Analysis of the natural resources of coastal and inland wetlands and environmental problems caused by human use and misuse of these ecosystems. Groups will 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. 4 cr.

#712. Sampling Techniques

Techniques of sampling finite populations in environmental sciences; choice of sampling unit and frame, estimation of sample size, confidence limits, and comparisons of sample designs. Prereq: BIOL 528 or equivalent. (Not offered every year.) 2 to 4 cr.

713. Quantitative Ecology

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. 4 cr.

714. Ecosystems of Puerto Rico

Field examination of a variety of tropical ecosystems in Puerto Rico including cloud forest, montane rain forest, tropical dry forest, mangroves and coral reefs. Field study supplemented by appropriate readings from the scientific literature and expert presentations. Students are responsible for round-trip airfare and personal expenses.

Prereq: two of the following three: 1) NR 527 or BIOL 541; 2) NR 501 or ESCI 401; 3) NR 703; permission. Cr/F. 1 cr.

715. Theoretical Ecology

Study of important theoretical concepts in ecology by analysis of mathematical models. Topics include population growth, competition, coexistence of species, competitive exclusion, predator-prey dynamics, invasions, migration, and spread. Strong foundation in ecology and mathematics is required. Prereq: BIOL 541, MATH 425, MATH 426; or permission. MATH 527 is recommended. 4 cr.

716. Wetland Delineation

Examination of 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.) 4 cr.

718. Law of Natural Resources and Environment

For resource managers: the legal system pertaining to resource management, protection of the environment, and possibilities for future action. Prereq: NR 435, EREC 606, or equivalent. 3 cr.

719. Wetlands Mitigation and Restoration

Assessing the problems of wetlands loss. Asks: What steps can be taken, does restoration work, can habitat value be replaced, and what constitutes equivalent mitigation? 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.) 3 cr.

720. International Environmental Politics and Policies for the 21st Century

Examine policies for managing human activities to sustain the health of regional ecosystems and planetary life-support systems. Focus on selected problems of the international commons (e.g., oceans, marine resources, atmosphere, migratory species); global and regional carrying capacity (e.g., population, resource consumption), internationally shared ecosystems (e.g., trans-boundary watersheds and water-bodies, tropical rainforests); 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. The Earth Summit Strategy to Save the Planet. Prereq: permission. 4 cr.

721. Ecology of Polluted Waters

Impact of various water quality problems (e.g., excessive nutrient loading, organic matter loading, contamination by trace organic compounds) on the ecology of fresh waters, including microorganisms, aquatic invertebrates, algae, and fish. Design of impact assessment studies and data interpretation. Prereq: NR 703 or BIOL 528 or BIOL 541; permission. Special fee. Lab/field trips. Writing intensive. 4 cr.

722. Advanced Silviculture

Intensive silviculture of forest stands. Regeneration (e.g., alternative regeneration methods and site preparation); stand management (e.g., thin-

ning schedules, and fertilization). Prereq: NR 629 or equivalent; permission. Special fee. (Not offered every year.) 3 cr.

723. Field Wetland Ecology

Field investigation of coastal and inland wetland types. First half of course consists of field trips to visit sample regional wetlands. Second half of course consists of methods used to analyze field samples from wetlands. Enrollment is limited. Prereq: present or past enrollment in NR 711. Special fee. Lab/field trips. 3 cr.

724. Resolving Environmental Conflicts

Theories and practices of environmental dispute settlement. Roles of public, non-governmental organizations and government assessed. Effectiveness of public participation initiatives in influencing public policy decisions and/or resolving environmental conflicts examined. Alternative approaches to consensus (policy dialogues, joint problem solving; strategic planning; negotiation, mediation) as well as litigation examined. Specific cases critiqued and evaluated; conflict resolution skills developed. Prereq: second-semester juniors, seniors; permission. 3 cr.

725. Environmental Communications and Advocacy

Principles and techniques of communication and policy advocacy as applied to selected environmental issues. Case studies of regional, national, international importance are pursued within a seminar-workshop format in which students: 1) learn content analysis skills to critically examine practical constraints on communication about environmental issues within complex political environments and involving stakeholders with diverse values and political interests; 2) develop analytical procedures and rhetorical strategies to build public policy advocacy cases, using diverse perspectives, for selected environmental issues; and 3) learn consensus building and negotiation strategies for forging advocacy coalitions and to advocate policy objectives in pluralistic contexts. Prereq: senior standing and permission. 4 cr.

730. Terrestrial Ecosystems

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; PBIO 412 or BIOL 411; permission. Lab. 3 cr.

732. Chemistry of Soils

Chemical composition of soil; structure of soil minerals; mineral solubility; contaminant sorption by minerals and organic matter; cation and anion exchange processes; and organic reactions in soil, their kinetics and their effects on soil properties. Prereq: CHEM 403 or equivalent. Special fee. Lab. 4 cr.

734. Forest Protection Seminar

Discussion and special problems based on principles and techniques of forest protection. Prereq: permission. (Not offered every year.) 3 cr.

737. Wildlife Population Dynamics

Mechanisms that influence the characteristics of terrestrial wildlife populations. Prereq: one course in general ecology and statistics; senior major or permission of the instructor. Special fee. Lab. 4 cr.

738. Wildlife Policy and Management

Wildlife administration and policy. Local, regional, and national wildlife management strategies. Contemporary management issues of land-

use, commercialization of wildlife, and wildlife professionalism. Prereq: senior majors only; permission. Special fee. Lab. Writing intensive. 4 cr.

739. Methods in Wildlife Demography and Conservation Biology

Introduction to estimators of abundance, survival estimates, life tables, and assessment of population viability. Prereq: concurrent or previous enrollment in a course on the concepts of population dynamics or conservation biology and one course in statistics. Prereq: permission. Special fee. 3 cr.

745. Forest Management

Forest land ownership; management objectives; forest inventory regulation and policy; forest administration; professional responsibilities and opportunities. Prereq: completion of junior year in forestry curriculum. Special fee. Lab. 4 cr.

750. Applied American Environmental Philosophy

Applying the philosophical theory underlying environmental studies and approaches to environmental conservation. Students conduct critiques of extensive readings and write papers creatively analyzing aspects of selected philosophical works. Major research manuscript required. (Also offered as AMST 750.) 4 cr.

753. Decision Sciences in Natural Resource Management

Application of decision science methods (optimization, simulation, input-output, and statistics) to natural resources problems. Emphasis on practical work in evaluating projects, dealing with risk and uncertainty, analyzing regional impacts, valuing non-market resources, and exploring sustainability of managed forests. Prereq: NR 643 or intermediate microeconomics. Special fee. Lab. Writing intensive. 4 cr.

754. Wood Products Manufacture and Marketing

Wood products from harvesting and procurement of raw materials to finished product processes, management decisions, marketing, and promotion problems. Case-study approach backed up by weekly all-day field trips to wood products manufacturing plants in the region. Prereq: NR 426 or permission. Special fee. Lab. (Not offered every year.) 4 cr.

755. Regional Silviculture and Forest Management

Extended field trip to another forest region. Prereq: senior standing; NR 745; permission. Limited enrollment. Cr/F. (Not offered every year.) 2 cr.

757. Photo Interpretation and Photogrammetry

Practical and conceptual presentation of techniques for using remote sensing, specifically aerial photographs, in natural resources. Includes photo measures of scale, area, parallax and object heights; flight planning; photo geometry; an introduction to the electromagnetic spectrum; and photo interpretation and mapping. Concludes with an introduction to digital remote sensing including multi-spectral scanners, radar, and thermal imagery and a brief discussion of geographic information systems (GIS). Applications to forestry, wildlife, land-use planning, earth sciences, soils, hydrology, and engineering. Prereq: algebra. Special fee. Lab. (Also offered as GEOG 757.) 4 cr.

759. Digital Image Processing for Natural Resources

Introduction to digital remote sensing including multi-spectral scanners (Landsat and SPOT) ra-

dar 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 application. Use of ERDAS image processing software. Knowledge of PCs and DOS required. Prereq: NR 757 or equivalent and permission. (Also offered as GEOG 759.) 4 cr.

760. Geographic Information Systems in Natural Resources

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.) 4 cr.

764. Vegetation Sampling and Analysis

Methods for sampling plant populations and communities, especially estimation of abundance. Analysis of pattern, measurement of species diversity, and relation of abundance to environmental factors. Ordination and classification of communities. Modeling of succession. Prereq: statistics; BIOL 541 or equivalent. Special fee. Lab. 4 cr.

765. Community Ecology

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: BIOL 528 and BIOL 541. Special fee. Lab. 4 cr.

772. Wildlife Energetics

Energy requirements of wildlife species and the manner in which these needs are met in their natural environment. Thermodynamics in ecological systems, factors influencing metabolic rate, food habits, food-use efficiency, food availability. Prereq: permission. Special fee. 2 cr.

775. Natural Resources Senior Project

Multidisciplinary approach to land-use planning. Provides experience with dynamics of working in a group to identify, evaluate, and suggest management strategy to solve environmental problems. Class will be divided into small groups, each of which will choose or be assigned a real problem. Each group will act as a consulting firm in developing management strategies. Prereq: senior standing in the Department of Natural Resources and permission. Special fee. Writing intensive. 2 cr.

784. Sustainable Living

Concepts of living within ecosystem limits explored in a learning-community format. The importance of human communication, sense of place and time, and the health and longevity of human species and natural systems emphasized. Examination of governance, education, economic, agricultural, and ethical systems while asking, "What makes one system more or less sustainable than another?" to lead to directions for sustainable society. Field trips and small research projects conducted. Prereq: permission. Special fee. 3 cr.

785. Systems Thinking for Sustainable Living

Introduction to systems thinking from a sustainable living perspective. The course is a collaborative inquiry using a problem-solving approach. After study of different types of systems and learn-

ing 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?" Prereq: NR 784 or permission. 3 cr.

795. Investigations

Investigations in Natural Resources may include topics in environmental conservation, forestry, soil science, water resources, and wildlife management. Permission required. 1 to 4 cr.

797. Special Topics

Course is designed as an "Experimental Course," for the purpose of introducing a new course or teaching a special topic for a semester in Environmental Conservation, Forestry, Soil Science, Water Resources, and Wildlife Management. Permission required. 1 to 4 cr.

799. Honors/Senior Thesis

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. 4 cr.

Nursing (NURS)

(For program description, see page 74.)

Chairperson: Raelene Shippee-Rice

Professors: Gail A. Harkness, Judith A. Sullivan

Associate Professors: Susan J. Fetzer, Gene E. Harkless, Dorothy D. Rentschler, Raelene Shippee-Rice, Carol L. Williams-Barnard
Assistant Professors: Katherine S. Collopy, Pamela P. DiNapoli, Jeffrey A. Eaton, Janice B. Foust, Liza Little, Alison H. Sweatt

501. Introduction to Nursing

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. Writing intensive. 4 cr.

502. Concepts of Pathophysiology/Pharmacology

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. 4 cr.

508. Foundations of Nursing Judgment

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. Coreq: NURS 502, NURS 514. 4 cr.

514. Techniques of Clinical Nursing

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. Coreq: NURS 508. Lab. Special fee. 4 cr.

535. Death and Dying

Course 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. 4 cr.

595. Women's Health

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. 4 cr.

606. Seminar on Professional Nursing

The role of health professionals from historical, social, political, economic and technical viewpoints. 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 646. Special fee. Writing intensive. 7 cr.

615. Care of the Adult

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. Coreq: NURS 619, 645. Special fee. 8 cr.

617. Nursing and Healthcare Policy

Examination of 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. 3 cr.

618. Caring for People with Alterations in Mental Health

Provides an understanding of the concepts of mental health and major factors affecting human behavior and interaction. Uses specific theoretical concepts and psychosocial theories as a vehicle for supporting the person's and family's optimum state

of well-being. Also emphasizes the practice of psychiatric nursing as being grounded on certain empirical, aesthetic, personal, and ethical knowledge. Through a variety of clinical experiences, the student applies mental health concepts, principles of therapeutic communication, and the nursing process in caring for individuals and families with alterations in mental health. Prereq: second semester junior nursing major. Special fee. 4 cr.

619. Clinical Decision Making I

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. Coreq: NURS 615. 4 cr.

620. Caring for the Childbearing and Childrearing Family

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 young family are discussed in terms of major morbidity/mortality and contemporary issues. Experience in various clinical settings will provide opportunities for the development of professional practice roles. Prereq: second semester junior nursing major. Special fee. 8 cr.

622. Clinical Decision Making II

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. 4 cr.

624. Nursing in the Community

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. Special fee. Prereq: second semester junior nursing major. 4 cr.

645/645W. Research

Focuses on enhancing the student's ability to evaluate, read, comprehend, participate in, and apply research to the practice of nursing. RN students should take 645W. Pre- or Coreq: statistics; or by permission. 4 cr.

655. Community Health Nursing I

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. Special fee. 3 cr.

656. Community Health Nursing II: Individuals, Families, and Aggregates

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. Coreq: NURS 656C. Special fee. 2 cr.

656C. Community Health Nursing II/Clinical 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. Coreq: NURS 656. 1 cr.

694. Special Topics

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.) 1 to 4 cr.

695. Independent Study

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. 2 to 4 cr.

703/703W. Nursing Leadership/Management and the Organizational Context

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. 4 cr.

710. Families in Health and Illness

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. 4 cr.

719. Professional Nursing Practice: Transitions

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. Special fee. 7 cr.

720. Professional Nursing Practice: Transitions

Provides opportunity for students to refine and integrate theory and practice from previous coursework into professional practice through cooperatively designed learning experience. Final course in major. Special fee. 8 cr.

794. Special Topics

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. 1 to 4 cr.

#796. Assessment and Intervention of Addictive Behaviors

Concepts related to addictions seen in common disorders such as alcoholism, drug abuse, eating disorders, and codependency. Addresses assessment, treatment, and relapse prevention. Generic concepts are expanded through specific areas of addiction. Seminar format to facilitate class participation. Prereq: junior, senior, or graduate standing. 4 cr.

797. Honors Thesis

Honors seminar designed to expand the knowledge and skills presented in previous honors in major courses. Focus of course is a project relevant to the discipline of nursing under the direction of a faculty adviser. Pre- or Coreq: NURS 645; permission. Writing intensive. 4 cr.

Nutritional Sciences (NUTR)

Department of Animal and Nutritional Sciences (For program description, see page 90. For other courses, see listings under Animal Sciences, page 133.)

Professors: Gail B. Carey, Samuel C. Smith, Anthony R. Tagliaferro
Associate Professors: Dennis J. Bobilya, Gale B. Carey, Joanne Curran-Celentano, Colette H. Janson-Sand

Adjunct Professor: Mark Windt
Teacher/Trainers: Carolyn Giles
Clinical Faculty: Ruth A. Reilly
Extension Educators: Valerie A. Long, Catherine A. Violette
Lecturer/Contract Faculty: Jesse Stabile Morrell

400/400H. Nutrition in Health and Well Being

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. 4 cr.

401. Introduction to the Dietetics Profession Survey of the role and responsibilities of the dietitian. Legal and ethical considerations necessary for the student dietitian in clinical experiences. Educational and personal qualifications for specialization in dietetics. Prereq: NUTR major. Cr/F. (Fall semesters only.) 1 cr.

405. Food and Society

Consideration of the cultural significance of food, emphasizing historical, psychological, social, political, and economic aspects. Also offered as ANSC 405. (Spring semester only.) Writing intensive. 4 cr.

473. Food Fundamentals

Principles and techniques of food selection, preparation, and preservation in relation to quality and acceptability. (Fall semester only.) 3 cr.

476. Nutritional Assessment

Techniques in anthropometric and biochemical assessment of nutritional status with emphasis on

client interviewing and nutritional evaluation in both community and clinical settings. Prereq: NUTR 400/475 or permission. Special fee. (Spring semester only.) 3 cr.

503. Principles of Food Service Management
Practical experience in methods of purchasing, and handling food, tools, and equipment used in quantity food preparation; lab experience in selective settings. May be taken independently of NUTR 504. Prereq: NUTR 473 or permission of instructor. (Fall semester only.) 3 cr.

504. Managerial Skills in Dietetics
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.) 3 cr.

510. Nutrition Education and Counseling
Principles, methods, skills and materials involved in nutrition education and counseling. Emphasis on development of educational materials and practicum skills necessary to perform as an effective nutrition counselor. Special fee. (Fall semester only.) Prereq: Nutrition major or permission. 3 cr.

550. Food Science: Principle and Practice
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: NUTR 473; NUTR 400 or 475; CHEM 403-404; CHEM 545-546. Special fee. Lab. (Spring semester only.) 4 cr.

600. Field Experience in Nutrition
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 or 475. May be repeated for a maximum of 6 credits. Cr/F. 1 to 4 cr.

646. Sports Nutrition
In-depth look at the facts and fallacies of sports nutrition for students who plan to become health professionals. Topics include protein needs for athletes, fat as fuel, carbohydrates and athletic performance, nutrition ergogenic aids, vitamin and mineral needs of athletes, fluid replacement, eating disorders, and proper training diets. Prereq: NUTR 475 or ANSC 400; KIN 620 or ANSC 511-512. Writing intensive. 4 cr.

650. Life Cycle Nutrition
Detailed analysis of nutrient requirements throughout the life cycle. Nutrient needs are evaluated in the context of their metabolic functions. Prereq: NUTR 400/475. (Spring semester only.) 3 cr.

699. Independent Study
Scholarly research project or supervised teaching experience in an area of the nutritional sciences under the guidance of a faculty adviser. May be repeated. Prereq: permission. Cr/F. 1 to 4 cr.

720. Community Nutrition
Solutions to the complex public health problems require cost-effective, community-based interventions that address their multiple causes. Since

food, nutrition, and diet are woven into the economic, social, and emotional fabric, as well as the health fabric, of the community, the community nutritionist is a key player in diagnosis and treatment of the public. This course will provide the skills and tools needed to assess, design, implement, and evaluate interventions for the community. Prereq: NUTR 400. Writing intensive. 4 cr.

740. Nutrition for Children with Special Needs

Nutritional assessment and care of children with special needs resulting in feeding difficulties requiring medical nutrition therapy. 2 cr.

750. Nutritional Biochemistry
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; BCHM 658; or equivalents. (Also offered as ANSC 750.) Writing intensive. 4 cr.

760. Geriatric Nutrition
Emphasis on the nutritional requirements and status of the elderly in view of psychological and physiological changes in aging. Approaches for nutrition intervention and support will be addressed. Prereq: NUTR 400/475 or permission. (Also offered as ANSC 760. Spring semester only.) 3 cr.

773. Clinical Nutrition
Application of principles of normal nutrition and physiology to clinical problems; altered nutrient requirements in human disease. Prereq: basic nutrition and biochemistry or permission. Coreq: NUTR 775. (Fall semester only.) 4 cr.

775. Practical Applications in Medical Nutrition Therapy
Supervised practical experience in therapeutic dietetic in one of several cooperating New Hampshire hospitals. Emphasis on nutritinal counseling, assessment, and instruction of patients with nutrition-related disorders. Coreq: NUTR 773. (Fall semester only.) 3 cr.

780. Critical Issues in Nutrition
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. 4 cr.

799. Honors Thesis
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. 1 to 4 cr.

Occupational Therapy (OT)

(for program description, see page 75.)

Chairperson: Lou Ann Griswold
Professor: Elizabeth L. Crepeau
Associate Professors: Lou Ann Griswold, Shelley E. Mulligan, Alice C. Seidel, Barbara Sussenberger, Judith D. Ward
Assistant Professors: Susan C. Merrill, Douglas C. Simmons, Barbara Prudhomme White

The following courses are for occupational therapy students; they are elective for others by permission of the course instructor.

500. Behavior and Development of Children
Introduction to the biological, psychosocial, and cultural aspects of human development from birth through adolescence. Emphasis on theories that help explain human behavior; discussion of implications of developmental research. 4 cr.

501. Developmental Tasks of Adulthood
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. 4 cr.

510. Exploring Occupational Therapy
Occupational therapy will be 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 will be explored. Comparisons will be made to related human service careers. Students will be encouraged to do a personal assessment of their interest and potential for further study of occupational therapy. Students will be required to complete a community service learning assignment. 4 cr.

511. Introduction to Professional Literature and Communication
Literature related to the practice of occupational therapy and the communication skills required of therapists. Emphasis on research in professional literature, scholarly writing, and professional terminology. Introduction to oral reporting, clinical observation, and documentation techniques. Prereq: sophomore OT major. Writing intensive. 4 cr.

595. Special Topics
Explores areas related to occupational therapy theory, practice, and/or research. 4 cr.

685. Psychosocial Disorders and Everyday Life
The study of abnormal behavior in the context of its effect on everyday function. It 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. 4 cr.

695. Independent Study
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. 2 to 4 cr.

722. Assistive Technology
This hands on course will provide 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. 4 cr.

723. Group Process in Occupational Therapy
Theoretical and applied dimensions of group process in both clinical and organizational settings. Skills in group planning, implementation, and evaluation for direct service roles. Indirect service roles including program development, collaborative leadership, and teamwork studied. Students actively participate in simulated group experience. Prereq: OT senior standing. Special fee. Writing intensive. 2 cr.

724. Assistive Technology and Physical Disabilities

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. 4 cr.

726. Assistive Technology and Sensory, Communicative, and Cognitive Disabilities

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. 4 cr.

741. Human Occupation I

Students will 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. 4 cr.

742. Human Occupation II

Expanding on the work from Human Occupation I, this course facilitates students' understanding of occupation as described and utilized in occupational therapy. The course has a four-fold purpose, (1) consider the historical and philosophical base of occupation, (2) examine the frames of reference that define and delineate occupation as a therapeutic medium, (3) explore the importance and meaning of belonging to a group, and (4) engage in ethnographic research. 4 cr.

751. Mind Body Systems/Neurologically Based Function and Dysfunction

Students will study neurologically related disorders commonly seen by occupational therapists. A problem based learning method will be used to examine the perceptual, cognitive, biopsychosocial basis of these disorders. A basic overview of human body-mind systems will be 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 will be discussed in terms of general, holistic methods of practice. The course is a prerequisite for courses in specific occupational therapy assessment and intervention. 4 cr.

752. Human Movement in Occupations

This course will integrate the student's prerequisite knowledge of occupation. The course will develop 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 will be emphasized. The analysis of environment as it

relates to human movement and participation in desired occupations will be explored. Special fee. 4 cr.

761. Occupational Therapy: Professional Roles and Principles of Practice

This course introduces students to foundation knowledge, values and philosophy of OT practice. Students learn and apply professional behavior skills required for competent and ethical OT practice. Topics included in the course are: historical roots of occupational therapy, organization and structure of the profession, professional roles, theoretical frameworks, the occupational therapy process, clinical reasoning, and professional code of ethics. Course assignments introduce students to the profession's scholarly literature. 3 cr.

762. Occupational Therapy Evaluation and Intervention I

The main goal of this course is to introduce students to the OT evaluation process. Students will apply the clinical reasoning process to OT evaluation across age levels, and types of medical conditions. Students will learn about common assessment tools available to occupational therapists, where, when, and how to apply them, and how to evaluate assessment tools. Students will develop technical skills in administering selected evaluation tools, in integrating assessment data, and demonstrate emergent clinical decisions about intervention planning. Finally, they will gain an appreciation of the importance of measurement in various facets of OT practice. Special fee. 4 cr.

771. Occupation-Based Program Development in the Community I

In this class 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. 4 cr.

772. Occupation-Based Program Development in the Community II

This is the second course in the Community Occupational Therapy Sequence. Students will continue to work with their first semester seminar group in the same organization. They will begin the semester by adapting their plan based on the feedback from the organization. They will use the rest of the semester to implement their program and evaluate its effectiveness. Writing intensive. 4 cr.

774. Occupational Therapy in School Systems

Current issues of practice in school systems. Explores unique features of occupational therapy in schools, interrelationships among educational personnel, and unique skills necessary for effective service delivery. Prereq: OT 694. 1 cr.

795. Special Topics

Explores areas related to occupational therapy theory, practice, and/or research. May repeat to 12 credits but not in duplicate subject areas. Prereq: permission. Cr/F. 2 to 4 cr.

797-798. Level II Fieldwork, 1 and 2

Supervised field experience in off-campus setting for three-month period. Prereq: completion of senior year OT requirements or permission. Must be completed successfully to qualify to take professional certification exam. This is multi-term course; an IA (continuous grading) grade will be given at the end of the first semester. Special fee. Cr/F.

799A. Continuing Fieldwork

Students who have previously registered for OT 797, 798, or 799 and have not completed their fieldwork must register for OT 799A. Prereq: permission. Cr/F. IA (continuous grading.)

Ocean Engineering (OE)

(For program description, see page 104.)

690. Introduction to Ocean Engineering

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. Special fee. 4 cr.

710. Ocean Measurements Lab

Measurements of fundamental ocean processes and parameters. Emphasis on understanding typical offshore measurements, their applications, and the use of acquired data, in terms of the effects on structures and processes in the ocean. 4 cr.

744. Corrosion

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. 4 cr.

#753. Ocean Hydrodynamics

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. 3 cr.

754. Ocean Waves and Tides

Introduction to 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. Introduction to 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. 4 cr.

756. Principles of Naval Architecture and Model Testing

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. Special fee. 4 cr.

757. Coastal Engineering and Processes

Introduction to 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. 3 cr.

770. Introduction to Ocean Mapping

An introduction to 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. 4 cr.

771. Geodesy and Positioning for Ocean Mapping

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.) 3 cr.

#781. Physical Instrumentation

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 information. The design implementation testing, and evaluation of a relevant instrument system is an integral part of the course. Prereq: senior standing in ECE or equivalent; ECE 652; and permission. Lab. 4 cr.

785. Underwater Acoustics

Vibrations, propagation, reflection, scattering, reverberation, attenuation, sonar systems, ray and mode theory, transducers and arrays, signal analysis. Prereq: permission. 4 cr.

795. Special Topics

New or specialized courses and/or independent study. May be repeated for credit. 2 to 4 cr.

Philosophy (PHIL)

(For program description, see page 46.)

Chairperson: Robert C. Scharff

Professors: Willem A. deVries, R. Valentine Dusek, David R. Hiley, Robert C. Scharff, Duane H. Whittier, Charlotte Elizabeth Witt

Associate Professors: Drew Christie, Paul McNamara, Timm A. Triplett

Assistant Professors: Kathy Miriam, Ruth J. Sample, Nicholas J. Smith

Introduction to Philosophy

The 400-level courses (except 495) listed below are all introductions to philosophy; students should select among them according to interest. See course descriptions posted in the department for detailed information on course offerings.

401/401H/401W. General Introduction to Philosophy

Depending upon the instructor, the emphasis will be on basic philosophic problems, recurrent types of philosophies, or selected readings from the history of philosophy. 401H and 401W are writing intensive. 4 cr.

412/412H. Beginning Logic

Principles of reasoning and development of symbolic techniques for evaluating deductive and inductive arguments. 4 cr.

417. Philosophical Reflections on Religion

Introductory 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. 4 cr.

421. Philosophy and the Arts

Contemporary philosophic concerns and perspectives as reflected in one or more of the arts (literature, theatre, film, music, plastic art). Writing intensive. 4 cr.

421H. Honors/Philosophy and the Arts

See description for PHIL 421. Writing intensive. 4 cr.

424. Science, Technology, and Society

Consideration of the scientific endeavor and its social import from a philosophical perspective. 4 cr.

430/430H. Society and Morals

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. 4 cr.

435. Human Nature and Evolution

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. 4 cr.

436/436W. Social and Political Philosophy

Examination of 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? 436W is writing intensive. 4 cr.

447/447H. Computer Power and Human Reason

The historical origins of the science of computation. The implications of the nature of information-processing for understanding the mind-body relation. Examination of the possible social, economic, and educational consequences of the computer revolution. 4 cr.

450/450H. Ecology and Values

Focus 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. 4 cr.

495. Tutorial Reading

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. Prereq: permission. 1 to 4 cr.

496. Topics

Introductory-level seminar in specific topics or problems (e.g., death, love, friendship) considered from a philosophic point of view. 4 cr.

For special introductory courses in the area of applied philosophy, see Fundamentals of Applied Philosophy, page 215.

500. Workshop

Introduction to methods of studying philosophical texts. Emphasis on 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. 4 cr.

510. Philosophy and Feminism

Focus 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. 4 cr.

520. Introduction to Eastern Philosophy

Major Eastern traditions of philosophy. Concentration on Indian, Chinese, and Japanese systems may vary from semester to semester. 4 cr.

525. Existentialism

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. 4 cr.

530. Moral Philosophy

Critical examination of the development of philosophical thinking regarding human values, rights, and duties. 4 cr.

540. Philosophy of Race and Racism

Investigation of the concept of race and how different understandings of race underlie racist and anti-racist politics; exploration of how racism is interlocked with gender, economic, and other forms of oppression. Questions may include: What is racism? Do racial categories (such as black, white, latino) have any scientific basis, or are they socially constructed? If race is socially constructed, is it still "real" and should it be treated as such? Should public policies be "color-blind" with respect to race? Is whiteness a problematic racial identity and what can white people do about it? How is racism built into the structure of the state? Can popular racial discourse serve to support racist policies or attitudes even when it does not contain explicitly racist claims? 4 cr.

#550. Symbolic Logic

Principles and techniques of modern logic. Topics: propositional logic, truth tables, predicate logic, and, time permitting, basic meta-theorems. Prereq: PHIL 412. 4 cr.

560. Philosophy Through Literature

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. 4 cr.

570. Ancient Philosophy

Development of Western philosophy from its beginnings in Greece to the Roman period, with particular emphasis on the thought of Plato and Aristotle. 4 cr.

#571. Medieval Philosophy

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. 4 cr.

580. Modern Philosophy from Descartes to Kant

The rise of modern science, the discoveries in the new world, disputes in both religious and political ideology, and the ability to disseminate ideas broadly via print all contributed to a tremendous flowering of philosophy in 17th and 18th century Europe. At first, a new era of enlightenment was proclaimed in which reason would rule in science and in human affairs. Later, reason was itself subjected to rigorous rational scrutiny. This course traces 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, Reis, Kant, and others. Prereq: PHIL 570 or permission. 4 cr.

#616. 19th Century Philosophy

Philosophical movements such as later German idealism, French positivism, utilitarianism, pragmatism, Marxism, existentialism, and vitalism. Prereq: PHIL 574 or 575; or 19th century philosophy developed from two profound sources: Kant projected a complete philosophical system of reason, while historical and anthropological studies stressed the variability and gradual development of cultural perspectives. This contrast posed fundamental issues about how reason, truth, and knowledge relate to time, history, and cultural diversity. These issues were addressed by heterogeneous philosophical systems, including Hegel's idealist rationalism; Schopenhauer's pessimism; Marx's revolutionary materialism; Kierkegaard's reassertion of religious faith; Nietzsche's critique of reason, religion, and morality; the Positivism of Comte, Mill, and Mach; American Pragmatism; and philosophical responses to Darwin and to Freud. This course examines selected themes and authors from this provocative century. Prereq: PHIL 574 or 575; or permission. Writing intensive. 4 cr.

618. 20th Century Anglo-American Philosophy

Philosophical movements such as analytic philosophy, pragmatism, and process philosophy. Typical readings: Russell, Wittgenstein, James, Dewey, Whitehead. Prereq: two courses in history of philosophy (one of which may be concurrent); or permission. Writing intensive. 4 cr.

620. 20th Century European Philosophy

Major developments and themes. Representative

figures: Jaspers, Husserl, Heidegger, Bloch, Lukacs, Habermas, Bergson, Marcel, Sartre, Merleau-Ponty, Ricoeur, Kolakowski, etc. Prereq: two courses in history of philosophy (one of which may be concurrent); or permission. Writing intensive. 4 cr.

#630. Philosophy of the Natural Sciences

Philosophical problems raised by the physical and biological sciences; role of mathematics in science, nature of scientific concepts of space and time, relations of science to common sense, relation of theory to observation, logic of scientific discovery, nature of historical changes in scientific world view, relation of logic of science to the psychology, and history of science. Writing intensive. 4 cr.

635. Philosophy of Law

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. 4 cr.

#650. Logic: Scope and Limits

Close examination of the scope and limits of formal systems. Variable content: consistency and completeness of predicate logic; Godel's proof and the formalization of mathematics; modal and deontic logic; set theory; finite automata and computing machines; and formal semantics. Prereq: PHIL 550; MATH 531; or equivalents or permission. 4 cr.

660. Law, Medicine, and Morals

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. 4 cr.

#683. Technology: Philosophical and Ethical Issues

The bases of modern technology in, and its impact upon, people's philosophic conceptions of themselves and their world. Ethical, social, political, and ecological implications of technology. Risk and benefit criteria. Technological and humanistic philosophies of life. Writing intensive. 4 cr.

699. Senior Thesis

Tutorial work for philosophy department candidates for "Commendation" and "Honors." Prereq: two courses in history of philosophy, senior standing, and permission. Cr/F. Writing intensive. 4 cr.

701. Topics in Value Theory

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. Prereq: permission. Writing intensive. 4 cr.

702. Topics in Metaphysics and Epistemology

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. Prereq: two courses in history of philosophy; or permission. Writing intensive. 4 cr.

#710. Philosophy of Religion

Philosophic nature and significance of religious experience; historical and systematic analysis of such traditional issues as the nature of faith, relation of faith to reason, arguments concerning the existence and nature of God, the problem of evil, the relationship of religion and morality, and the relationship of religion and science. Prereq: two courses in history of philosophy; or permission. Writing intensive. 4 cr.

720. Philosophical Psychology

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: two courses in history of philosophy or permission. Writing intensive. 4 cr.

#725. Philosophy of the Social Sciences

Nature of explanation and understanding in the social sciences. Similarities and differences between the social and physical sciences; claims of objectivity and of subjectivity in the social sciences; role of values in the social sciences. Prereq: two courses in history of philosophy; or permission. Writing intensive. 4 cr.

#735. Major Figures in Philosophy

Content variable. In-depth examination of a major figure (e.g. Aristotle, Kant, Heidegger) or movement (logical positivism, phenomenology, feminism, etc.). Prereq: two courses in history of philosophy; or permission. Writing intensive. 4 cr.

740. Advanced Topics in the Philosophy of Law

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). Prereq: PHIL 635 or permission. 4 cr.

#745. Philosophy of Language

Contemporary philosophical studies of the nature of meaning and structure of language. Prereq: two courses in history of philosophy; or permission. Writing intensive. 4 cr.

#750. Philosophy of History

Nature of historical knowledge, efforts to discover patterns of meaning in the past. Prereq: two courses in history of philosophy; or permission. Writing intensive. 4 cr.

#755. Environmental Ethics

Exploration of moral issues, principles, and perspectives involved in human behavior toward, and treatment of, the natural environment. Various historical and contemporary ethical perspectives compared and evaluated, e.g., utilitarianism, natural law tradition, deep ecology, anthropocentrism, eco-feminism, as well as other social and religious approaches. For graduate students and advanced undergraduates. Prereq: one course on environmental issues (PHIL 450 or EC 635) or permission. Writing intensive. 4 cr.

780. Special Topics

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: two courses in history of philosophy; or permission. Writing intensive. 4 cr.

795. Independent Study

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. Writing intensive. 1 to 4 cr.

796. Independent Study

See description for PHIL 795. Writing intensive. 1 to 4 cr.

798, 799. Honors Thesis

Open only to philosophy majors in the University Honors Program. Students writing an honors thesis must take both of these courses, in consecutive semesters, under the supervision of two faculty advisers. Students are required to give an oral defense of their thesis. Prerequisite for 799: satisfactory grade on written work in 798. Writing intensive. 4 cr.

Fundamentals of Applied Philosophy

The following are introductory courses on the fundamentals of philosophy in practice. Special emphasis is placed on identifying and reflecting on philosophical issues that arise in the context of one's professional as well as everyday life. They are designed to interest those who wish to examine the broader philosophical implications of their chosen professional activity and also those who share the awareness that, in today's world, a systematic value-orientation must complement one's scientific knowledge and skills.

447. Computer Power and Human Reason

The historical origins of the science of computation. The implications of the nature of information-processing for understanding the mind-body relation. Examination of the possible social, economic, and educational consequences of the computer revolution. 4 cr.

660. Law, Medicine, and Morals

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. 4 cr.

#683. Technology: Philosophical and Ethical Issues

The bases of modern technology in, and its impact upon, people's philosophic conceptions of themselves and their world. Ethical, social, political, and ecological implications of technology. Risk and benefit criteria. Technological and humanistic philosophies of life. Writing intensive. 4 cr.

Physics (PHYS)

(For program description, see page 67.)

Chairperson: John F. Dawson

Professors: L. Christian Balling, John R. Calarco, Edward L. Chupp, John F. Dawson, Olof Echt, James M.E. Harper, Jochen Heisenberg, F. William Hersman, Joseph Hollweg, Richard L. Kaufmann, Martin A. Lee, Eberhard Mobius, James M. Ryan, Harvey K. Shepard, Roy B. Torbert, John J. Wright

Research Professors: Terry Forbes, Philip A. Isenberg, R. Bruce McKibben

Associate Professors: James Connell, Lynn M. Kistler, Dawn C. Meredith

Research Associate Professors: David J. Forrest, Antoinette B. Galvin, Clifford Lopate, Mark L. McConnell, Jack M. Quinn

Assistant Professors: N. Per Berglund, Maurik Holtrop, Karsten Pohl

400. Freshman Seminar

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 will 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. Cr/F. 1 cr.

401-402. Introduction to Physics I and II

Broad survey of classical and modern physics. Designed to enable students to appreciate the role of physics in today's society and technology. Emphasis on 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. Special fee. Lab. 4 cr.

406. Introduction to Modern Astronomy

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. Special fee. Lab. 4 cr.

407. General Physics I

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. Coreq: MATH 425. May not receive credit for both PHYS 401 and 407. Special fee. Lab. 4 cr.

407H. Honors/General Physics I

See description for PHYS 407. Coreq: MATH 425H. 4 cr.

408. General Physics II

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. Coreq: MATH 426. May

not receive credit for both PHYS 402 and 408. Special fee. Lab. 4 cr.

408H. Honors/General Physics II

See description for PHYS 408. Coreq: MATH 426H. 4 cr.

412. Technical Physics

Introductory course emphasizing the fundamentals of mechanics, heat, electricity, and other subjects underlying modern machinery and instruments. Recommended for Thompson School students. Prereq: algebra and trigonometry. Lab. 4 cr.

505. General Physics III

Electromagnetic waves, geometrical and physical optics, relativity, atomic physics, elementary quantum mechanics, molecular physics, and nuclear physics. Prereq: PHYS 408. 3 cr.

506. General Physics III Laboratory

Structured laboratory experience in optics and modern physics. Coreq: PHYS 505. Special fee. Lab. 1 cr.

508. Thermodynamics and Statistical Mechanics

Classical and statistical approach to thermodynamics, kinetic theory. Prereq: PHYS 505. Coreq: MATH 526 or MATH 528. 4 cr.

605. Experimental Physics I

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. 5 cr.

615. Introduction to Mathematical Physics

Application of mathematical analysis to physics, including complex numbers, multiple integrals, vector analysis, and Fourier series. Prereq: PHYS 407, MATH 525 or MATH 527. Coreq: MATH 526 or MATH 528. 4 cr.

616. Physical Mechanics

Analytical treatment of classical mechanics covering the dynamics of particles and rigid bodies, at intermediate level. Prereq: PHYS 407, 615. 4 cr.

701. Introduction to Quantum Mechanics I

Nonrelativistic Schrodinger equation, the hydrogen atom, applications to atomic and nuclear structure. Prereq: PHYS 505, 615, 616. 4 cr.

702. Introduction to Quantum Mechanics II

See description for PHYS 701. 4 cr.

703-704. Electricity and Magnetism I and II

Foundation of electromagnetic theory; electrostatics, dielectric theory, electromagnetism, magnetic properties of matter, alternating currents, Maxwell's field theory. Prereq: PHYS 408, 615, 616. 4 cr.

705. Experimental Physics II

Modern physics experiments and special project problems assigned to individual students. Prereq: PHYS 605; senior standing in physics. Lab. Writing intensive. 4 cr.

708. Optics

Geometrical optics, electromagnetic theory of light, interference, diffraction, polarization, related phenomena and nonlinear optics. Prereq: PHYS 505, 615, 616. Lab. 4 cr.

710. Introduction to Modern Astrophysics

Review of 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. 4 cr.

712. Physics of the Ionosphere

Introduces basic plasma physics using a case study of the Earth's ionosphere and its connection to both the upper atmosphere and to the Earth's magnetosphere. Topics include single particle motion, fluid and kinetic descriptions of ionospheric plasma, wave propagation, and instabilities. Prereq: PHYS 408; PHYS 703 or ECE 603; or permission. 4 cr.

718. Introduction to Solid State Physics

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. Coreq: PHYS 701. 4 cr.

720. Nuclear Physics

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. 4 cr.

791. Special Topics

Any selected topics not covered sufficiently in a general course may be studied. May be repeated to a maximum of 8 credits. 4 cr.

795. Independent Study

Individual project under direction of a faculty adviser. Prereq: department permission. 1 to 8 cr.

799. Thesis

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. 4 cr.

Plant Biology (P BIO)

(For program description, see page 90.)

Chairperson: Garrett E. Crow

Professors: Robert O. Blanchard, Garrett E. Crow, Thomas M. Davis, Curtis V. Givan, J. Brent Loy, Arthur C. Mathieson, Subhash C. Minocha

Affiliate Professors: Clinton J. Dawes, Walter C. Shortle

Associate Professors: Alan L. Baker, Wayne R. Fagerberg, Paul R. Fisher, Estelle M. Hrabak, Leland S. Jahnke, Anita S. Klein, Christopher D. Neefus, James E. Pollard, John M. Roberts
Affiliate Associate Professors: Rakesh Minocha, Kevin T. Smith, Janet R. Sullivan
Assistant Professors: Dean A. Kopsell, Stefan Seiter

Research Assistant Professors: Rosanna Freyre, Dennis E. Mathews

Affiliate Assistant Professor: Jianhua Li

Extension Professors: Alan T. Eaton, William G. Lord, Catherine A. Neal, Cheryl A. Smith, Stanley R. Swier

400. Plants and Civilization

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. Lab. 4 cr.

401. Plant Biology Orientation

Overview of plant biology research and teaching facilities; introduction to research, extension, and educational functions within the department; career opportunities in plant biology. Required of all plant biology majors. Cr/F. 1 cr.

407. Sustainable Gardening

Sustainability issues related to growing of ornamental plants and vegetables. Practical gardening techniques based on ecological principles. Composting, garden design, nonchemical management of pests and diseases, and plant culture. Hands-on labs and field trips to innovative gardens and farms. An introductory course for plant biology and non-major students. Special fee. Lab. (Summer only.) 4 cr.

412. Introductory Botany

Plants in their natural environments: their structure, function, growth, reproduction, and evolutionary diversity. Emphasis placed on horticultural principles affecting crop growth and development. Special fee. Lab. 4 cr.

421/421H. Concepts of Plant Growth

Fundamentals underlying plant growth and response in natural and modified environments. Special fee. Lab. 4 cr.

501. Basic Biochemistry

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 BCHM 658-659, BCHM 751-752.) Not open to first-year students; not offered every year. Prereq: CHEM 403-404 or equivalent. 3 cr.

503. Introduction to Marine Biology

A course emphasizing 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 ZOOL 503.) 4 cr.

546. Plants, Soils, and Environment

Plant, soil, and environment relationships under natural and modified conditions with emphasis on soils as the foundation resource for plant production. Principles and practice of organic and conventional culture to sustain and improve soils/crops. Contemporary activities impacting soils as part of ecosystems. Prereq: CHEM 403 or permission. Special fee. Lab. 4 cr.

547. Environmental Horticulture

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. 4 cr.

557. Small Fruit Crop Management

Management strategies for a wide variety of small fruit crops appropriate for growing in the United States: soils, nutrition, climatic considerations, integrated pest management, marketing, and economics. 2 cr.

565. Turf Management

Adaptation and management of fine turf grasses for recreational, aesthetic, and functional use. Lab. 4 cr.

566. Systematic Botany

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. 4 cr.

572. Plant Propagation

Sexual and asexual propagation of horticultural plants. Prereq: PBIO 421/equivalent or permission. Special fee. Lab. 4 cr.

582. Sustainable Food Systems

A systems perspective on ecologically-based food production, consumption, and recycling; historical perspective of traditional management and sustainability. Genetic and physiological basis for improved resource use in plant/animal systems. Resource depletion and opportunities for recovery/substitution. Comparative profitability analysis of different enterprises. Socioeconomic and ethical issues associated with technological innovation. Field trips. Special fee. Lab. (Not offered every year.) 4 cr.

600. Field Experience

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. 1 to 4 cr.

601. Biology of Plants

Structural and functional biology of the plant organism, with emphasis on land plants. Evolution of vegetative processes and sexual reproduction. Prereq: PBIO 412 or BIOL 411-412, general chemistry. Special fee. 4 cr.

612. Plant Genetics and Reproduction

Introduction to 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. 4 cr.

625. Introduction to Marine Botany

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. 4 cr.

650. Crop Production Technologies

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.) 3 cr.

651. Plant Pathology

Nature, symptomatology, etiology, epidemiology, and control of important plant diseases. Prereq: PBIO 412, BIOL 411-412, or equivalent. Lab. 4 cr.

652. Culture of Vegetable Crops

Origin, distribution, adaptation and culture of major temperate and subtropical vegetable crops. Lectures will 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.) 3 cr.

653. Forest and Shade Tree Pathology

Principles, symptomatology, etiology, and control of forest and shade tree diseases. Prereq: PBIO 412 or BIOL 412 or equivalent. Lab. Special fee. 4 cr.

655. Tree Fruit Management

Management systems for the major tree fruit crops grown in the northeastern United States. Emphasis on integrated orchard management and environmental considerations, planting systems, tree training, nutrition, pest management, and marketing and economics. Prereq: 412 or 421 or equivalent. Writing intensive. 3 cr.

668. Summer Flora of New Hampshire

Study of the flora of New Hampshire. Topics include major vegetation types, common plant families, plant identification, and field techniques. Prereq: basic botany or permission. Field trips. Special fee. 4 cr.

678. Nursery Crop Production

Application of the fundamentals of environmental horticulture to the commercial production of woody ornamentals and perennials. Crop management and culture, problem diagnosis, pest management, marketing, and environmental considerations of crop production. Prereq: PBIO 547. Lab. Special fee. (Not offered every year.) 4 cr.

679. Landscape Management

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 547 or permission. Special fee. (Offered every other year.) 3 cr.

689. Greenhouse Crop Management

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.) 4 cr.

701. Plant Physiology

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. 3 cr.

702. Plant Physiology Laboratory

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. 2 cr.

709. Plant Stress Physiology

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.) 3 cr.

711. Plant Cell Biochemistry

Selected topics in photosynthetic and nonphotosynthetic metabolism of plant cells, including inorganic and organic nitrogen metabolism, lipid and pigment synthesis and degradation, glycolysis and respiration, nitrogen fixation, and integration and regulation of cell functions. Prereq: an introductory course in Biochemistry; Plant Physiology or permission. (Not offered every year.) 3 cr.

713. Biochemistry of Photosynthesis

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.) 4 cr.

714. Electron Microscopy

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. Coreq: PBIO 715. 2 cr.

715. Electron Microscopy Lab

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. Coreq: PBIO 714. Special fee. 3 cr.

717. General Limnology

Introduction to 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: BIOL 541 or equivalent. (Also offered as ZOOL 717.) 4 cr.

719. Field Limnology

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 agen-

cies, lake stakeholders and the submission of written manuscripts for publication. (Also offered as ZOOL 719.) Special fee. Writing intensive. 4 cr.

720. Plant Nutrition

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. Special fee. 4 cr.

721. Microscopic Algae

Survey of phytoplankton and periphyton in local marine and freshwater habitats. Identification, systematics, and evolution. Class and individual collection trips. Prereq: BIOL 412 or PBIO 412 or 703. Lab. (Not offered every year.) 4 cr.

722. Marine Phycology

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.) 4 cr.

723. Seaweeds, Plankton, and Seagrass: The Ecology and Systematics of Marine Plants

An introduction to 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 will 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 tidepool 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.) 4 cr.

724. Freshwater Algal Ecology

Survey of freshwater algal habitats; physiological explanation of population models. Individual experimental projects. Prereq: PBIO 717 or permission. (Not offered every year.) Special fee. 4 cr.

725. Marine Ecology

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.) 4 cr.

726. Integrated Pest Management

Integration of pest management techniques involving biological, cultural, and chemical control with principles of ecology into management approaches for pests. Prereq: permission. Writing intensive. 4 cr.

727. Algal Physiology

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. Coreq: PBIO 729. (Not offered every year.) 3 cr.

729. Algal Physiology Laboratory

Useful laboratory techniques in studying the physiology of freshwater and marine algae. Experiments in nutrition, metabolism, pigment, and enzyme analysis. Small research project required. Prereq: concurrent registration in PBIO 727; permission. Coreq: PBIO 727. (Not offered every year.) 2 cr.

732. Lake Management: A Multidisciplinary Approach

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. Introduction to and 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. 4 cr.

740. Ecological Agriculture

Application of ecological concepts and principles to the design of agricultural ecosystems. Processes in natural ecosystems will be used as models for sustainable agricultural management. The course will emphasize self-directed, project-based learning during which students will individually and in groups apply their knowledge in the analysis of real world agroecosystems. Prereq: PBIO 546 or equivalent; permission. 4 cr.

747. Aquatic Higher Plants

Flowering plants and fern relatives found in and about bodies of water in the northeastern United States; extensive field and herbarium work, preparation techniques, and collections. Prereq: PBIO 566 or permission. Lab. (Not offered every year.) 4 cr.

751. Cell Culture

Theory and principles fundamental to the culture of cells in vitro. Introduction to techniques of preparation and maintenance of animal, plant, insect, and fish cell cultures. Application of cell culture to contemporary research in biological sciences. Prereq: MICR 503; permission. (Also offered as ANSC 751 and MICR 751.) Special fee. Lab. 5 cr.

752. Mycology

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. 4 cr.

753. Cytogenetics

Chromosome structure, function, and evolution. Eukaryotic genome organization. Theory of, and laboratory techniques for, cytogenetic analysis in plants and animals. Prereq: BIOL 604. Special fee. Lab. (Also offered as GEN 753. Not offered every year.) 4 cr.

754. Laboratory in Biochemistry and Molecular Biology of Nucleic Acids

Application of modern techniques to the analysis of biomolecules, with an emphasis on nucleic acids; includes DNA isolation and analysis, cloning,

sequencing, and analysis of gene products. No credit if credit has been received for MICR 704. Prereq: BIOL 604; BCHM 658/659; 751, or permission. (Also offered as BCHM 754, GEN 754.) Special fee. (Not offered every year.) Writing intensive. 5 cr.

758. Plant Anatomy

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.) 5 cr.

761. Biodiversity: A Phytogeographic Perspective

Global view of biodiversity, floras and vegetation types, from a phytogeographical perspective. Major factors such as climatic, edaphic, biotic, geologic, glaciation on distributions. Four Saturday field trips: Mt. Washington, northern bogs, old-growth forest, coastal dunes. Prereq: PBIO 566 or permission. (Offered alternate years.) Special fee. Writing intensive. 4 cr.

766. Plant-Microbe Interactions

Physical, chemical, genetic, and molecular methods utilized by plant pathogens in interactions with plants, as well as plant defense mechanisms. Major groups of plant pathogens (bacteria, fungi and viruses) will be discussed, as will beneficial plant-microbe symbioses. (Also offered as MICR 766.) 3 cr.

772. Evolutionary Genetics of Plants

Mechanisms of genetic change in plant evolution, domestication, breeding, 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: DNA techniques, sequence analysis programs, phylogenetic trees. Special fee. Prereq: BIOL 604 or equivalent; PBIO 412 or BIOL 411/412 or equivalent. (Also offered as GEN 772.) 4 cr.

774. Plant Biotechnology and Genetic Engineering

Plant transformation and regeneration, gene isolation and identification, structure and regulation of plant genes, current applications of plant genetic engineering, environmental and social implications. Prereq: BIOL 604 or permission. (Also offered as GEN 774.) 3 cr.

775. Plant Biotechnology and Genetic Engineering Lab

Techniques for genetic transformation and selection of plants, analysis of foreign gene expression, and plant cell and tissue culture. Coreq: PBIO or GEN 774. (Also offered as GEN 775.) Special fee. (Not offered every year.) 2 cr.

795. Investigations

Topics may include systematic botany, plant physiology, plant pathology, plant anatomy, plant ecology, mycology, cell biology, phycology, botanical teaching, morphology, cell physiology, scientific writing, microtechnique, 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. 1 to 6 cr.

796. Special Topics

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) Phy- cology, I) Cell Biology, J) Genetics, K) Evolution, L) Plant Utilization, M) Plant Molecular Biology, N) Developmental Plant Biology, O) Cell & Tissue Culture, P) Plant Disease Control, Q) Plant Hormones, R) Crop Management, S) Biotechnology, T) Plant Nutrition, U) Ecological Agriculture. Prereq: permission. May be repeated. No more than 4cr. maximum per semester for any single section. 1 to 4 cr.

797. Senior Seminar

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. 1 cr.

799. Honors Senior Thesis

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. 2 to 4 cr.

Political Science (POLT)

(For program description, see page 46.)

Chairperson: John R. Kayser

Professors: Marilyn Hoskin, B. Thomas Trout

Associate Professors: Marla A. Brettschneider,

Warren R. Brown, John R. Kayser, Aline M.

Kuntz, Lawrence C. Reardon, Susan J.

Siggelakis, Clifford J. Wirth

Assistant Professors: Todd A. Eisenstadt,

Daniel R. Krislov, Bernard T. Schuman, Stacy

D. VanDeveer, J. Mark Wrighton

401/401H. Politics and Society

Introduction to the nature of politics and political institutions. Emphasis on political behavior and continuing issues of modern politics, such as power, authority, legitimacy, freedom, and order. 4 cr.

402/402H. Introduction to American Government

Power and competition in American political 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. 4 cr.

403/403H/403W. United States in World Affairs

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. 403H and 403W are writing intensive. 4 cr.

407/407H. Law and Society

Introduction to 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. 4 cr.

595, 596. Explorations

Designed to meet special interests of students and instructors in exploring selected issues in political science. See departmental listings for semester offerings. Writing intensive. 2 to 4 cr.

American Politics

500. American Public Policy

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. 4 cr.

502. State and Local Government

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. 4 cr.

504. American Presidency

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. 4 cr.

505. American Congress

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. 4 cr.

506. Parties, Interest Groups, and Voters

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. 4 cr.

507. Politics of Crime and Justice

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. 4 cr.

508. Supreme Court and the Constitution

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. 4 cr.

#509. Bureaucracy in America

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. 4 cr.

510. Mass Media in American Politics

Contemporary review of media in politics; major roles of media today in providing news, setting public agenda, influencing public opinion; gov-

ernment regulations vs. media responsibility; future developments and consequences for American democracy. Writing intensive. 4 cr.

512. Public Opinion in American Politics

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. 4 cr.

513. Civil Rights and Liberties

Analysis of four major areas of constitutional rights and liberties—religious and 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. 4 cr.

#523. American Political Thought

American political thinkers and observers of American politics; the founding of the Republic; problems and tensions reflected in the writings of Calhoun, Thoreau, Lincoln, de Tocqueville, and others; relations between liberty and authority, democracy and stability, capitalism and alienation. Writing intensive. 4 cr.

600. Selected Topics in American Politics

Special topics such as politics and public affairs in New Hampshire, women in politics, and civil liberties. See departmental listings for semester offerings. Writing intensive. 4 cr.

701. Courts and Public Policy

Impact of judicial decisions on public policy and influences on judicial decision making at the federal, state, and local levels. Writing intensive. 4 cr.

702. Public Planning and Budgeting

Analysis, goal setting, and strategic planning in a governmental setting, with particular emphasis on budgetary processes as a means for controlling policy effectiveness. Writing intensive. 4 cr.

703. Urban and Metropolitan Politics

An eclectic approach to the study of urban and metropolitan politics. Topics include: urban politics, forms of local government; migrations, urban development, intergovernmental relations; community power structure, urban policy making, urban service delivery, crime and law enforcement, urban bureaucracy, urban decay, and revitalization. Writing intensive. 4 cr.

704. Policy and Program Evaluation

Policy and program evaluation of federal, state, and local governmental enterprise; focuses on the politics, practices, and methods of evaluative investigation. Evaluation as a technique for providing rational information for budgetary and policy-making decisions. Writing intensive. 4 cr.

705. American Public Policy

Examination of public policy formation, agenda-setting, decision-making, implementation. Focuses on theories, models, concepts, actors, and case study examples. 4 cr.

707. Criminal Justice Administration

Examines the administration and politics of police organizations, the courts, and correctional institutions. 4 cr.

708. Administrative Law

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. Course examines federal and state levels of government. 4 cr.

710. Public Human Resource Management

Examination of the administration, politics, and strategies of effective public human resource management. 4 cr.

797F/798F. Seminar in Public Administration

Advanced analysis and individual research, including opportunities for direct observation of governmental administration. Prereq: senior standing. Writing intensive. 4 cr.

798B. Seminar in American Politics

Advanced analysis and individual research. Prereq: senior standing. Writing intensive. 4 cr.

798C. Seminar in Comparative Politics

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. 4 cr.

Political Thought

520. Justice and the Political Community

Origin of the idea of justice; relationship between politics, justice, and morality; selections from Plato, Aristotle, Roman, Islamic, and Christian political philosophers. 4 cr.

521. Rights and the Political Community

Human rights and the quality of communities as expressed in Hobbes, Locke, Mandeville, Rousseau, and others. 4 cr.

522. Dissent and the Political Community

Current political ideologies and controversies in America and abroad; liberal democracy and its critics since the 19th century. 4 cr.

524. Politics and Literature

Classical and contemporary works of literature to illustrate perennial issues in political philosophy; among authors studied are Aristophanes, Sophocles, Shakespeare, Melville, Tolstoy, and Sartre. 4 cr.

525. Multicultural Theory

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. 4 cr.

620. Selected Topics in Political Thought

Selected issues in political theory, such as liberalism and conservatism, radical political thought, the American political character, and others. See departmental listings for semester offerings. Writing intensive. 4 cr.

#721. Feminist Political Theory

Exploration of various strands of feminist political theory; taking a specifically political view of the challenges of feminist activism and philosophy. We address issues of the public space, power, social transformation, and democracy. 4 cr.

797I. Seminar in Political Thought

Advanced treatment and individual research. Prereq: senior or graduate standing. Writing intensive. 4 cr.

798I. Seminar in Political Thought

Advanced treatment and individual research. Prereq: senior or graduate standing. Writing intensive. 4 cr.

Comparative Politics**545. People and Politics in Asia**

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. 4 cr.

#546. Wealth and Politics in Asia

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. 4 cr.

550. Comparative Government and Society

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. 4 cr.

551. Global Urban Politics

Examines the social, economic, demographic, and political processes of cities around the globe. Topics include: population growth; theories of urbanization; urban economic development; urban policies toward transportation; environment; employment; housing; land; water supplies; sanitation; solid-waste disposal; and infrastructure. Comparisons are made between cities of the developed and less developed nations of the world. Urban and national social stratification, structures of urban and national social stratification, structures of urban and subnational governments, and political participation examined. Writing intensive. 4 cr.

552. Contemporary European Politics

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. 4 cr.

#553. Politics in the Developing World

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. Writing intensive. 4 cr.

#554. Latin American Politics

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. 4 cr.

555/555W. Politics in Russia

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. 555W is writing intensive. 4 cr.

556. Politics in China

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. 4 cr.

558. Government and Politics of Canada

Cultural background of party competition, role of ideology, structure of government, and contemporary issues in Canadian political system. Special fee. Writing intensive. 4 cr.

651. Selected Topics in Comparative Politics

Specialized areas or issues such as regional politics, national politics, judicial systems, administrative law, constitutions, etc. See department listings for semester offerings. Writing intensive. 4 cr.

743. Comparative Political Economy

Exploration of the origins, development, and functions of the modern state in the West, its links with markets and capitalism, and its role in contemporary political economy. Examples from various advanced industrial societies. Writing intensive. 4 cr.

797B. Seminar in American Politics

Advanced analysis and individual research. Prereq: senior standing. Writing intensive. 4 cr.

797C. Seminar in Comparative Politics

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. 4 cr.

International Politics**#544. Pathways to Democracy**

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 towards democracy by some of the world's remaining authoritarian regimes. Writing intensive. 4 cr.

560. World Politics

Examines the structures, processes and issues that shape contemporary international relations. Topics included are: 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. 4 cr.

562. Strategy and National Security Policy

Provides an overview of U.S. national security. Examines the nature of security, evolution of

strategy, and the history of the United States 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. 4 cr.

#564. Russia in World Affairs

Background and contemporary perspectives on the Russian role in international politics. Particular emphasis on issues in international economics, American relations, security developments, and regional relations. 4 cr.

565. United States/Latin American Relations

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. 4 cr.

566. Foreign Policies of Asia and the Pacific

Analyzes the foreign policies and interactions of the four great Pacific powers: China, Japan, Russia, and the United States from the breakdown of the western imperialist order and the rise of imperial Japan, the Cold War clashes in Korea and the Sino-Soviet border, to the current search for a new Pacific economic and political order. Writing intensive. 4 cr.

567. Politics of Global Resources

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. 4 cr.

568. Introduction to Intelligence

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. 4 cr.

569. Chinese Foreign Policy

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. 4 cr.

#571. International Politics of the Middle East

An examination of inter-Arab affairs and United States involvement in the region. Particular focus on: oil and economics; migration; transnational political ideologies (Arab nationalism, Islam, democracy); and the Arab-Israeli crisis. Writing intensive. 4 cr.

660. Selected Topics in International Politics

Examines specialized issues in international politics. Topics may include such areas as: ethnic conflict; non-proliferation and global security; economic and political globalization; etc. See department listings for semester offerings. Writing intensive. 4 cr.

760. Theories of International Relations

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. 4 cr.

762. International Political Economy

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. 4 cr.

#778. International Organization

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. Includes examination of the role and influence of non-governmental international organizations. Writing intensive. 4 cr.

780. International Environmental Politics, Policy and Law

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. 4 cr.

797, 798 Section E. Seminar in International Politics

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. 4 cr.

Internships, Advanced Studies, and Honors Thesis**602A. Internship**

Field experience in a governmental or nongovernmental organization at the local, state, national, or international level. Arrangements should be made through the political science department. Open to juniors or seniors with a least a 3.2 G.P.A. Permission of the Undergraduate Curriculum Committee of the department is required prior to the internship. From 4-16 credits may be taken; however, only 4 credits may be for a grade. The rest will be credit/fail, and only 4 credits may be applied to the political science major. May be taken in conjunction with Advanced Study in Political Science. Cr/F. 4 to 12 cr.

602B. Internship

Field experience in a governmental or nongovernmental organization at the local, state, national, or international level. Arrangements should be made through the political science department. Open to juniors or seniors with a 3.2 G.P.A. Permission

of the Undergraduate Curriculum Committee of the department is required prior to the internship. May be taken in conjunction with Advanced Study in Political Science. 4 cr.

602C. Concord Internship Program

Provides students with field experience in state government in Concord (working for a state senator, legislative lobbyist or the Governor's Office). Students will spend Tuesday through Thursday in Concord and attend a weekly practicum in Durham. Open to junior and senior majors with a 3.2 or better G.P.A. Applications accepted in the fall semester. Permission required. Prereq: POLT 402 and 502. Coreq: POLT 602A. Students will enroll in POLT 602A for 4 credits, Credit/Fail and 602C for 4 credits letter grade. 4 cr.

795, 796. Advanced Study

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 will be 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. 4 cr.

799. Honors Thesis

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 will be 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 will constitute the tenth course in the major. Writing intensive. 4 cr.

Psychology (PSYC)

(For program description, see page 47.)

Chairperson: Kenneth Fuld

Professors: Victor A. Benassi, Ellen S. Cohn, Peter S. Fernald, Kenneth Fuld, Benjamin Harris, Robert G. Mair, John D. Mayer, Edward J. O'Brien, Rebecca M. Warner, William R. Woodward

Associate Professors: Victoria L. Banyard, Robert C. Drugan, John E. Limber, Carolyn J. ebert, William Wren Stine, Daniel C. Williams
Assistant Professors: J. Pablo Chavajay, Michelle D. Leichtman, Amy L. Odum

Research Assistant Professors: Lisa M. Jones, Kimberly J. Mitchell, Timothy A. Shahan
Lecturers: Mark J. Henn, Richard I. Kushner, Peter Yarensky

Academic Counselor: Janice Chadwick

PSYC 401 is a prerequisite for all courses in the psychology department except PSYC 402 and 571. PSYC 402 and 502 are prerequisites for all 700-level psychology courses

General Course**401. Introduction to Psychology**

Psychology as a behavioral science; its theoretical and applied aspects. Coverage of basic topics in

the field, including developmental, learning, personality, abnormal, social, perceptual/sensory, and physiological 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. 4 cr.

Major Courses**402. Statistics in Psychology**

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; DS 420; EREC 525; HHS 540; MATH 639; MATH 644; SOC 502. Special fee. 4 cr.

502. Research Methods in Psychology

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. 4 cr.

512. Psychology of Primates

A comparative analysis of primate cognitive, linguistic, and social processes. The origins of human behavior will be explored from the perspectives of history, evolution, and contemporary work in neuropsychology, linguistic, sociobiology, and related fields. Prereq: PSYC 401. 4 cr.

513. Cognitive Psychology

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. 4 cr.

521. Behavior Analysis

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. 4 cr.

523. Behavior Modification

The application of principles of behavior analysis to a variety of realistic nonlaboratory settings including daily life, education therapy, and self management. Examination of factors governing behavior observed in the world. Prereq: PSYC 401. 4 cr.

531. Psychobiology

Introduction to 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. 4 cr.

552. Social Psychology

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. 4 cr.

553. Personality

Major theories, methods of assessment, and research. Prereq: PSYC 401. 4 cr.

561. Abnormal Behavior

Causes, diagnosis, and treatment of abnormal behavior. Implications of varying theoretical viewpoints. Prereq: PSYC 401. 4 cr.

571/571H. Great Psychologists

Historical introduction to some of the great psychologists and their classic works. 4 cr.

581. Child Development

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. 4 cr.

582. Adult Development and Aging

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. 4 cr.

702. Advanced Statistics and Research Methodology

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. 4 cr.

#704. Research Methods in Social Psychology

Critical examination of the experimental method and nonexperimental alternatives, including survey research, field techniques, and evaluation research. The importance of ethical responsibility, experimental artifacts, and validity issues. Each student is responsible for an original research project. Prereq: PSYC 402; 502; or permission. Special fee. Writing intensive. 4 cr.

705/705H. Tests and Measurement

Testing intelligence, creativity, achievement, interests, and personality. Test construction; evaluation; relation to psychological theory, research, and practice. Prereq: PSYC 402; 502; or permission. 4 cr.

710. Visual Perception

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; 531; or permission. Special fee. Writing intensive. 4 cr.

711. Sensation and Perception

Anatomy, physiology, psychophysics, and perceptual processes of the visual, auditory, gustatory, olfactory, and cutaneous senses. Topics include stimulus definition, psychophysics, sensory transduction, sensory and perceptual adaptation, neural coding of space, time, magnitude, and quality. Prereq: PSYC 402; 502; 531; or permission. Special fee. Writing intensive. 4 cr.

712. Psychology of Language

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. 4 cr.

713. Psychology of Consciousness

This course 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; 512; or 513; or permission. Writing intensive. 4 cr.

721. Experimental Analysis of Behavior

Environmental and biological determiners of behavior. Theory, research methods, and applications. Major concepts and recent research. Prereq: PSYC 402; 502; 521 or 522; or permission. Special fee. Writing intensive. 4 cr.

722. Behaviorism, Culture, and Contemporary Society

Introduction to 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. 4 cr.

723. Addiction and Behavior

The psychological and physiological determinants of substance dependence and abuse. Aspects of drug use thought to relate to dependence, e.g., tolerance and sensitization; acute and chronic effects of drugs; physical dependence and withdrawal; discrimination between different drugs of abuse; factors influencing drug self-administration. Theories of drug use and relapse. Prereq: PSYC 402; 502; 521 or 531; permission. Writing intensive. 4 cr.

731. Brain and Behavior

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. 4 cr.

732. Evolution and Behavior

Behavior from the perspective of evolutionary theory. Examines evolutionary theory and basic genetic mechanisms. Compares simple and complex behaviors across species. Explores evolutionary explanations of simple behaviors (e.g., certain reflexes) as well as evolutionary explanations of complex behavior like aggression, mate selection, and parenting style. Prereq: PSYC 402; 502; 512 or 521 or 531; or permission. Writing intensive. 4 cr.

733. Drugs and Behavior

An introduction to the principles of psychopharmacology and the effects of psychoactive substances on behavior. Topics will focus 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 will be discussed as they relate to the use or abuse of particular drugs. Prereq: PSYC 402; 502; 531; or permission. Writing intensive. 4 cr.

735. Neurobiology of Mood Disorders

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. 4 cr.

737. Behavioral Medicine

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 will be discussed from behavioral and pharmacological perspectives. Prereq: PSYC 402; 502; 531; or permission. Writing intensive. 4 cr.

752. Advanced Social Psychology

A general survey of current research and major theories. An in-depth critical analysis of selected topics such as attribution theory, social cognition, and theories of aggression. Prereq: PSYC 402; 502; 552; or permission. Writing intensive. 4 cr.

755. Psychology and Law

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. 4 cr.

756. Psychology of Crime and Justice

Examines the psychological aspects of crime and justice including the following origins and causes of crime: developmental, biological, biopsychological, learning, and mental disorder. Focus is 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. 4 cr.

758. Health Psychology

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. 4 cr.

762. Counseling

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. 4 cr.

763. Community Psychology

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. 4 cr.

#770. History of Psychology

Survey of the history of psychology up to the 20th century. Major figures, theories, and developments. Relationship to developments in cultural history, philosophy, and the natural sciences. Beginnings of modern scientific psychology. Prereq: PSYC 402; 502; or 571; or permission. Writing intensive. 4 cr.

771. Psychology in 20th Century Thought and Society

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. 4 cr.

780. Prenatal Development and Infancy

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. 4 cr.

783. Cognitive Development

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. 4 cr.

785. Social Development

Examines development of social interactions. Emphasizes important social relationships for the child (i.e., 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. 4 cr.

Special Courses

591. Special Topics

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. 4 cr.

595. Applications of Psychology

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. 1 to 4 cr.

741. Advanced Topics

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. 4 cr.

791. Advanced Topics

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. Writing intensive. 4 cr.

793. Externship

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; additional psychology courses desirable. 4 to 8 cr.

795A-L. Independent Study

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. 1 to 4 cr.

797. Senior Honors Tutorial

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.) 4 cr.

799. Senior Honors Thesis

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.) 4 cr.

Recreation Management and Policy (RMP)

(For program description, see page 76.)

Chairperson: Janet R. Sable

Professors: Lou G. Powell, Janet R. Sable

Associate Professor: Ann L. Morgan

Assistant Professors: Robert J. Barcelona,

Jason M. Bocarro

Affiliate Assistant Professors: James Hilton,

Cari Moorhead

Clinical Assistant Professors: Patricia J.

Craig, Jill Gravink

Clinical Instructors: Tom Carr, David Lee

Adjunct Faculty: Donna Marie Sorrentino,

Dennis M. Byrne, Ann Dolloff

#400. Impact of Leisure in Society

Critical factors such as self, family, aging, ecology, health, work patterns, communications, cultural diversity, affluence, and changing sex roles are studied in relationship to present and future leisure patterns. Leisure trends are examined through a process of issue analysis spanning social, technological, economic, and political spheres. 4 cr.

490. Recreation and Leisure in Society

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. 4 cr.

501. Recreation Services for Individuals with Disabilities

Presentation and discussion of 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. 4 cr.

502. Foundations of Therapeutic Recreation

History and professional concepts of therapeutic recreation and the roles and functions of the therapeutic recreation specialist. 4 cr.

503. Therapeutic Recreation Rehabilitation Principles & Interventions

Course 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 will provide students with the opportunity to utilize 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. 4 cr.

504. Therapeutic Recreation Mental Health Principles and Interventions

This course 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. 4 cr.

511. Issues of Wilderness and Nature in American Society

This course will provide students with an overview of the evolving relationship between wilderness/nature and American society. It will examine the philosophy, ethics, and societal values in American society and its relationship to our natural wilderness. Recent issues will be used as case studies in order for students to articulate, defend and critique the ethical issues presented. Students will be 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. 4 cr.

550. Perspectives on Disability

Introduction to many fields of study to current perspectives on disability. Designed to appeal to students not intending to work with individuals with disabilities as a career focus. Students who will soon be in positions of managing key resources and systems associated with areas of community life targeted by the Americans with Disabilities Act (e.g., public transportation, state and local government, etc.) will gain a broader understanding of how to accommodate and value a diverse membership in their communities. Writing intensive. 4 cr.

#554. Recreation Business Management

Principles of business management and managerial problem solving as applied to the operation of recreation facilities, parks, and tourist attractions. Emphasizes knowledge in both the public and private sectors: personnel and financial management, market analysis, promotion, and the protection and maintenance of facilities and resources. Prereq: RMP 490 or permission. Lab. 4 cr.

557. Recreation Services Program Design

Introduces the student to a systems approach to program design. Course topics include 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. 4 cr.

558. Program Supervision and Leadership

Emphasis on 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. Special fee. 4 cr.

560. Recreational Sport Management

Exploration and examination of 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. 4 cr.

#561. Introduction to Outdoor Recreation

The history, delivery system, social and economic impacts, and management tools for outdoor recreation. Includes identification of contemporary issues, problems, and opportunities in recreation resource management. Lab. 4 cr.

563. Recreation Management and Policy Practicum

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. Cr/F. 2 cr.

#570. Community Systems Planning and Development

Evaluation of principal theories of community systems and planning. Topics include problem analysis, methods of community research design, and decision-making skills. 4 cr.

593/593W. Special Topics

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-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. 593W is writing intensive. 2 to 4 cr.

600. Multicultural Perspectives and Leisure

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. 4 cr.

603. Assessment and Treatment Planning in Therapeutic Recreation

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. Special fee. 4 cr.

604. Therapeutic Communication and Facilitation in Therapeutic Recreation

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. 4 cr.

654. Professional Development and Ethics

Focus 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 will be developed. Majors only. Prereq: permission. Cr/F. IA (continuous grading). 2 cr.

663. Management and Policy in Leisure Services

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. Emphasis on organizational development, fiscal management, and budgeting as tools used in formulating and implementing policy. Prereq: RMP 557 or permission. 4 cr.

664. Internship

A) Internship in Recreation Management; B) Internship in Therapeutic Recreation. Students enroll in the section corresponding to their major option after receiving approval from the academic adviser. 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. 6 to 16 cr.

665. Applied Marketing and Communications in Recreation Services

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. 4 cr.

#667. Recreation Resource Planning

Overview of site-planning techniques and issues as currently practiced by recreation resource agencies at local, state, and national levels. Relationship of planning to management, policy, and practice; current trends in planning and likely future directions. Extensive use of field trips to enable students to learn how to read landscapes in order to use natural features in design as well as to enhance visitor experiences. Prereq: RMP 490; RMP major or permission. 4 cr.

668. Youth Culture and Programs

Emphasis on 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 will also examine 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. 4 cr.

#698. Meetings and Conventions

Provides an in-depth perspective on the planning, implementation, and the evaluation of meetings and conventions in the corporate/commercial recreation environment. Students will be exposed to the following topical areas: (a) trends in meeting management, (b) goal and objective technology, (c) convention budgeting, (d) site selection and evaluation, (e) liability and legal aspects, and (f) food and beverage planning. Course consists of lecture, discussion, and site visits to corporate/commercial recreation venues. Prereq: junior standing. (Also offered as HMGT 698C.) 4 cr.

700H. Senior Honors Project

Under the direction of an RMP faculty member students will complete either a supervised research or applied field study project that builds on their honors coursework. Students will submit a

written proposal for approval and present the results at the completion of their project. Applied studies will address a specific need or problem of a local agency or organization. Prereq: permission required. 4 to 6 cr.

705. Management and Policy in Therapeutic Recreation

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. 4 cr.

711. Recreation Resource Management

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. 4 cr.

724. Grantsmanship, Evaluation, and Research

Emphasis on 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, 558 and senior RMP major or permission. Writing intensive. 4 cr.

#743. Environmental Education

Blend of environmental education/interpretation theory, process, and practical application. Includes seminars, workshops, and practical experience in an environmental education program. Prereq: permission. 4 cr.

#764. Issues in Leisure Services Management

Issues are presented and discussed as related to applied professional practice. Examination of the commonality in professional experience as well as in-depth investigation of option-specific issues and trends. Students enroll in the course section corresponding to their declared option within the major: A) Program Administration; B) Therapeutic Recreation. Prereq: RMP major; senior; permission. 4 cr.

772. Law and Public Policy in Leisure Services

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. 4 cr.

793. Advanced Topics

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 4 cr.

796. Independent Study

Individual study and/or research relating to leisure-oriented topics. Prereq: permission. 1 to 4 cr.

Religious Studies (RS)

(For program descriptions, see page 30.)

Coordinator: David Frankfurter

483. History of World Religions

Introduction to 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. 4 cr.

484. Patterns in World Religions

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. 4 cr.

576. Hebrew Bible in Historical Context

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. Course topics include 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. 4 cr.

577. New Testament in Historical Context

A study of the collection of writings known as the New Testament as both literature and historical documentation. Assigned readings from primary and secondary sources stress the historical, social, religious, and literary backgrounds of gospels, Paul's letters, and the Apocalypse, and will include a variety of early Christian texts left out of the canonical New Testament. Other more general themes are: the formation of the Christian canon, the division of the Jesus-movement from Judaism, the status of Jesus in his own time, the nature of parables, the end of the world, and the authority of women in early churches. Emphasis on the historical understanding of sacred scripture. (Also offered HIST 577.) Writing intensive. 4 cr.

599. Special Topics

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. 4 cr.

601. Seminar in Religious Texts

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.) 4 cr.

#607. Religion in American Thought and Life

Interdisciplinary study of the varied nature of American religious experience and its relationship to other aspects of American culture. Topics vary

from year to year, and may include, for example: the interdisciplinary study of a spiritual community, African American religious history, material culture and spiritual expression, politics and religious free speech, religious culture in the nineteenth century, multi-ethnic religions, and literature. (Also offered as AMST 607.) Writing intensive. 4 cr.

#682. Cults and Charisma

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.) 4 cr.

699. Seminar in Religious Studies

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. 4 cr.

795. Independent Study

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. 2 or 4 cr.

796. Independent Study

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. 2 or 4 cr.

Reserve Officer Training Corps (ROTC)

(For program description, see page 111.)

(See *Aerospace Studies and Military Science*.)

Russian (RUSS)

Department of Languages, Literatures, and Cultures

(For descriptions of courses, see pages 190. For program description, see LLC/Russian, page 43.)

Social Science (SCSC)

681. Internships

Fieldwork in a state or local government department, agency, or institution, or in an approved private agency. Work will be 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. 16 cr.

682. Washington Internship

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. Internship credit variable to 12 credits. Cr/F. 12 cr.

Social Work (SW)

(For program description, see page 77.)

Chairperson: Robert E. Jolley

Associate Professors: Mary Banach, Cynthia Anne Broussard, Robert E. Jolley, Jerry D. Marx, Sharyn J. Zunz

Assistant Professors: Linda Rene Bergeron, Barry N. Feldman, Karen R. Oil, Martha H. Ortmann, Angie H. Rice, Patrick Shannon
Instructors: Martha A. Byam, Kim Kelsey, Susan A. Lord, Lee P. Rush

524. Introduction to Social Work

The role of social work within agency structures. Programs, policies, social work services studied in historical perspective; their auspices, goals, and operations for consumers from various ethnic, racial, and social groups. 40 hour/semester observational/participatory assignment at community agencies required. 4 cr.

525. Introduction to Social Welfare Policy

An overview of the history and current status of social welfare policy in the United States. Considerations of the origins, development, and analysis of significant policies, values, attitudes, and other issues related to the social welfare system, and the delivery of service. Focus on policy analysis from a social and economic justice perspective. Writing intensive. 4 cr.

550. Human Behavior and Social Environment I

Introduction to 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. 4 cr.

551. Human Behavior and Social Environment II

Continuation of 550. 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 cultural diversity on development and behavior. Prereq: SW 550. 4 cr.

601. Research Methods in Social Work

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 524 and junior or senior standing or permission. 4 cr.

622. Social Work Practice I

Introduction to methods and practice. Basic principles, values, and ethics. Interviewing skills, problem assessment, social contracting. Skills training in lab sessions. Should be taken in junior year. Prereq: SW 524 or permission. Writing intensive. 4 cr.

623. Social Work Practice II

Continuation of SW 622. Delineation and study of intervention and change strategies differentiated with individuals, groups, and communities. Prereq: SW 622. Writing intensive. 4 cr.

#633. Seminar in Social Work Methods

4 cr.

640. Social Welfare Field Experience I

Majors will be 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. 5 cr.

640A. Social Welfare Field Experience I: Seminar

On-campus seminar for all seniors in field work. Emphasis on processing field experiences and achieving competency in skills of completing an interview and assessment within ethical boundaries of the profession. Must have senior status. Prereq: SW 622 and permission. Coreq: SW 640. 3 cr.

641. Social Welfare Field Experience II

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. 5 cr.

641A. Social Welfare Field Experience II: Seminar

Continuation of 640A. Emphasis is on intervention and termination skills, self awareness and moving into the professional world. Must have senior status. Prereq: SW 640/640A and permission. Coreq: SW 641. Special fee. Writing intensive. No credit for minor. 3 cr.

697. Special Topics in Social Welfare

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. 4 cr.

#700. Social Gerontology

Theories, social problems, programmatic responses, and recent research on aging; emphasis

on psychosocial forces. Prereq: senior status; or permission. 4 cr.

701. Women and Aging

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: senior status or permission. 4 cr.

705. Child Welfare: Policies, Programs, and Practice

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: senior status or permission. 4 cr.

710. Computer Utilization in Social Work

Provides students with a basic understanding of computerization and its application in social work. Computer literacy is seen as a requirement for effective practice of social work in the 21st century. Prereq: senior status or permission. 4 cr.

711. Social Work and Mental Illness

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: Senior status or permission. 4 cr.

712. Social Work and Developmental Disabilities

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: Senior status or permission. 4 cr.

715. Practice with Gay, Lesbian, and Bisexual Clients

Sexual minorities constitute the minority group social workers will 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 will 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 will be included. Students will also be required to explore and examine their own attitudes and assumptions about gays, lesbians, bisexuals, and gender minorities. Senior status only. (Also offered as SW 815.) 4 cr.

795. Independent Study in Social Service

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. 1 to 6 cr.

796. Independent Study: Teaching Assistantship

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. 1 to 6 cr.

797H-798H. Honors Thesis

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; permission. Prereq for 798H: satisfactory completion of 797H; permission. 6 credit maximum for both semesters. 2 to 4 cr.

Sociology (SOC)

(For program description, see page 48.)

Chairperson: Lawrence C. Hamilton

Professors: Melvin T. Bobick, David Finkelhor, Lawrence C. Hamilton, Murray A. Straus, Sally Ward

Associate Professors: Linda M. Blum, Benjamin C. Brown, James Tucker, Heather A. Turner

Assistant Professors: Sharyn J. Potter, Cesar Rebellon, John B. Strait, Karen VanGundy

Adjunct Faculty: Jean Elson, Anne D. Nordstrom, Priscilla S. Reinertsen

400/400H/400W. Introductory Sociology

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. 400H and 400W are writing intensive. 4 cr.

500/500W. Self and Society

Examines meaning and interaction at the individual level of society. The course considers reciprocal relationships between self and society, including (1) the nature of the self concept, identity formation processes, and the fulfillment of social roles and (2) the impact of social structure on thoughts, feelings, and behavior. 500W is writing intensive. 4 cr.

502/502H. Statistics

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 639; MATH 644; PSYC 402; but petitions for acceptance of such courses to fulfill the sociology major requirement in statistics will be entertained. 4 cr.

515. Introductory Criminology

Introduction to the scientific study of crime. Review of the different forms of criminal behavior, theories of crime, and strategies of crime control.

520. Family

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. 4 cr.

525. Juvenile Crime and Delinquency

Crime, violence and the criminal justice system as it affects children and youth in the role of both perpetrators and victims. 4 cr.

530/530W. Race and Ethnic Relations

Majority-minority group relations; special atten-

tion to nature and results of black-white and ethnic group relations in the United States. 530W is writing intensive. 4 cr.

540/540W. Social Problems

Relation of customs and institutions to such social problems as crime, delinquency, alcoholism, physical and mental disease, sexual deviance, poverty, old age, broken families, and racial and religious prejudices. Especially for non-majors. 540W is writing intensive. 4 cr.

#570. Sexual Behavior

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. 4 cr.

580. Arts in Society

Students attend live concerts of "classical" music, dance, opera, and theatre; as well as visit art museums and architectural monuments in the region. Assigned readings and introductory lectures precede the performances and art trips, and response papers and discussion follow them. While exposure to "live" art is primary, events are related to other institutions that constitute society—the family, education, the economy, religion, and government, again through assigned readings, lectures, and discussion. (Also offered as INCO 480.) Special fee. 4 cr.

585. Social Geography

Introduces and explores the field of social geography, or the study of human spatial behavior and the derived geographical patterns from the point of view of society. Focuses on the geographical or spatial dimensions of our population's symbolic interactions, including thematic considerations of spatial behavior as a form of social interaction and the ways that social and geographical systems of identity operate together. (Also offered as GEOG 585.) 4 cr.

595. Independent Reading and Research

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. Prereq: 12 sociology credits and permission. 2 to 8 cr.

597. Special Topics

Occasional or experimental offerings. May be repeated for different topics. 4 cr.

599. Sociological Analysis

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. 4 cr.

601. Methods of Social Research

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; juniors and seniors only. Writing intensive. 4 cr.

611. Sociological Theory

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. 4 cr.

612. Topics in Sociological Theory

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. 4 cr.

630. Sociology of Gender

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. 4 cr.

635. Medical Sociology: Organization and Processes of Modern Medicine

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. 4 cr.

640. Sociology of Religion

The continuing significance of religion in society is a central area of sociological inquiry. This course will examine the historical and cultural explanations for the persistence of religion and apply diverse sociological perspectives to explaining the personal, institutional, and cultural relevance of religion with a focus on contemporary American society. Topics studied include religious authority, identity, violence, and the impact of religion on various domains of social life including gender relations, family, politics, and economy. Writing intensive. 4 cr.

645. Class, Status and Power

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. 4 cr.

#650. Family Violence

Various forms of family and intimate violence, including child physical abuse, sexual abuse, spouse assault, dating violence and elder abuse, their characteristics and dynamics, place within larger social trends, the theories that explain their occurrence and effects and the major social institutions that respond to them. Juniors and seniors only. 4 cr.

655. Sociology of Crime and Justice

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. 4 cr.

#660. Urban Sociology

This course focuses on urban communities, urbanization, and urban social issues. It 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. The emphasis is on American cities, with some consideration to world patterns of ur-

banization and the growth, development, and role of global cities. Writing intensive. 4 cr.

665. Environmental Sociology

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. 4 cr.

#670. Sociology and Non-Fiction Film

Examination of 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 include the use of photographic images in social science research, the historical development of documentary film, and the critical analysis of visual images. 4 cr.

675. Sociology of AIDS

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. 4 cr.

680/680W. Sociology of the Holocaust

Examination of 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. 680W is writing intensive. 4 cr.

685. Work and Occupations

Examination of the changes in workplace organization and workers' lives as the U.S. became first, an industrial society, and later, a postindustrial nation. Emphasizes how and why workers' rights have been contested as well as how and why racial, ethnic, and gender segmentation emerged and persist. 4 cr.

690. Ethnographic Field Research

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. Writing intensive. 4 cr.

697. Special Topics

Occasional or experimental offerings. May be repeated for different topics. Writing intensive. 4 cr.

699. Senior Thesis

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 from two faculty members. Should be initiated by next-to-last semester (in latter case to extend over two semesters). 4 or 8 cr.

730. Political Sociology

Contemporary issues in political sociology, with emphasis on the relationship between social class structure and political power. Seminar explores

various perspectives on the nature and distribution of power, theories of state, class structure and political participation, and the politics of policy making. 4 cr.

760. Aging and Late Life Family

Using a life-course perspective, this course focuses on family relationships and social role transitions in later life. Addresses the impact of the empty-nest stage, grandparenting, retirement, care giving, and widowhood on the well-being and relationships of older people. Juniors and seniors only. 4 cr.

773. Sociology of Childhood

This course will expose students to a variety of sociological perspectives about childhood in American society. It will stimulate 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. Prereq: SOC 520 and permission. Writing intensive. 4 cr.

780. Social Conflict

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. Writing intensive. 4 cr.

#790. Applied Sociology

(1) Current level of use of sociological knowledge; (2) the advocate, consultant, and researcher in roles applied settings; (3) techniques of applied research; (4) implications of applied sociology, including ethical problems. Each student will focus on a social problem and write a paper covering the above issues. Applied projects where possible. Prereq: SOC 601. 4 cr.

792. Research Internship

Designed for students who want some practical experience applying social research methods in a program or policy setting. Students meet together weekly to discuss their experiences in the internship placement. Students design and carry out research in the placement settings. Placements are arranged by the student and faculty member. Examples include community development agencies, social services agencies, nonprofits, research centers and companies. Major report on the research undertaken is required. Prereq: SOC 502, 599, 601, permission. 4 cr.

793. Internship

The course 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. Prereq: junior or senior sociology majors. 4 cr.

794. Evaluation of Social Programs

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. Prereq: SOC 601. 4 cr.

797. Special Topics

Occasional or experimental offerings. May be repeated for different topics. Writing intensive. 4 cr.

Spanish (SPAN)

Department of Languages, Literatures, and Cultures

(For descriptions of courses, see page 191. For program description, see LLC/Spanish, page 43.)

Technology (TECH)

Arthur Greenberg, Dean

400. Introduction to CEPS Programs

An overview of programs offered by the College of Engineering and Physical Sciences with an emphasis on career opportunities and professional development. Required course of all undeclared majors in CEPS. Cr/F. 1 cr.

564. Fundamentals of CAD

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. 3 cr.

583. Technology: Cultural Aspects

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. 4 cr.

583H. Honors/Technology: Cultural Aspects

See description for TECH 583. 4 cr.

685. Budapest Program

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. Cr/F. 20 cr.

696. Independent Study

Open to all qualified students pursuing studies that do not fall within existing departmental areas. Special fee when the topic is chemistry for engineers. 1 to 4 cr.

797. Undergraduate Ocean Research Project

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. 2 cr.

Theatre and Dance (THDA)

(For program description, see page 49.)

Chairperson: H. Gay Nardone

Professors: Carol Lucha-Burns, David M. Richman

Associate Professors: Joan W. Churchill, David J. Kaye, Deborah A. Kinghorn, H. Gay Nardone, David L. Ramsey, Charles L. Robertson

Lecturers: Carol J. Fisher, Ruth J. Grossen, Sarah Jane Marschner, Daniel J. Raymond

Adjunct Faculty: Adrienne B. Hounse

Dance

461. Modern Dance I

Introductory course that includes techniques and improvisation as well as lectures in history and theory. (Also listed as KIN 604.) 4 cr.

462. Ballet I

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 will determine appropriate level. Not open to seniors. 4 cr.

463. Theatre Dance I

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 will determine appropriate level. Not open to seniors. 4 cr.

487. Dance

Historical and philosophical consideration of dance trends. Not a performance course. 4 cr.

562. Ballet II

Extension of ballet I syllabus; emphasis is on technique, with additional step vocabulary. May be repeated once for credit. Prereq: THDA 462 or permission. 2 cr.

563. Theatre Dance II

Technique; African-Cuban, modern, and East Indian dance; body movement through exercise and combinations involving stretch, strength, and flexibility. May be repeated for credit. Prereq: THDA 463 or permission. 2 cr.

576. Pointe

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. 2 cr.

586. Dance Pedagogy

Introduction to the art and science of teaching the movement forms of ballet, modern, jazz, and tap. Provides a general background into the nature of teaching, standards that make up good teaching, and methods of teaching dance that allow for technical proficiency to develop. Students focus on pedagogic approaches to learning their art and craft. 4 cr.

597. Dance Theatre Performance

Designed for students participating in UNH Dance Theatre Company. Skill development through rehearsal and actual performance experience. 2 cr.

598. Dance Composition

Practical, developmental approach to process of creating dances. Prereq: THDA 561; 562; 563; or permission. Special fee. 4 cr.

662. Ballet III

Advanced-level course in technique; pointe work included. May be repeated for credit. Prereq: THDA 562 or permission. 2 cr.

663. Theatre Dance III

Extension of Theatre Dance I and II; brings students to a more advanced technical level. May be repeated for credit. Prereq: Theatre Dance II. 2 cr.

684. Special Topics

Exploration of topics agreed upon by students and instructor. Topics vary. May be repeated. 2 to 4 cr.

732. Choreography

Theoretical and practical consideration of the creative and aesthetic aspects of ballet, modern, and theatre dance. Prereq: THDA 633. Special fee. 4 cr.

Theatre

435. Introduction to Theatre

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. 4 cr.

436/436H. History of Theatre I

History and theory in its social framework from the beginnings to 1700. Writing intensive. 4 cr.

438/438H. History of Theatre II

History and theory in its social framework from 1700 to the present. Writing intensive. 4 cr.

450. History of Musical Theatre in America

Study of the development of the musical and its relationship to American social history. Special fee. 4 cr.

458. Costume Construction

Study and development of costuming techniques, including hand and machine sewing, pattern drafting, alterations, and fabric manipulation. Emphasis on demonstrated understanding. Special fee. 4 cr.

459. Stagecraft

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. 4 cr.

470. Movement and Vocal Production

Expansion of the student's vocal and physical/kinesthetic awareness, utilizing basic theories and lessons of Lessac, Laban, and Alexander. Text exploration will be supplemented with exercises from Berry. Permission required. 4 cr.

475. Stage Makeup

Fundamentals of juvenile, old age, character, and special stage makeup techniques. Special fee. 2 cr.

520. Creative Drama

Drama techniques leading to the design and execution of drama sessions with children. Includes role-playing, improvisation, and story dramatization. Lab. 4 cr.

532. London Experience

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. Special fee. IA (continuous grading). 2 cr.

541. Art and Theatre Administration

Administration practices applied to arts, music and theatre management. Fund raising, public relations, business and box office management, audience development and long range planning. 4 cr.

546. Costume Design for the Theatre

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. 4 cr.

547. Stage Properties

Research and manufacture of period and modern stage, trim, and hand properties. Prereq: THDA 459. Special fee. 4 cr.

548. Stage Lighting Design and Execution

Script analysis, the light plot, and instrument schedule, including cue-writing, color, instrumentation, and the mechanics of developing a functional design. Special fee. 4 cr.

550. Actor's Voice Through Text

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. 4 cr.

551. Acting I

Development of fundamental vocal and physical stage techniques for actors and directors through exercises, improvisation and theatre games. Special fee. 4 cr.

552. Acting II

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. 4 cr.

555. Exploring Musical Theatre

Introduction to musical theatre as an American art form. Discussion and analyses of performing, acting, and staging techniques. Permission required. Lab. Special fee. 4 cr.

583. Introduction to Puppetry

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. 4 cr.

592A. Special Topics

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. 1 to 4 cr.

621. Education through Dramatization

Application to educational curricula of drama techniques including sensory awareness, movement, pantomime, storytelling, story dramatization. Includes lesson plan writing. Appropriate for both elementary and secondary education. Prereq: THDA 520. Writing intensive. 4 cr.

622. Storytelling, Story Theatre, and Involvement Dramatics

Students actively develop storytelling techniques based on individual needs. Includes an examination of story theatre and involvement styles and the development of the ensemble. 4 cr.

624. Theatre for Young Audiences

This broad spectrum theatre course touches on every aspect of dramatic production from historical overview through scripted play to final production. Emphasis is on dramatic theory as it applies to play writing, acting, directing, and production techniques as applied to a production for young audiences. Students are expected to actively participate in a culminating production experience to complete the learning experience. 4 cr.

627. Methods of Teaching Theatre

Laboratory course for students interested in teaching theatre, directing extra-curricular theatre programs and examining the approaches, materials, and techniques of theatre structure in combination with a teaching practicum. Special fee. Prereq: THDA 520. Writing intensive. 2 to 4 cr.

632. Interpretation of Shakespeare in Theatre

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. 4 cr.

641. Stage Management

Introduction 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. 2 cr.

650. Scene Painting for the Theatre

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 will extend the training of easel painters. Prereq: THDA 459. 2 cr.

651. Rendering for the Theatre

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. Prereq: THDA 459. 2 cr.

652. Scene Design

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 459. 4 cr.

653A. Performance Project

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. Writing intensive. 2 cr.

653B. Performance Project/Musical Theatre

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. 2 cr.

654. Scenic Arts Project

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. Writing intensive. 2 cr.

655. Musical Theatre Styles

Gives an increased understanding of performing and directing techniques as they apply to musical theatre. Students gain knowledge of various writers, and historical periods, and apply their knowledge to a variety of performance styles. Focus is on the discussion and application of auditioning, acting, and staging techniques. Special fee. Lab. Permission required. Writing intensive. 4 cr.

656. Musical Theatre Repertoire and Audition

Students read and analyze selected texts and scores from the 20th Century Musical Theatre and utilize their combined readings and research to develop audition repertoire materials. Class participants will be expected to demonstrate an understanding of subject matter through shared oral presentations and written work throughout the term. Prereq: THDA 655 or permission. Special fee. 4 cr.

657. Play Reading

A high-volume reading course which introduces a breadth 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. 4 cr.

683. Advanced Puppetry

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. 4 cr.

689. Practicum

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 in theatre and dance, D) management. May be repeated for up to 6 credits. Cr/F. 1 cr.

691. Internship

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. Variable up to 8 credits. Cr/F. 2 to 8 cr.

#729. Community Oriented Drama Programs

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 4 credits. 1 to 4 cr.

741. Directing

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. 4 cr.

742. Directing II

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, and exploration of avant garde theory and directorial technique. Concludes with a major project mounted for public performance. Prereq: THDA 741. Special fee. 4 cr.

750. Writing for Performance

An intensive exploration of the playwright's process. A mixture of theory and creative writing. Students will 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.) 4 cr.

755. Advanced Musical Theatre

Emphasis on characterizations and directing techniques. Use of scripts and scores of representative composers, lyricists, and librettists. Permission required. Lab. Special fee. 4 cr.

756. Producing and Directing the Musical

Focuses on analyzing musical scripts/scores from the viewpoint of the producer and the director. Learning is theoretical and performance-based. Special fee. 4 cr.

758. Acting III

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 will be 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. 4 cr.

759. Acting: Period and Style

Techniques of style analysis and period research. For the first time in the students' undergraduate actor training, students will synthesize their basic actor training with the heightened language and archetypal characterization inherent in the classical theatre of the ancient Greeks, the Commedia d'Elle 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. 4 cr.

781. Short Courses for Teachers and Directors

Each of these intensive, week-long summer 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 and high school teachers, basic choreography for the school musical, script adaptation, the use of drama to enhance reading and writing, set and lighting, and design and construction techniques. Continuing education and professional development is also available for graduate education credit. (Also offered as EDUC 998.) Special fee. May be repeated. (Offered summer semester.) 3 or 4 cr.

#782. Advanced Theatre Workshop for Teachers

A) puppetry; B) storytelling; C) play production for the elementary and middle school teacher; D) makeup; E) performing the musical with elementary and middle school students; F) play production for middle and high school teacher; G) basic choreography for the school musical; H) script adaptation; I) the use of drama to enhance reading and writing; J) set and lighting: design and construction techniques. Each of these advanced, intensive summer workshops for teachers focuses on expanding both play production skills and methods of implementing theatre techniques in the classroom. May be repeated. Special fee. (Offered summer semester.) 2 to 4 cr.

795, 796. Independent Study

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. Writing intensive. 1 to 8 cr.

798. Senior Seminar

Course consists of two parts. Part I is an exploration of avenues available to graduates in theatre and dance. In part II, students write a senior research paper and present an oral report. Theatre majors only. Prereq: junior or senior status. Special fee. Writing intensive. 4 cr.

Tourism Planning and Development (TOUR)

Department of Resource Economics and Development

(For program description, see page 92.)

Chairperson: Alberto B. Manalo

Coordinator: Robert A. Robertson

Professors: John M. Halstead, Bruce E.

Lindsay

Associate Professors: Alberto B. Manalo,

Robert A. Robertson

Assistant Professor: Kelly L. Giraud

Instructor: Mary Adamo Robertson

Extension Educator: Michael R. Sciabarrasi

400. Introduction to Tourism

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. 4 cr.

510. Tourism and Global Understanding

Introduction to 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. It will help 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. 4 cr.

550. Tourist Characteristics and Behavior

Study of the socioeconomic, demographic, and psychographic characteristics of various types of tourist populations; specific emphasis on host-guest relationships and human development. Prereq: TOUR 400. 4 cr.

560. Special Topics

A) Heritage Tourism Planning; B) Rural Tourism Development. Prereq: TOUR 400. May be repeated. 4 cr.

615. Tourism Planning and Development

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. 4 cr.

633. Economics of Travel and Tourism

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.) 4 cr.

#660. Designing and Implementing Conferences and Meetings

Basic principles and theory of the planning and management of conferences and meetings. Use of steering committees, selection of resource people, site selection, exhibits, and relations to supplier personnel. Special attention to designing the core of the conference and related activities. 4 cr.

700. Marketing Places

Concepts, tools, and techniques of services marketing with specific application to tourism attractions and facilities. Provides an understanding of market research, consumer attitudes and behavior, market segmentation, product pricing, and quality control. Differentiates between advertising, promotion, and public relations. Prereq: MKTG 550; TOUR 400. 4 cr.

705. Ecotourism: Managing for the Environment

Ecotourism embraces both the environment and economics. Provides a comprehensive framework for planning and managing ecotourism in order to both maximize potential benefits and to 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. 4 cr.

767. Social Impact Assessment

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 tech-

nology. 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. 4 cr.

792. International Experience

Travel to foreign country for study of a specific topic to be approved by the student's major adviser. Prereq: permission. 1 to 4 cr.

794. Internship

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. 4 to 12 cr.

798. Independent Study

Special assignments in readings, investigations, field problems. May include teaching experience. Prereq: permission. 1 to 4 cr.

Water Resources Management (WARM)

Department of Natural Resources

(For program description, see page 93; for faculty listing, see page 209; see also course listings under *Environmental Conservation, Forestry, Natural Resources, Soil Science and Wildlife Management.*)

500. Work Experience

Credits: Cr/F

Work in the field of water resources management; must be performed under professional supervision or approved by natural resources faculty. Students are responsible for arranging their own experience. The department assists students in locating acceptable internships. Prereq: WARM majors. May be repeated.

503. Wetlands Resources

An introduction to the biology and ecology of a wide variety of wetlands with emphasis on north-eastern coastal saltmarsh, estuarine, and freshwater ecosystems. Lectures and discussions focus on species composition, adaptations, biotic and abiotic interactions, wetland functional values, wetland creation and restoration efforts, and current policy and regulation issues. Field trips to selected wetlands are designed to emphasize and expose students to the major topics discussed. Prereq: one full year of college level biology. (Offered summers at the Shoals Marine Laboratory.) 2 cr.

504. Freshwater Resources

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. 4 cr.

604. Watershed Hydrology

Course will focus on the basic principles underlying the physical processes of water movement at the watershed scale. Topics will include precipitation, soil infiltration, stream flow, open channel hydraulics, and groundwater movement. Labs will consist of problem sets and field trips in which hydrological processes will be quantified. Prereq: WARM 504 and one semester of calculus. Special fee. Writing intensive. 4 cr.

700. Critical Analysis of Water Resources Literature

Detailed consideration of current issues in water resource management in a seminar format. Emphasis on critical analysis of primary literature in environmental science relevant to water resources management. Special fee. Prereq: WARM 603, or permission. 4 cr.

703. Watershed Water Quality Management

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: WARM 504, or WARM 604 or permission. Special fee. Lab/field trips. Writing intensive. 4 cr.

711. Wetland Resource Management

Analysis of the natural resources of coastal and inland wetlands and environmental problems caused by human use and misuse of these ecosystems. Groups will collect field data to summarize the structure and function of four wetland types within a management context. Special fee. Lab. Prereq: BIOL 541, or WARM 703, or permission. Writing intensive. 4 cr.

713. Field Wetland Ecology

Field investigation of coastal and inland wetland types. First half of course consists of field trips to visit and sample regional wetlands. Second half of course consists of methods used to analyze field samples from wetlands. Enrollment is limited. Prereq: present or past enrollment in WARM 711. Special fee. Lab/field trips. 3 cr.

716. Wetland Delineation

Examination of 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 professionals. Prereq: permission. Special fee. (offered summer session only.) 4 cr.

719. Wetlands Mitigation and Restoration

Assessing the problems of wetlands loss. Asks: what steps can be taken, does restoration work, can habitat value be replaced, and what constitutes equivalent mitigation? 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: WARM 711 or permission. Special fee. Lab/field trips. (Not offered every year.) 3 cr.

721. Ecology of Polluted Waters

Impact of various water quality problems (e.g., excessive nutrient loading, organic matter loading, contamination by trace organic compounds) on the ecology of fresh waters, including microorganisms, aquatic invertebrates, algae, and fish. Design of impact assessment studies and data interpretation. Prereq: WARM 603 or BIOL 528 or BIOL 541; permission. Special fee. Lab/field trips. Writing intensive. 4 cr.

795. Senior Thesis

Individual research guided by a program faculty member on a topic relevant to the student's area of specialization in the major. The research should employ skills and knowledge acquired by students during their tenure in the program and will result

in a written thesis or scholarly publication. This course is open to all students in the program and is required for honors students. Prereq: permission. Two semester sequence; grade of IA (continuous grading) given at end of first semester. Writing intensive. 4 cr.

Women's Studies (WS)

(For program description, see page 51, for minor program, see page 30.)

Coordinator, Women's Studies Program:

Susan D. Franzosa

Core Faculty: Kristine M. Baber, Family Studies; Victoria L. Banyard, Psychology; Linda M. Blum, Sociology; Marla A. Brettschneider, Political Science; Susan D. Franzosa, Education; Diane P. Freedman, English; Cinthia Gannett, English; Marc W. Herold, Economics; Nancy Lukens, Languages, Literatures, and Cultures; Kathy Miriam, Philosophy; Mary M. Moynihan, Women's Studies; Janet L. Polasky, History; Mary E. Rhiel, Languages, Literatures, and Cultures; Julia E. Rodriguez, History; Juliette M. Rogers, Languages, Literatures, and Cultures; Susan Schibanoff, English; Jennifer D. Selwyn, History; Raelene Shippee-Rice, Nursing; Mara R. Witzling, Art and Art History.

Associate Professors: Linda M. Blum, Marla A. Brettschneider

Research Associate Professor: Mary M. Moynihan

Assistant Professor: Julia E. Rodriguez

401/401H. Introduction to Women's Studies

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. 4 cr.

595/595W. Special Topics

In-depth study of topics not covered in regular course offerings. Prereq: permission; WS 401. 595W is writing intensive. 1 to 4 cr.

632. Feminist Thought

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. 4 cr.

795. Independent Study

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. 1 to 4 cr.

796. Advanced Topics

Advanced or specialized topics not normally covered in regular course offerings. May be re-

peated, but not in duplicate areas. Prereq: permission. 1 to 4 cr.

797. Internship

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. 4 cr.

798. Colloquium

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. 4 cr.

799. Honors Thesis

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. 4 to 8 cr.

Zoology (ZOOL)

(For program description, see page 94.)

Chairperson: James F. Haney

Professors: Ann C. Bucklin, John F. Burger, Donald S. Chandler, James F. Haney, Larry G. Harris, W. Hunting Howell, Thomas D. Kocher, Michelle P. Scott, James T. Taylor, Charles W. Walker, Winsor H. Watson III

Research Professor: Michael Lesser

Affiliate Professors: Arthur C. Borrer, Miyoshi Ikawa, John J. Sasner, Edward K. Tillinghast

Associate Professors: Jessica A. Bolker, Marianne Klausner Litvaitis

Research Associate Professor: Raymond E. Grizzle

Assistant Professors: David L. Berlinsky, James E. Byers

Research Assistant Professor: Karen L. Carleton

Affiliate Assistant Professors: David T. Bernstein, Michele Dionne, Leslie J. Newman, Barry J. Wicklow

Instructor: Mary Katherine Lockwood

Adjunct Faculty: Richard Langan, Dwight D. Trueblood

401. Human Biology

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 ZOOL 507-508. Special fee. Lab. 4 cr.

#402. Environmental Biology

Basic interrelationships among organisms, populations, communities, and their environments; ecosystems; human modifications of natural environments and their consequences. No credit toward major or minor. Lab. (UNH Manchester only.) 4 cr.

412. Principles of Zoology

Fundamentals of modern animal biology from cells to organisms, including anatomy, physiology, genetics, development, ecology, and the diversity produced by animal evolution. Weekly laboratory sessions provide a hands-on introduction to the animal kingdom. Special fee. Lab. (Fall semester only.) 4 cr.

460. Biological Illustration

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.) 2 cr.

474. Introduction to Marine Science

Allows non-biology majors to experience the breadth of the marine sciences under field conditions at an island (Appledore) laboratory, with excursions to seal and seabird colonies on the neighboring islands and whale feeding grounds in the Gulf of Maine. Involves field investigation, lab work, and lectures as well as reading, independent research, and scientific writing. Topics include general marine biology, intertidal ecology, plankton biology, fisheries, and benthic (sea floor) communities. (Summers only at Shoals Marine Lab.) 4 cr.

503. Introduction to Marine Biology

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 PBIO 503.) Special fee. Lab. 4 cr.

507, 508. Human Anatomy and Physiology

Cellular and systematic aspects of the human body. Laboratory exercises utilize preserved specimens, dissectable 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. 4 cr.

510. Field Ornithology

An introduction to field ornithology focusing on the biology, ecology, and behavior of avifauna on the Isles of Shoals. Includes such ornithological field methods as censuring 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.) 4 cr.

518. Vertebrate Morphology

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. 5 cr.

529. Developmental Biology

Introduction to 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 will 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. 4 cr.

542. Ornithology

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.) 4 cr.

#560. Anatomy and Behavior of the Gull

Functional anatomy of all organ systems, with emphasis on the sensory, nervous, digestive, and respiratory systems. Large nesting colonies of two species of gulls on Appledore Island are used to demonstrate basic patterns of gull behavior. Involves daily lectures, lecture demonstrations, laboratory work, and fieldwork. Prereq: one course in college-level biology. Cr/F. (Summers only at Shoals Marine Lab.) 1 cr.

570. Climates and Ecosystems

Practically-oriented. Emphasizes: 1) the definition, description and measurement of major abiotic factors (e.g., radiation, temperature, atmospheric moisture and precipitation, and winds and currents); 2) the role of both biotic and abiotic coastal environmental factors with respect to plants and animals including humans; 3) the fundamentals of dynamic meteorology and short-term weather prediction from observations of natural coastal phenomena such as cloud and wind patterns. Special attention is given to the terrestrial and littoral microclimate of Appledore Island. Prereq: One year of college-level biology; some physics or physical geography preferred. (Summers only at Shoals Marine Lab.) 4 cr.

600. Field Experience

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. 1 to 4 cr.

610. Principles of Aquaculture

An introduction to 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. 3 cr.

611. Principles of Aquaculture Lab

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. 2 cr.

625. Principles of Animal Physiology

Introduction to 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. No credit if credit earned for ZOOL 507-508 or ANSC 511-512. Prereq: two years of the biology core curriculum. 3 cr.

626. Animal Physiology Laboratory

Basic training in the measurement of function in animals, data analysis and expression, and the development of scientific communication skills. Writing intensive. Coreq: ZOOL 625. 2 cr.

628. Marine Invertebrate Evolution and Ecology

A course that 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.) 5 cr.

#674. Field Marine Science

Introduction to 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. (Summers only at Shoals Marine Lab.) 6 cr.

675. Field Marine Biology and Ecology

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.) 6 cr.

690. Evolution

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. 4 cr.

701. Conservation Biology

Critical and quantitative investigation of current issues in the conservation of biological systems. Issues addressed include habitat restoration, nonindigenous species, harvest strategies, conserving genetic diversity, population viability analysis, global climate change, endangered species recovery, habitat fragmentation, and reserve design. Case studies include examples drawn from terrestrial, aquatic, and marine systems. Weekly laboratories include trips to local habitats of concern. Prereq: BIOL 541 or permission. A statistics course is highly recommended. Special fee. Lab. (Not offered every year.) 4 cr.

705. Population Genetics

An exploration of the forces affecting the frequency and distribution of allelic variation in natural populations. Emphasis on the relative roles of mutation, selection, random drift and inbreeding in structuring genetic variation and on

the quantification of the genetic structure of populations. Prereq: BIOL 604. (Also offered as GEN 705.) Special fee. Lab. (Not offered every year.) 4 cr.

708. Stream Ecology

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. Prereq: permission. Special fee. Lab. (Not offered every year.) 4 cr.

#709. Environmental Physiology of Animals

Animal responses to natural changes or extremes of the physical environment. Emphasis on adaptation of animals to major environmental parameters such as nutrient levels, light, temperature, and ionic environment, as well as temporal (seasonal, daily) changes in these major environmental factors. Examples from several levels of organization including biofeedback mechanisms. Prereq: BIOL 541, ZOOL 625, or equivalent. (Not offered every year.) 4 cr.

710. Ichthyology

Introduction to 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.) 4 cr.

711. Zooplankton Ecology

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 ecology and limnology, ZOOL/PBIO 717, or equivalent; permission. Special fee. Lab. (Not offered every year.) 4 cr.

712. Mammalogy

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.) 4 cr.

713. Animal Behavior

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. 4 cr.

714. Ecology of Animal Behavior

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: introductory biology; experience in

psychology, animal behavior, or ecology is helpful. (Summers only at Shoals Marine Lab.) 4 cr.

715. Molecular Evolution

Rates and patterns of evolutionary change in biomolecules; forces affecting the size and structure of genomes; molecular mechanisms of organismal evolution. Emphasis on integrating evidence from biochemistry, molecular genetics, and organismal studies as well as on methods of reconstructing phylogeny from molecular sequences. Prereq: BIOL 604. Some knowledge of statistics is recommended. (Also offered as GEN 715.) Special fee. Lab. (Not offered every year.) 4 cr.

#716. Multivariate Statistics for Ecology

Methods of observation and inference in ecology; data reduction and exploratory analysis; detection of association, difference, and similarity using linear models and other multivariate approaches. Critiques of design and analysis of published studies. Prereq: formal coursework in statistics and ecology; permission. 4 cr.

717. General Limnology

Introduction to 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: BIOL 541 or equivalent. (Also offered as PBIO 717.) 4 cr.

719. Field Limnology

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. (Also offered as PBIO 719.) Special fee. Lab. Writing intensive. 4 cr.

#720. Marine Biology for Teachers

Primarily for teachers of grades 6 through 12, but open to others. An overview of living marine organisms (algae, invertebrates, fishes, marine mammals, and shore birds) and their environment. Emphasizes fieldwork; students who are certified divers or who wish to learn snorkeling are encouraged to use these techniques. Includes at least one excursion on the lab's research vessel. Topics include coastal zone problems, marine fisheries, economics of marine organisms, and the educational resources of the marine environment. Participants are encouraged to register for additional credit to research and prepare lesson plans and teaching material for class use. Prereq: introductory biology. (Summers only at Shoals Marine Lab.) 3 or 4 cr.

722. Ecology of Marine Fishes

Principles, models, and methods for analysis of dynamics of fish populations and communities; analysis of current research emphasizing theory and its potential uses in fisheries management; lab and field activities emphasizing collection and analysis of data from the Gulf of Maine and adja-

cent estuarine habitats. Prereq: one year of college-level biology. Lab. (Summers only at Shoals Marine Lab.) 4 cr.

723. Quantitative Genetics

Analysis of continuous variations in populations simultaneously segregating at multiple loci; genetic and nongenetic factors and the complex interactions between them; models and methods of analysis, for both theoretical and practical applications. Prereq: BIOL 604, BIOL 528 is strongly suggested. (Also offered as GEN 723.) Special fee. Lab. (Not offered every year.) 4 cr.

725. Marine Ecology

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 PBIO 725.) Special fee. (Not offered every year.) 4 cr.

#726. Comparative Physiology

Laboratory modules designed to enable students to investigate nutrition, metabolism, neural function, reproduction and homeostatic mechanisms of animals, especially invertebrates. Emphasis on learning how to conduct physiological studies. Prereq: ZOOL 625 and 626 or equivalent; permission. Special fee. (Not offered every year.) 1 to 4 cr.

727. Field Ecology of Amphibians and Reptiles

Origins, evolution, ecology, and conservation of amphibians and reptiles. Overnight field trips conducted throughout the state make use of photographic and nondestructive sampling methods. Prereq: BIOL 411-412 or equivalent. Special fee. (Summers only.) 4 cr.

#728. Comparative Systematics and Evolution of Invertebrates

A synthetic approach to invertebrate phylogeny based on critical examinations of morphological, embryological, and molecular characters. Considers methods of phylogenetic reconstruction, theories of metazoan origin, and phylogeny of major groups. Prereq: ZOOL 628 or equivalent. Lab. (Not offered every year.) 4 cr.

729. Developmental Biology of the Vertebrates

Principles of animal development, primarily in vertebrates, emphasizing the comparative approach and the integration of classical and molecular data. General topics include embryonic patterning, differentiation, morphogenesis, germ layers and their specific derivatives, environmental effects in development, and limb development. Special topics include maternal and embryonic adaptations, reproductive technology, and evolutionary perspectives on development. Prereq: ZOOL 518 and ZOOL 625; or ZOOL 529; or permission. Special fee. Lab. (Not offered every year.) Writing intensive. 4 cr.

730. Underwater Research

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.) 4 cr.

731. A Systems Approach to Biological Ocean Science

Broad survey of biological ocean science for advanced undergraduate and graduate students. Uses an interdisciplinary, "systems" approach to focus on major opportunities and challenges for ocean science in the future. Classes meet for one three-hour session each week and include lecture, discussion, demonstration, and laboratory sessions appropriate to the subject material with presentations by guest speakers. Focus of the course is different each time it is offered; topics have included temporal and spatial scales of variation, estuarine ecosystem dynamics. May be repeated for credit. Prereq: permission. 3 cr.

732. Lake Management: A Multidisciplinary Approach

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. Introductions to and use of 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 PBIO 732.) Special fee. Lab. 4 cr.

733. Behavioral Ecology

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. Emphasis is on critical understanding of concepts as exhibited in oral and written exercises. Students conduct independent investigations. Prereq: ZOO 713 or permission. Lab. (Offered in alternate years.) Writing intensive. 4 cr.

740. Introduction to Biogeography

Biogeography is an integrative field of inquiry that unites concepts and information from evolutionary biology, ecology, systematics, geology, and physical geography. This course covers theories and data from several disciplines with emphasis on evolutionary aspects of biogeography. Attention is given to the biogeography of individual taxa rather than groups of species or communities. Prereq: BIOL 541, ZOO 690, Evolution, is strongly recommended. Recitation. 4 cr.

745. Biology and Diversity of Insects

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.) 4 cr.

750. Biological Oceanography

Biological processes of the oceans, including primary and secondary production, trophodynam-

ics, 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.) 4 cr.

751. Research in Marine Biology

Introduction to the adaptations of organisms to marine environments and the role these adaptations have in structuring marine communities using an experimental approach. Emphasis is on experimental design, implementation, data analysis and scientific presentations. Offered in cooperation with Cornell University. Prereq: one year of college-level biology. Additional experience in ecology or physiology is recommended. (Summers only at Marine Lab.) 6 cr.

753. Marine Vertebrates

Lectures, laboratory work, and fieldwork on the systematics, ecology, and physiology of fishes, marine reptiles, marine birds, and marine mammals of the Gulf of Maine. Offered in cooperation with Cornell University. Prereq: field marine science or vertebrate biology. (Summers only at Shoals Marine Lab.) 6 cr.

#760. Practical Oceanography

A six-week program aboard a sail-training/oceanographic vessel offered through affiliation with the Sea Education Association. Includes daily on-board lectures by the scientific staff. Students are required to formulate a research plan and then collect, analyze and present data on the biological, geological, chemical and physical oceanography of the waters sailed during the program. Student's written reports are added to the SEA-maintained database. Prereq: One year of biology or permission of Zoology faculty and successful completion of the shore component of the SEA program. (Offered through SEA of Woods Hole, Massachusetts.) 7 cr.

772. Fisheries Biology

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: ZOO 710 or equivalent; permission. Lab. (Not offered every year.) 4 cr.

773. Physiology of Fish

Investigation of the physiological processes responsible for maintaining homeostasis in fishes. Focus is on the function and regulation of the major organ systems during stress and environmental adaptation. Topics include reproduction, osmoregulation, digestion, endocrinology and sensory perception. Prereq: ZOO 625 or equivalent; or permission. 4 cr.

#775. Reproduction and Development of Marine Invertebrates

Cultivation, experimental and descriptive embryology, developmental energetics, substrate selection, metamorphosis, and ecological significance of reproductive patterns in major invertebrate groups. Prereq: ZOO 674 (UNH), Biol Sci 364 (Cornell), or invertebrate zoology. Offered in cooperation with Cornell University. (Summers only at Shoals Marine Lab; not offered every year.) 6 cr.

777. Neurobiology and Behavior

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 (ZOO 625) also desirable. 4 cr.

#778. Neuroscience Techniques

Techniques- and laboratory-oriented course designed for students of the behavioral and physiological sciences who wish to understand the basic electrophysiological properties of neurons and how they interact. Uses both invertebrate and vertebrate systems to illustrate principles of synaptic transmission, integration, sensory information processing, and the control of movement. Prereq: ZOO 777 or equivalent. Lab. (Not offered every year.) 4 cr.

795. Special Investigations

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. 1 to 4 cr.

799. Senior Thesis

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. 2 to 4 cr.

Thompson School of Applied Science

Professors: John C. Bozak, Jr., Thomas A. March, Robert G. Moynihan, Guy E. Petty, Donald W. Quigley, William H. Scott, Donald J. Silva

Associate Professors: Dwight E. Barney, Timothy E. Barreto, Charles A. Caramihalis, Matthew C. Chagnon, Andrew B. Conroy, Kenneth L. Flesher, Benjamin P. Fowler, Rene J. Gingras, Katharine M. Hanson, John L. Hart, Nancy M. Johnson, David H. O'Brien, Dana M. Sansom, David E. Tooch, Steven D. Tuttle, Jerilee A. Zezula

Assistant Professor: Gino Alibrio

The following courses are offered through the Thompson School of Applied Science. For more information, see page 113.

Program Abbreviations

The number of class hours, laboratory sessions, and credits is shown following each course description. For Example, "2 lec/1 lab/3 cr" signifies that the course has two hours of lecture and one laboratory session scheduled each week, and that

it is a three-credit offering; "rec" stands for "recitation." The word "permission" indicates permission of the instructor is required.

"Cr/F" following the description indicates that the course carries no letter grade, being marked "Cr" for credit, "F" for failure.

The abbreviations are used to identify those disciplines offering the coursework.

Code	Discipline
AM	Agricultural Mechanization
AAS	Applied Animal Science
ABM	Applied Business Management
ANSC	Animal and Nutritional Science
CT	Civil Technology
COM	Communications
CSL	Community Service and Leadership
FSM	Food Services Management
FORT	Forest Technology
HT	Horticultural Technology
MTH	Mathematics
NUTR	Nutrition
PHYS	Physics
SSCI	Social Science
ZOOL	Zoology

Applied Animal Science

AAS 221. Dairy Production Techniques

Essential skills for daily care and management of dairy animals. Students participate in milking, clipping, herd care, plus other herdsmanship skills. 1 lec/1 lab. 2 cr.

AAS 222. Small Animal Grooming

Techniques and styles of grooming, clipping, trimming, and bathing of common breeds of small animals. May be repeated for credit once. Special fee. 1 lec/1 lab. 2 cr.

AAS 223. Dairy Selection

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. 2 cr.

AAS 224. Small Animal Management

Organization, care, facilities design, and general management of small businesses dealing with companion animals and their owners. 3 lec/1 lab. 4 cr.

AAS 226. Equine Conformation and Lameness

The study of conformation as it relates to soundness and performance. Topics include basic unsoundness related to faulty conformation and type evaluation. 2 lec/1 lab. 4 cr.

AAS 227. Small Animal Diseases

Common diseases in companion animals discussed system by system; emphasis on canine and feline medicine. Prereq: AAS 228, 239, 249. 2 1-hr lec. 2 cr.



AAS 228. Anatomy and Physiology of Domestic Animals

Structure of the body and functions of the tissues, organs, and systems in the living animal. 3 lec/1 lab. 4 cr.

AAS 230. Small Animal Breeds and Behavior

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. 4 cr.

AAS 231. Introduction to Animal Science

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. 4 cr.

AAS 232. Animal Forages

Production and utilization of New England forage crops. Selection of species and varieties; cultural and harvesting practices for top production of excellent quality feed. Combining uses for greatest efficiency in feeding various livestock classes. 2 lec/1 lab. 3 cr.

AAS 234. Equipment and Facilities Management

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. 3 cr.

AAS 235. Animal Nutrition

The food nutrients, their digestion and absorption, factors affecting value of feeds, feed additives, and nutrient requirements for maintenance and productive functions. 3 lec. 3 cr.

AAS 237. Equine Handling and Care Techniques

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. 4 cr.

AAS 239. Fundamentals of Animal Health

Principles of disease mechanisms: causes, body reactions, and preventive medicine. Prerequisite for other AAS disease courses. Prereq: AAS 228. 2 lec/1 lab. 3 cr.

AAS 240. Animal Breeding

Principles and practices, including the physiology of reproduction, fertility and sterility, artificial insemination, breeding systems, and selection. 2 lec/1 lab. 3 cr.

AAS 242. Introduction to Business: Applied Animal Science

Basic course covering business structure, philosophy, and terminology. Foundation for AAS 246, Management Applications. 2 lec. 2 cr.

AAS 244. Introduction to Dairy Herd Management

The course explores economic, scientific and practical aspects of dairy herd management. The topics covered include history, cattle selection, nutrition, housing, milking, and disease preven-

tion strategies. There are a number of field trips and weekly labs emphasizing management and hands-on experience. (Also offered as ANSC 409/410.) 4 cr.

AAS 246. Animal Business Applications

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. 4 cr.

AAS 247. Applied Equine Management

The application of farm and horse management techniques, including stable routine, planning, and design; nutrition; business considerations; and legal responsibilities. 2 lec/1 lab. 3 cr.

AAS 249. Small Animal Care Techniques

Essential skills and basic background knowledge for the day-to-day care of dogs and cats in a small animal enterprise. 1 lec/1 lab. 2 cr.

AAS 251. Human/Animal Bond

Explores the many aspects of the human/animal bond through required reading, writing, and discussions. Requires an 8 hour volunteer practicum. 2 cr.

AAS 252. Equine Health Management

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. 4 cr.

AAS 253. Equine Competition Management

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. 1 lab. 2 cr.

AAS 254. Animal Assisted Activities and Therapy

This course explores Animal Assisted Activities and Therapy using the Pet Partners Program and Manual as the core of the material presented. Once completed, students will have fulfilled the Team Training requirement of the Pet Partners Registration and may then, if they wish register as an individual or follow through with the Team Evaluation and register as a Pet Partners Team with their pets. The class will meet 2 hours weekly for 5 weeks. Special fee. Cr/F. 1 cr.

AAS 257. Small Animal Diseases Lab

Provides an opportunity for students to perform clinical laboratory procedures commonly done in small animal veterinary practices. Also includes basic pharmacology, dosage calculations, and an introduction to veterinary radiology and surgical assisting. Prereq: AAS 227, 228, 239, 249. 2 hr lab. 1 cr.

AAS 258. Comparative Dairy Operations

Exploration of New England dairy farm operations and related businesses. Through field trips and journals, students will see and experience the diversity in modern dairy production. Prereq: AAS 244; permission. Cr/F. 1 cr.

AAS 264. Dairy Nutrition Practicum

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. 1 cr.

AAS 272. Comparative Equine Operations

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. Cr/F. 1 cr.

AAS 274. Dairy Cattle Disease Seminar

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 630.) 2 cr.

AAS 275. Cooperative for Real Education in Agriculture (CREAM)

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. Permission. Two semesters of 4 credits each are required. 4 cr.

AAS 276. Introduction to Laboratory Animal Science

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. Coreq: AAS 277. 2 lec. 2 cr.

AAS 277. Laboratory Animal Science Practicum

Hands-on experience working in the UNH laboratory animal facilities. Coreq/Prereq: AAS 276. May be taken twice. 3 to 4 hours per week. 1 cr.

AAS 278. Applied Animal Science Computer Applications

Use of computers in a university setting, developing skills in Microsoft Office, and using the internet. During the second half of the semester, students further develop skills using specific animal science and business-related programs. 1 lec/1 lab/half-term. 1 cr.

AAS 279. Small Animal Care Practicum

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. 2 cr.

AAS 291, 292. Studies in Applied Animal Science

A) Dairy; B) Light Horses; C) Livestock; D) Poultry; E) Meats; F) Forages; G) Management; H) Small Animals; I) General Animal Science. Prereq: permission of instructor and student's adviser. 1 to 3 cr.

AAS 293. Equine Field Operations

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. 1 to 3 cr.

AAS 297. Applied Animal Science Work Experience

Employment (12 weeks, generally in the summer following the first year) in an approved animal-related position. Cr/F. 1 cr.

Associated Courses

ANSC 402. Horsemanship

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. 3 cr.

ANSC 406. Careers in Animal Science

Survey of various areas of animal and veterinary science and opportunities available. Cr/F. 1 cr.

ANSC 507. Scientific Approach to Equine Discipline

Physiological development, control, and education; biting, lunging, driving, and equine gymnastics. Special fee. Lab. 3 cr.

Applied Business Management

ABM 202. Professional Writing

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. 2-hr lec-discussion. 2 cr.

ABM 204. Principles of Management

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. 4 cr.

ABM 205. Applied Financial Accounting

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. 4 cr.

ABM 206. Human Resource Management

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. 4 cr.

ABM 207. Applied Marketing

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. 4 cr.

ABM 208. Managerial Accounting

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. 4 cr.

ABM 210. Production/Operations Management

In traditional classroom format, field visits, and analysis of existing businesses, students learn to design and evaluate production systems of any business enterprise. Elective course for ABM seniors interested in the field of efficiency of operations. 2 lec/field trips. 2 cr.

ABM 211. Business Policy

Through use of case studies from existing businesses, the organization and execution of a student-run business, and computer simulations of the overall management of a manufacturing facility, students now bring together and apply all they have learned throughout the program. 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. 4 cr.

ABM 212. Business and Industry Internship

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. Cr/F. Course may be repeated for credit. 1 to 4 cr.

ABM 213. Applied Micro-Economics

Successful business owners and managers must understand the relationship between government and business and must be able to position themselves to seize the many opportunities that government offers to business. With the necessary understanding of economic theory, students combine field work and research to acquire many possible solutions to the problems of growth, pollution, welfare, poverty, education, health, international trade, natural resource management, and politics. 2 2-hr lec-discussion. 4 cr.

ABM 214. Applied Sales

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. Also presents and discusses the roles of the sales manager and related financial elements. 2 2-hr lec-discussion. 4 cr.

ABM 215. Business and the Community

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. 4 cr.

ABM 216. Accounting with Microcomputers

Developing charts of accounts, custom reports, journal entries, adjustments, and operation of popular computer accounting packages. Special fee. Prereq: ABM 205 or permission. 2 2-hr lec. 4 cr.

ABM 217. Web Page Programming and Design

Course focuses on creating and maintaining sites on the world wide web. Topics include designing, programming, and promoting individual web sites, and HTML coding. 2 2-hr lec. 4 cr.

ABM 218. Computer Database Management

Training on the latest database management software. Emphasis on database development and use as a business tool. Major topics include: inventory management, personnel record keeping, managerial decision making, development of queries, reports, labels, and relational database. Special fee. Prereq: ABM majors and permission. 2-2hr. lec for one half semester. 2 cr.

ABM 219. Desktop Publishing and Advanced Applications

Training in the use of desktop publishing applications for the development of both personal and business-oriented support materials, such as business cards, resumes, posters, and pamphlets. Special fee. 2-2hr. labs. 4 cr.

ABM 220. Computer Spreadsheet Applications

Training with current spreadsheet software. Emphasis on managerial decision making and problem solving. The class meets weekly for training and students work independently on projects they develop in conjunction with the instructor. Special fee. Prereq: ABM major and permission. 2 cr.

ABM 221. Seminar in Marketing and Sales

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. 1 cr.

ABM 222. Operating Systems and Networking

Training on current PC and networking operating systems including Windows and UNIX. Explores file, disk, and directory management as well as creating and maintaining Ethernet hardware and software. Prereq: ABM Computer Option only. 2 lec. 2 cr.

ABM 223. Seminar in Human Resource Management

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. 1 cr.

ABM 224. Seminar in Financial Management
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. 1 cr.

ABM 225. Senior Project

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. 4 cr.

ABM 232. Business Law

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. 4 cr.

ABM 240. Holistic Business Management

A course designed to combine traditional quantitative managerial methods and more humanistic qualitative methods to study and develop a holistic approach to management technique and the marketplace. The course will bring together concepts such as profit, values, community, and responsibility in all phases of the business process to explore and create a paradigm which meets the needs of all the elements of the organization from stockholder to maintenance person. The course will help students identify methodologies for sustaining business in its function as a responsible force for the betterment of wealth and well-being in society. 2 lec. 4 cr.

ABM 242. International Trade Applications

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. 2 cr.

ABM 291, 292. Studies

Through a one-on-one contact with an ABM faculty member, students design their own course or research project on a topic not available through existing and conventional course offerings. Projects vary in credits depending on the time commitment and contact. 1 to 4 cr.

Civil Technology

CT 220. Professional Practice

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. 1 cr.

CT 222. Computer Aided Design Level I

The student designs fundamental buildings and structures and prepares plans using computer software (AutoCAD). Emphasis is on learning the soft-

ware, basic design and plan requirements. Students then apply this knowledge to produce presentation drawings and developing proficient skills with this software. The student also works concurrently on course projects. 2-hr lec/2-hr rec. 4 cr.

CT 223. Introduction to Surveying and Mapping

Established procedure for data gathering, analysis and display in Surveying and Mapping. Linear and angular measurements, Traversing and computation of areas, Geographic Information Systems, the Global Positioning System, topographic mapping. 3-hr lec/2-hr rec. 4 cr.

CT 227. Mechanical and Electrical Systems

Description, analysis and design application of conventional heating, ventilating, air conditioning, lighting and plumbing systems. Electrical principles, laws, and installation with emphasis on the National Electrical Code. 2-hr lec/2-hr rec. 4 cr.

CT 230. Statics and Materials

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. 4 cr.

CT 231. Design I

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 will develop intermediate CAD skills. Prereq: CT 222. 2-hr lec/2-hr rec. 4 cr.

CT 232. Environmental Technology

Examines the macro and micro issues inherent to the management of our environment. Discussion of the macro component covers global environmental issues, both the problems and sustainable solution strategies. The micro component includes examination of the technical processes inherent to deliver potable water, treat waste water, manage solid waste, and recycling. 2 lec/1 lab. 3 cr.

CT 233. Construction Surveying

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. 4 cr.

CT 234. Soils and Foundations

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. 4 cr.

CT 235. Introduction to Information Technology

This course will provide an introduction to Information Technology and the issues and chal-

lenges with managing the computing enterprise in a corporate environment. Topics to be covered include hardware troubleshooting and repair, operating system fundamentals, general application deployment, data communications, networking software and hardware, server security and management, and an introduction to HTML (web site) programming. Prereq: AM 280, MTH 203. 2 lec/1 lab. 4 cr.

CT 237. Land Design and Regulations

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. 4 cr.

CT 238. Introduction to Multimedia

Introduces multimedia computer applications through the creation of still image renderings and high-quality animation. A personal, computer-based applications course for technical and artistic generation of graphical information in a multimedia format with emphasis on visual presentation. Prereq: CT 222, 226; permission. 2 cr.

CT 240. Legal Aspects of Surveying

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/2-hr rec/7 wks. 2 cr.

CT 243. Advanced Surveying and Mapping

A continuation of surveying topics not covered in CT 223, CT 233 and 240. Specifically: Geodesy, Map Projection Systems, State Plane Coordinates, Satellite Positioning, Theory of Observations, and Control Surveys. 3-hr lec/1-hr rec/1-hr lab/6 wks. 2 cr.

CT 244. Advanced Surveying Computations

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. 4 cr.

CT 246. Introduction to Geographic Information Systems

The basic principles of an operational Geographic Information System. History of and future trends in the field. The fundamentals of data quality, data capture, data manipulation, applications, and analysis. System component selection—hardware and software. 2 lec/1 lab. 3 cr.

CT 247. Construction Contracting

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. 4 cr.

CT 281. Architecture I History and Design

Develops a basic understanding of American architectural history while developing architectural programming and design skills in a project based environment. Considerable CAD usage for project submissions 2-hr lec/2-hr rec. 4 cr.

CT 282. Architecture II

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. 4 cr.

CT 291, 292. Studies

A) Energy Conservation; B) Surveying; C) Construction; D) Machinery; E) Hydrographic Surveying. Prereq: permission of instructor and student's adviser. 1 to 3 cr.

CT 297. Work Experience

Career-oriented work experience (10 weeks, full time) to include, but not limited to, architecture, construction, surveying, and mapping. Cr/F.

Required Course in Physics

PHYS 412. Technical Physics

Introductory course emphasizing the fundamentals of mechanics, heat, electricity, and other subjects underlying modern machinery and instruments. Recommended for Thompson School students. Prereq: algebra and trigonometry. Lab. 4 cr.

Community Service and Leadership

CSL 200. Technology for Community Service and Leadership

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. 2 cr.

CSL 201. Introduction to Community Service and Leadership

This course serves as the foundation course for the Community Service and Leadership Program. Students are introduced to current and historical definitions of community and "service" to the variety of organizations providing service within communities, and to the challenges facing leaders within community organizations as they work to address key problems. All students will participate in a variety of community placements during this course. 4 cr.

CSL 202. Introduction to Nonprofit Organizations

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. 4 cr.

CSL 203. Organizing and Supervising Volunteers

This course provides students with the knowledge and skills necessary to design, organize, and man-

age 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. Prereq: permission. 4 cr.

CSL 204. Managing Change and Conflict in Communities

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 201, permission. 4 cr.

CSL 205. Communication Within Communities

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 community newsletters and create at least one newsletter as a service to a community organization. Prereq: COM 209, 210 or Coreq: COM 210. 4 cr.

CSL 206. Literature of Family and Community

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. 4 cr.

CSL 207. Introduction to Non-profit Budgeting and Accounting Practices

This course is designed to help students understand the responsibilities of nonprofit financial management. 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. Common nonprofit accounting principles and approaches will also be taught. 3 cr.

CSL 208. Essentials of Fundraising for Community-Based Organizations

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, rais-

ing money by mail, personal solicitation, event planning, and other key approaches to raising money. 2 cr.

CSL 209. Essentials of Grant Writing for Community-Based Organizations

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. 2 cr.

CSL 210. Community Service and Leadership Capstone Seminar

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 201, 202, 203, and CSL 205. 4 cr.

CSL 290. Civic and Community Internship

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 201 or permission of instructor. 2 to 4 cr.

CSL 297. Community Service and Leadership Work Experience

Career-related internship and/or training (minimum of 50 hours) that enhances previous course work and service-learning experiences in community organizing and leadership. Students may work with a community-based and/or nonprofit organization in a full or part-time position; participate in an internship with an organization that serves the needs of the community; attend UNH's Leadership Program or other leadership programs to learn more about leadership, teambuilding, and other group management skills; create an independent project based on a specific interest; or work with a "for profit" company. Course focus is on learning new skills and developing deeper insights into the work of creating and sustaining community. Required for graduation. Prereq: CSL major. Cr/F.

Food Service Management

FSM 200. Introductory Chemistry

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 majors only. 3 lec. 3 cr.

FSM 201. Food Preparation Fundamentals

Preparation techniques, knife skills, measurements, food handling, selection, and classification. FSM majors only. 2hr lec. Restaurant Manage-

ment majors must also complete a lab. Practical application of skills and techniques utilized in a professional kitchen. 2hr lab. 2 or 3 cr.

FSM 202. Meal Management

Enhancement of food preparation skills and techniques, recipe conversion, standardization and costing, garnishments, and service, as adapted for hotels and restaurants. Prereq: FSM 201 or permission. FSM majors only. 1 1/2 lec/1 to 3-hr lab. 3 cr.

FSM 203. Introduction to Restaurant and Hospitality Management

This first-semester course introduces students to the field of hospitality and restaurant management. Topics discussed include: forms of business, employment opportunities in the field, social and environmental responsibility and ethics, as well as the future of the restaurant and industry. 3 1-hr lec. 3 cr.

FSM 205. Hospitality Computer Applications

Introduction to personal computers and business application software. Utilizing the most recent Windows environment, students will learn the fundamental principles and techniques associated with processing (Word), spreadsheets (Excel), and database management (Access). Each of these applications will be presented in relationship to business management responsibilities within the hospitality industry. Concepts/applications such as business letters, proposals, contracts, accounting spreadsheets, and customer and employee databases will all be explored. 3 contact hours/lec/lab. 3 cr.

FSM 206. Food and Beverage Operations Controls

An overview of accounting principles with emphasis on managerial accounting as it relates to the food services industry. Cost control with respect to product, labor, purchasing, and physical plant examined in depth. Extensive practical experience in cost control procedures, methods, and techniques utilizing computer spreadsheet applications required. Prereq: FSM 205. 3 1-hr lec/1 2-hr lab. 4 cr.

FSM 207. Hospitality: Sanitation and Safety

The organization, functions, and responsibilities of food services operators in both the public and private sectors as they relate to sanitation and safety. Development, control and implementation of HACCP standards and procedures, pest control, crisis management, safe food production, and accident prevention explored. Also requires students to sit for the Foodservice Sanitation Certification exam as offered by the Educational Foundation of the National Restaurant Association. 1-2 hr lec. 2 cr.

FSM 208. Non-Commercial and Contract Food Service Management

Course focus is on the contract and non-commercial aspect of the food service business. Emphasis is on comparing and contrasting food services offered in healthcare, business and industry, education, recreation and leisure, in-flight and vending operations. 3 cr.

FSM 209. Applied Restaurant Operations Management

Students learn hands-on while managing the Balcony Bistro, an upscale, gourmet restaurant open to the public. Emphasis is on plate presentation, kitchen management, front-of-the-house operations, menu pricing, and food and labor cost controls for an on-going restaurant operation. Prereq:

FSM 201, 202, and 207. FSM majors only. 1 lec/6-hr lab. 4 cr.

FSM 211. Food and Beverage Facilities Planning

Course covers preplanning and layout of facilities and equipment for various food services operations. Care and maintenance of the physical plant, as well as selection, operation, and placement of essential equipment will be emphasized. Design and development of the operation in relation to the physical plant as well as the product/service offering examined and analyzed. May be repeated. 1 2-hr lec. 2 cr.

FSM 212. Hospitality Personnel Management

A course focusing on motivational theory, personnel administration techniques, and supervisory attitudes that affect employee work performance. Topics discussed specifically reflect human resource issues in the context of the hospitality work environment. 2 lec. 2 cr.

FSM 215. Restaurant And Hospitality Law

Study of the legal environment as it applies to all segments and aspects of food services operations. Topics include common and statutory law with regard to contracts, employment, negligence, public accommodation and disclaimer liability as well as the operator's duty to protect guests and "reasonability." Significant examination of actual case law will be employed. May be repeated. 1 2-hr lec. 2 cr.

FSM 218. Beverage Operations Management

Provides a well-rounded examination of the foundation of knowledge and techniques regarding the history, production, and control of wines, spirits, and other beverages within a food services operation. Additionally, a variety of other topics such as purchasing, staffing, cost control, and safe alcoholic beverage service covered. May be repeated. 2 2-hr lec. 4 cr.

FSM 226. Dining Room Practicum

The fundamental principles of dining room service, organization, and supervision. Students actively participate in real-world applications of techniques and methods associated with effective front-of-the-house operations in a supervised setting. Students will be required to staff all positions at the Balcony Bistro, our on-campus, full-service operation, throughout the semester. 1-hr lec/4-hr lab. 2 cr.

FSM 228. Applied Nutrition

Consideration of the nutritional requirements of healthy individuals and the benefits of good nutrition. Basic study of food and nutrients: functions, sources, requirements, digestion, absorption, and metabolism. Introduction to the science of energy balance, special needs during the life cycle, and selected nutrition problems/controversies. 3 lec. 3 cr.

FSM 229. Applied Nutrition for Dietetic Technicians

Consideration of the nutritional requirements of healthy adults and the benefits of good nutrition. Basic study of nutrients: functions, sources, requirements, digestion, absorption, and metabolism. Introduction to such topics as energy balance, special needs during the lifecycle, and selected nutrition problems/controversies. Incorporates practical application of lecture topics through problem-solving activities completed in the lab. 2 lec/2 lab. 1 cr.

FSM 235. International Cuisine

Designed to provide food service student with knowledge of international food preparation and equipment not included in other courses. The student will be introduced to international cuisine and the unique preparation techniques needed for each item. 1 lec/6 hrs. 1 lab. 4 cr.

FSM 236. Advanced Baking

The development of advanced knowledge of baking and fancy pastries. Use of tools and equipment to produce quality items to be marketed in the Thompson School snack bar. Assignments in the food lab at Thompson School. 6 hrs. Lab. 3 cr.

FSM 238. Buffet Catering

Introduction to the art of buffet style of service. Actual work assignments will require preparation of two buffets during the semester. The student will experience the program of buffet presentations and handle foods and utensils required for buffet work. 1 lec/6hrs. Lab. 4 cr.

FSM 240. Restaurant Sales and Promotion Management

An overview of fundamental marketing principles as they relate to the food services industry. Evaluation methods for planning, testing, budgeting, and analyzing in-house promotional programs explored in detail. Emphasis will be placed upon techniques and media utilized in the promotion of food and beverage operations. Basics of the marketing mix such as product, price, promotion, and distribution applied to management of a foodservice operation. May be repeated. 2 2-hr lec. 4 cr.

FSM 241. Applied Buffet and Catering Management

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: FSM 201, 202, and 207. FSM majors only. 1 lec/6-hr lab. 4 cr.

FSM 260. Community Nutrition Practicum

Exploration and participation in programs and organizations that offer nutrition services to the community. Hands-on activities vary from year-to-year with emphasis on providing nutrition education using a variety of curricula presented to varying age groups throughout the lifecycle including: Head-start, Cooperative Extension (EFNEP&4-H), the Elderly Nutrition Program, as well as public schools and various low-income groups. Prereq: FSM 228/229, NUTR 476, NUTR 510, majors only. Coreq: FSM 265. 5 cr.

FSM 265. Community Nutrition for Dietetic Technicians

A study of community programs and agencies providing food and nutrition services to age groups throughout the life cycle. Emphasis is on assessment of nutritional needs in the community. Prereq: FSM 229; NUTR 510. Coreq: FSM 260. 2 lec. 2 cr.

FSM 275. Diet Therapy

The study of therapeutic nutrition. Review of the physiology related to nutrition disorders so that students may calculate and plan the most common modified diets. Prereq: FSM 200, 229; NUTR 476, 510; ZOOL 401. 2hr-lec/3-hr lab. 3 cr.

FSM 278. Applied Principles of Food Preparation

Principles and techniques of food selection, preparation, and presentation in relation to quality and acceptability. Dietetic Technician students only. 2 lab. 1 cr.

FSM 290. Managerial and Clinical Dietetics Practicum

Supervised practice in current foodservice systems and clinical practice in healthcare institutions. Students will participate in the activities of a foodservice operation including menu planning, food purchasing and production, delivery and service, sanitation and safety, management and supervision as well as quality improvement. Students also participate in patient care activities in the nutrition department including nutrition screening and assessment, development of patient care plans and documentation. Majors only. Prereq: FSM 201, 207, 228/229, 278, NUTR 476, 503, 504, 510. Coreq: FSM 275. 7 cr.

FSM 291, 292. Independent Studies in Restaurant Management

A) Culinary Apprenticeship; B) Bake Shop Apprenticeship; C) Noncommercial/Contract FS Management; D) Public Relations/Marketing; E) Restaurant Management; F) Catering Management; G) Dining Room Management. Prereq: permission of instructor. 1 to 4 cr.

FSM 293, 294. Studies in Dietetic Technology

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 students adviser. 3 to 6 cr.

FSM 295. Dietetic Seminar

Preparation of a professional resume, skills and practice for the registration exam for dietetic technicians, overview of professional portfolios for continuing education in the field of dietetics. Prereq: majors only. Credit/Fail. 1 cr.

FSM 296. Dietetic Technician Independent Study. Dietetic Technician Practicum

For Dietetic Technician students who need to take practica at alternate times. There are three practica in the Dietetic Technician major: FSM 280 Food Service Management Practicum (6 cr.); FSM 290 Clinical Nutrition Practicum (4 cr.); and FSM 260 Community Nutrition Practicum (3 cr.). Prereq: permission. 3 to 6 cr.

FSM 297. Restaurant Management Summer Internship

Career-related internship intended to provide additional practical experience for the senior year. Minimum 12 weeks up to 16 weeks, 500-600 hours. Required for graduation and generally completed during the summer following freshman year. 3 cr.

Associated Courses

NUTR 405. Food and Society

Consideration of the cultural significance of food, emphasizing historical, psychological, social, political, and economic aspects. Also offered as ANSC 405. (Spring semester only.) Writing intensive. 4 cr.

NUTR 476. Nutritional Assessment

Techniques in anthropometric and biochemical assessment of nutritional status with emphasis on client interviewing and nutritional evaluation in both community and clinical settings. Prereq: NUTR 400/475 or permission. Special fee. (Spring semester only.) 3 cr.

NUTR 503. Principles of Food Service Management

Practical experience in methods of purchasing, and handling food, tools, and equipment used in quantity food preparation; lab experience in selective settings. May be taken independently of NUTR 504. Prereq: NUTR 473 or permission of instructor. (Fall semester only.) 3 cr.

NUTR 504. Managerial Skills in Dietetics

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.) 3 cr.

NUTR 510. Nutrition Education and Counseling

Principles, methods, skills and materials involved in nutrition education and counseling. Emphasis on development of educational materials and practicum skills necessary to perform as an effective nutrition counselor. Special fee. (Fall semester only.) Prereq: Nutrition major or permission. 3 cr.

ZOOL 401. Human Biology

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 ZOOL 507-508. Special fee. Lab. 4 cr.

Forest Technology

FORT 260. Forest Mapping

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 2-hr lab. 2 cr.

FORT 261. Dendrology

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 4-hr lab. 3 cr.

FORT 263. Forest Ecology

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/1 2-hr lab. 3 cr.

FORT 264. Arboriculture

Tree selection, care, and maintenance in the urban environment. Includes climbing, safety practices, pruning, transplanting, and fertilizing. Prereq: FORT 263 or permission. 1 lec/1 4-hr lab. 3 cr.

FORT 265. Forest Orientation Seminar

Seminar to prepare freshmen for study and placement in the broad area of forest technology. 1 lec. Cr/F. 1 cr.

FORT 266. Forest Surveying

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. 4 cr.

FORT 267. Leadership, Supervision, and Safety Practices

Fundamentals of leadership and supervision including effective communication, job organization, planning, personnel training and motivation, problem-solving and decision-making techniques, accident prevention, first aid, and CPR instruction. 2 lec. 2 cr.

FORT 269. Wildlife Ecology and Conservation

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. 3 cr.

FORT 270. Applied Silviculture

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. 3 lec/2-hr lab. 4 cr.

FORT 272. Mensuration

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 275 or permission. 2 lec/1 4-hr lab. 4 cr.

FORT 273. Management Operations and Analysis

Forest appraisal and valuation methods, timber sale contracts, depreciation and depletion calculations, forest taxation. Essentials of forest regulation and management planning. 2 lec/1 lab. 3 cr.

FORT 274. Industrial Forest Management Tour

Concentrated field experience and intensive observations of industrial, private, and federal forest holdings, emphasizing forest management operations as currently practiced in New England. Two weeks of concentrated field study. Prereq: permission of curriculum chairperson. Cr/F. 2 cr.

FORT 275. Forestry Field Practices

A one-week course of block-type instruction in the following areas: tree measurement, log scaling practices, sawmilling fundamentals, chainsaw maintenance and operation. 1 cr.

FORT 276. Forest Products

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. Prereq: permission and FORT 268. 2 lec/4-hr lab. 4 cr.

FORT 277. Logging

Harvesting methods: their physical layout and economics, relationship to silviculture, and protection. Maintenance of logging tools and machinery. Foremanship and woods safety are stressed. Prereq: permission. 2 lec/4-hr lab. 4 cr.

FORT 278. Forest Insects and Diseases

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/2-hr lab. 2 cr.

FORT 279. Forest Fire Control and Use

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. 4-hr lab. 2 cr.

FORT 280. Aerial Photography Interpretation

Value and use of aerial photos in forest typing, mapping, land-feature identification, forest road reconnaissance, and inventory techniques. 1 lec/1 lab. 2 cr.

FORT 283. Forestry Computer Applications

Introduction to file management, word processing, spreadsheets, databases, email, and the internet. Students use software to solve forestry-related problems. 1 lec/1 lab. 1 cr.

FORT 291, 292. Independent Studies in Forest Technology/Urban Tree Care

A) Forest Management; B) Forest Products; C) Forest Protection; D) Wildlife Management; E) Urban Tree Care. Prereq: permission of instructor and student's adviser. 1 to 3 cr.

FORT 297. Work Experience

Career-related employment (12 weeks, generally in the summer following freshman year) in a forestry, urban tree care, or other department-approved natural resources area. Cr/F.

Horticultural Technology

HT 201. Freshman Seminar

An introduction to the horticulture curriculum, to Thompson School and university facilities and resources, and to the art and science of applied horticulture. Guest speakers and field trips provide an overview of internship and career opportunities. Special fee. 2 lec. Cr/F. 1 cr.

HT 204. Plant Propagation

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. 3 cr.

HT 205. Introduction to Plant Materials

Systematics, morphology, and identification of herbaceous and woody plant materials in common use in the horticulture industry in the Northeast. Special fee. 1 lec/1 lab. 2 cr.

HT 207. Plant Structure and Function

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 lec/1 lab. 3 cr.

HT 215. Soils and Land Use

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 lec/1 lab/7 wks. 2 cr.

HT 217. Soils and Plant Nutrition

Role of nutrition in plant health care. Macro- and micro-nutrient needs, nutrition deficiency symptoms, soil testing, and fertilizer application tech-

niques in both soil and soil-less media. Special fee. 3 lec/1 lab/7 wks. 2 cr.

HT 219. Computers in Horticulture

Selection and use of microcomputers in horticulture. Word processing, spreadsheets, database management, and graphics, with emphasis on current applications in the horticulture industry. Special fee. 1 lec/1 lab. 2 cr.

HT 227A, B. Horticultural Facilities Management

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. 2 lec/1 lab. 3 cr.

HT 227C, D. Horticultural Facilities Management

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. 1 cr.

HT 234. Pest Management: Diseases

Introduction to diseases of horticultural crops: causes, symptoms, identification, lifecycles, impacts, and controls. Emphasis on integrated pest management. Special fee. 3 lec/1 lab/7 wks. 2 cr.

HT 236. Pest Management: Insects

Introduction to insect pests of horticultural crops: morphology, identification, lifecycles, impacts, and controls. Emphasis on integrated pest management. Special fee. 3 lec/1 lab/7 wks. 2 cr.

HT 237. Pest Management: Weeds

Introduction to weed pests of horticultural crops: identification, biology, impacts, and controls. Emphasis on integrated pest management. Special fee. 1 lec/1 lab/7 wks. 1 cr.

HT 239. Pest Management: Control Applications

Integrated pest management, cultural, biological, and chemical controls of turf, landscape, greenhouse and field crops. Safe application practices and procedures, and legal implications. Special fee. 1 lec/1 lab. 1 cr.

†HT 240. Introduction to Floral Design

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. 2 lec/2 labs/7 wks. 2 cr.

†HT 243. Floral Design Seminar

Exploration of student-generated design topics through design lab sessions, discussion, and field trips. Also, study and construction of sympathy work such as sprays and casket pieces. Prereq: HT 240 or permission. Special fee. 2 lec/2 labs/7 wks. 2 cr.

†HT 244. Floral Design: Weddings

Color and its use; planning floral pieces for weddings; and comparison of wedding bouquet designs such as colonial, crescent, and cascade. Creation of bouquets during lab sessions. Prereq: HT 240 or permission. Special fee. 2 lec/2 labs/7 wks. 2 cr.

†HT 245. Flower Shop Management

Operation and management of a retail floral enterprise. Site selection, shop layout, products and services, displays, marketing, personnel, and management techniques. Special fee. 2 lec/2 lab/7 wks. 2 cr.

†HT 246. New Directions in Floral Design

Lecture and studio exploration of the wide range of emerging styles and techniques in floral design. Focus varies with student interests and new trends. Prereq: HT 240 or permission. Special fee. 2 lec/2 lab/7 wks. 2 cr.

†HT 250. Flower Show Design and Construction

Design, construction, and maintenance of the Thompson School horticultural exhibit at a public flower show. May be repeated. Special fee. 1 rec. 1 cr.

HT 251. Introduction to Design Communication

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: HT 219. 4-hour lab. 2 cr.

†HT 254. Irrigation Design

Design, installation, and operation of irrigation systems in the greenhouse, nursery, field crops, and landscape. Special fee. 1 lec/1 lab. 2 cr.

†HT 256. Horticultural Pruning

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. 2 cr.

†HT 257. Woody Landscape Plants

Taxonomy, morphology, ecology, and identification of woody plants in common landscape use in the Northeast. Special fee. Prereq: HT 205. 1 lec/1 lab. 2 cr.

†HT 258. Herbaceous Ornamental Plants

Identification, cultural requirements, and design uses of common perennials, annuals, ornamental grasses, herbs, and bulbs found in the Northeast. Prereq: HT 205. Special fee. 2 lec. 2 cr.

HT 260. Grounds Maintenance

Introduction to the principles and practices of maintaining public and private grounds—residential, commercial, institutional, recreational. Field work emphasized. Special fee. 4 hour lab/7 wks. May be repeated for a maximum of two credits. 1 cr.

†HT 261. Interior Plants and Plantscaping

Establishment and maintenance of interior foliage plants in residential and commercial buildings. Identification and cultural requirements of common foliage plants and houseplants. Special fee. 1 lec/1 lab. 2 cr.

†HT 263. Landscape Construction

Materials and methods of landscape construction: grades and grading, drainage, site preparation, pavements, walls and retaining walls, wood structures, transplanting. Introduction to construction drawings, specifications, estimating and bidding. Special fee. Prereq: HT 205, 215. 1 lec/4 hour lab. 3 cr.

HT 265. Turfgrass Maintenance

Installation and maintenance of turfgrass in the Northeast. Turf species selection, site preparation, methods of establishment and turfgrass maintenance.

nance. Emphasis on sustainable approaches to turf culture. Special fee. Prereq: HT 205, 207, 215, 217. 1 lec/1 lab. 2 cr.

†HT 266. **Garden Design and Culture**
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. 2 cr.

†HT 268. **Sustainable Planting Design**
Selection and arrangement of landscape plants in ecologically appropriate, low maintenance designs. Plant tolerance ranges and the importance of site soils, topography, hydrology, climate, and microclimate in creating sustainable landscapes. Prereq: HT 257 or equivalent. Special fee. 1 rec/1 lab. 2 cr.

HT 270. **Grounds Management**
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. 2 cr.

†HT 272. **Landscape Design Studio**
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. 4 cr.

†HT 275. **Floricultural Crop Production**
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. 2 cr.

†HT 276. **Bedding Plant Production**
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. 2 cr.

†HT 280. **Garden Center Management and Nursery Production**
Operation and management of the retail garden center/nursery; site selection, layout, products and services, marketing, and management. Production of container-grown nursery stock for the garden center. Special fee. 2 lec/1 lab. 3 cr.

†HT 284. **Nursery Production and Management**
Production methods for field and container-grown crops, including trees, shrubs, ground covers, and perennials. Site selection and layout, marketing, and management. Prereq: HT 205 and 217. Special fee. 3 lec/1 lab/7 wks. 2 cr.

HT 286. **Fruit and Vegetable Production**
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. 3 cr.

HT 288. **Horticultural Business Management**
Business principles and practices in the formation, operation, and growth of horticultural enterprises. An introduction to marketing, accounting, personnel, and operation management. HT majors only. Special fee. 4 lec. 4 cr.

HT 290. **Senior Seminar**
Workplace and life skills: career entry and advancement, leadership and motivation, continuing education and professional associations, and first-aid training. Special fee. 1 lec. Cr/F. 1 cr.

†HT 291, 292. **Studies**
Independent study and research in a selected area of interest under the guidance of an appropriate member of the faculty/staff. A) Floriculture; B) Floral Design; C) Nursery and Garden; D) Landscape; E) Horticultural Therapy. Special fee. Prereq: permission of instructor and student's adviser. 1 to 3 cr.

†HT 293, 294. **Field Operations**
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. 1 to 3 cr.

HT 297. **Work Experience**
Work experience (12 weeks, generally in the summer following freshman year) in some aspect of the field of horticulture, such as landscaping, greenhouse production, interiorscaping, fruit and vegetable production, floral design. Cr/F.

Associated Courses

†AM 261. **Internal Combustion Engines I**

†AM 262. **Internal Combustion Engines II**

†Fort 264. **Arboriculture**

**Note: Special fees for courses will not be charged to students who have paid the one-time curriculum fee for their specialization.*

†Approved Horticultural Technology electives.

General Education

TSAS Communication

COM 209. **Expository Writing and Reading**
Weekly writing and individual conferences. Frequent reading assignments related to the writing. 3 lec/1 tutorial. 4 cr.

COM 210. **Public Speaking**
Frequent speaking exercises to develop the skill and confidence to speak in a variety of public situations. 2 lec. 2 cr.

COM 211. **Critical Reading**
Frequent readings of short nonfiction and fiction. Class discussions and writing assignments designed to develop skill in reading with critical discernment. 2 lec. 2 cr.

COM 212. **Technical Writing**
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. 2 cr.

COM 291, 292. **Studies in Communications**
A) Writing; B) Literature; C) Technical Reporting. Prereq: permission of instructor and student's adviser. 1 to 3 cr.

TSAS Mathematics

MTH 201. **Math I**
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. 3 cr.

MTH 202. **Math II**
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. 3 cr.

MTH 203. **Algebra and Trigonometry**
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. 3 cr.

MTH 206. **Basic Calculus**
Introductory course in analytical geometry and calculus for students taking technical programs. Prereq: MTH 203. 4 lec. 4 cr.

TSAS Social Science

SSCI 201. **Human Relations**
Learn theories of human behavior and develop skills for applying these concepts in the creation of more effective interpersonal and professional relationships. 4 cr.

SSCI 202. **Social Issues**
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. 4 cr.

SSCI 203. **Environmental Issues and Society**
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. 2 cr.

SSCI 204. **Leadership Effectiveness and Group Performance**
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. 2 cr.

SSCI 291. **Studies in Social Science**
For students who have the interest and preparation to carry out an individual project of supervised research/externship on a specific social science topic. May be repeated for credit. 1 to 4 cr.

Agricultural Mechanization

AM 251. **Welding and Fabrication Technology**
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. 4 cr.

AM 261. Internal Combustion Engines I

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. 4 cr.

AM 262. Internal Combustion Engines II

Advanced engine principles and theory. Detailed major failure analysis and overhaul techniques. Prereq: permission, AM261 or EDUC 461. 2 lec/2-hr rec. 4 cr.

AM 270. Residential Electricity

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.) 2 cr.

AM 275. Building Science/Residential Construction

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. 4 cr.

AM 280. Technical Computer Literacy/Internet Applications

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. 4 cr.

AM 291, 292. Studies in Agricultural Mechanization

A) Welding; B) Engines; C) Building Construction; D) Electricity; E) Computers. Prereq: permission of instructor and student's adviser. 1 to 3 cr.

Work Experience**297. Work Experience**

A career-related work experience required of all students in the day program of the Thompson School. Guidelines for meeting the requirements are set by each curriculum. Cr/F.

General Education Electives

When electives are allowed within the Thompson School general education requirement, or within a technical specialization, students are encouraged to elect courses from other disciplines at the Thompson School or from the University's general education program. This program offers a vast array of subjects in quantitative reasoning, science and technology, historical perspectives, foreign cultures, fine arts, social sciences, and literature.

University of New Hampshire at Manchester (UNHM)

Professor: Karol A. LaCroix

UNHM Professors: Deborah Brown,

Thaddeus M. Piotrowski, John P. Resch

UNHM Associate Professors: Thomas D.

Birch, John J. Cerullo, Michael Contarino,

Ralph W. Draper, David A. Forest, Gary S.

Goldstein, Jeffrey F. Klenotic, Robert L.

Macieski, Fred Metting, Stephen R. Pugh, Terry

M. Savage, John E. Sparrow, Susan A. Walsh,

Richard A. Zang

UNHM Assistant Professors: Ann E.

Donahue, Lorraine D. Doucet, Jack E. Hoza,

Barbara J. Jago, Roberta Kieronski, John F.

McCarthy, John A. Niesse, Alison K. Paglia,

Susanne F. Paterson, Gail Rondeau, Karla E.

Vogel, Carolyn B. White

UNHM Adjunct Assistant Professor: Peter

Haebler

UNHM Lecturers: Arkady Belozovsky,

Carolyn M. Bradley

The following courses are normally offered only at the University of New Hampshire at Manchester. For more information, see page 123 or contact UNHM at University Center, 400 Commercial Street, Manchester, NH 03101, phone (603) 641-4321; fax (603) 641-4305; TTD/TTY (603) 641-4308.

Administration

ADM 400. Introduction to Business

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. 4 cr.

ADM 430. Introduction to Business Statistics

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 639; MATH 644; PSYC 402; SOC 502. 4 cr.

ADM 532. Introduction to Financial Accounting

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. 4 cr.

ADM 533. Introduction to Managerial Accounting

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. Prereq: ADM 532. 4 cr.

ADM 601. Financial Management

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. 4 cr.

ADM 610. Marketing Principles and Applications

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. 4 cr.

ADM 620. Organizational Behavior

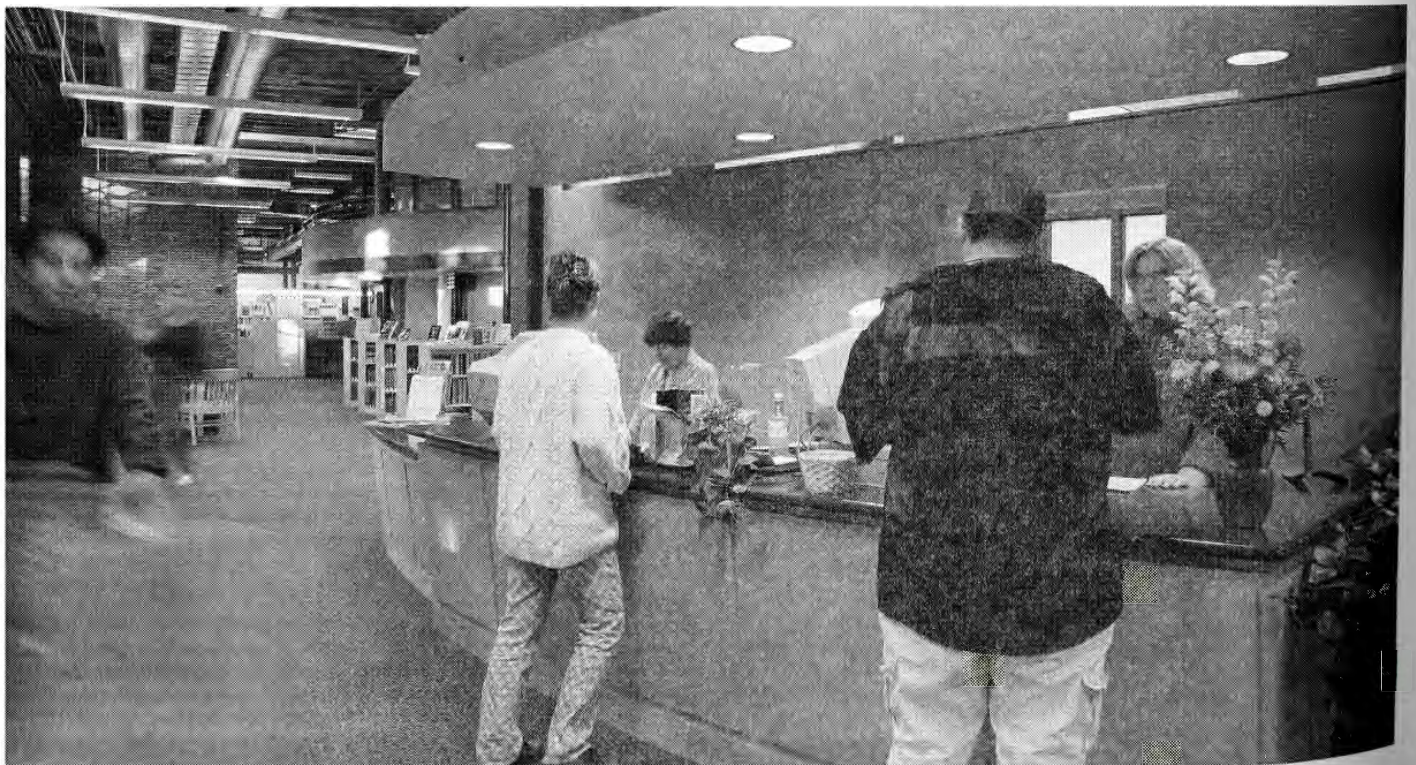
Applications of behavioral science concepts to work settings. Topics include worker incentives and perceptions toward work, group versus individual decision making, conflict resolution, interpersonal and leadership skills, and the study of other behaviors relevant to effective managing of a business organization. Prereq: Completion of Introductory Business Core or permission. 4 cr.

ADM 650. Operations Management

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. 4 cr.

ADM 675. Special Topics Business Administration

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. 4 cr.



ADM 695. Independent Study in the Political Economy of Business

Independent study exploring a special topic emphasizing the political and economic context within which business decisions are made. Prereq: permission of instructor. 1 to 4 cr.

ADM 701. Business, Government and Society
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: senior standing or permission. Writing intensive. 4 cr.

ADM 750. Business Internship Seminar

A seminar course in which students report on and discuss their business internship experiences. Selected group readings and written and oral student presentations. Prereq: senior standing or permission. 4 cr.

ADM 760. Applied Senior Project

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: senior standing or permission. 4 cr.

ADM 770. Special Topics Senior Seminar

In-depth exploration into the theoretical and applied aspects of a special business topic. Topics vary according to instructor. Prereq: senior standing or permission. 4 cr.

American Sign Language**ASL 435. American Sign Language I**

Introduction to American Sign Language with emphasis on visual receptive and expressive skills using mime, gesture, facial expression, and ASL grammatical constructions and linguistics. Participants develop their skills through videotapes, classroom participation, and readings that cover issues important to the deaf community. Limited to 15 students. Special fee. No credit if credit has been received for COMM 533. 4 cr.

ASL 436. American Sign Language II

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. Prereq: ASL 435 or program evaluation. Limited to 15 students. No credit if credit has been received for COMM 733. 4 cr.

ASL 530. American Sign Language Lab

Opportunity to focus on enrichment activities in an ASL language lab. Class is conducted entirely in ASL; instructors provide continual evaluation of and feedback on language skills. Prereq: ASL 435 and 436 or program evaluation. 2 cr.

ASL 531. American Sign Language III

Continuation of ASL 436. Expands on ground-work 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. 4 cr.

ASL 532. American Sign Language IV

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. 4 cr.

ASL 599. Special Topics in American Sign Language/Deaf Studies

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 if topics differ. 1 to 4 cr.

ASL 621. Advanced American Sign Language Discourse for Interpreters

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. 4 cr.

Biology**BIOL 413. Principles of Biology I**

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. 4 cr.

BIOL 414. Principles of Biology II

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. 4 cr.

BIOL 520. Our Changing Planet

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 credit if credit earned for ENE 520. 4 cr.

Biological Science**BSCI 405. Diversity of Life**

Survey of ecology, evolution, genetics, and the diversity of life. Emphasis on basic biological principles. For nonbiological 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. 4 cr.

BSCI 406. Human Organism

Survey of biological chemistry, molecular and cell biology, and major plant and animal systems. Emphasis on basic biological principles. For nonbiological 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. 4 cr.

BSCI 421. Diseases of the 21st Century

Provides a basic understanding of several diseases

that may be prevalent over the next century. Treatment and prevention are discussed. Students will acquire a basic understanding of research methodologies underlying several fields within the biological sciences, including microbiology, immunology, and molecular biology. Agents of biological warfare are also discussed. This class is offered in the traditional classroom and online, using Blackboard. 4 cr.

BSCI 422. Biotechnology and Society

Provides a basic understanding of genetic engineering, including 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; students will state their personal opinions on each issue. This class is offered in the traditional classroom and online, using Blackboard. 4 cr.

Communication Arts**CA 501. Internship/Communication in the Urban Community**

Provides opportunities for field-based learning experiences. Connects students to the urban community and integrates their classroom education within a business or organizational setting where the communication practice of their interest is the focus of everyday activity. Students work under the direction of a faculty adviser 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 adviser and are expected to promote critical reflection on the connections between on-site learning experiences and related coursework in the Communication Arts curriculum. Open to matriculated students with a GPA of 2.5 or better and junior standing who have completed CMN 455, 456, and 457. May be repeated for up to 8 credits, with 4 credits maximum accepted toward satisfaction of requirements for the CA major. Cr/F. 1 to 4 cr.

CA 502. Image and Sound

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. 4 cr.

CA 503. Techniques for News Reporting

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. 4 cr.

CA 504. Film Criticism

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. 4 cr.

CA 506. Gender

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. 4 cr.

CA 508. Conflict in Relational Communication

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. 4 cr.

CA 510. Language and Interaction

Examines how identities, relationships, and social realities are constituted through language and interaction. Specific topics include perception, meaning, metaphor, power, gender, illness, and the environment. Prereq: CMN 457 or permission. 4 cr.

CA 512. Scriptwriting

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. 4 cr.

CA 513. Radio News Production

Theory and practice of producing news stories for radio. Covers the research, organization, and technical skills necessary to produce a basic three-and-a-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. 4 cr.

CA 514. Fundamentals of Video Production

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, CMN 455; or permission. Preference given to CA majors. Special fee. 4 cr.

CA 515. Advanced Video Production

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. Special fee. 4 cr.

CA 516. Speechwriting

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. 4 cr.

CA 520. Special Topics in Applied Communication

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. 1 to 4 cr.

CA 525. Media Programming

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. 4 cr.

CA 526. Organization of Newswork

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. 4 cr.

CA 527. History of Film

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. 4 cr.

CA 528. Media Policy and Law

Nature, scope, history and current practice of federal regulation over broadcast and related telecommunications media. Emphasis on FCC policies and procedures in the United States with some coverage of comparative regulatory systems. Prereq: CMN 455 or permission. 4 cr.

CA 530. Celluloid Relationships

Considers the complex dialogue between filmic representations of relationships and lived experience. Topics include ethnicity, sexuality, class, gender, friendship, marriage, family, conflict, and intercultural relationships. Hollywood, independent, and foreign films are screened. Prereq: CMN 457 or permission. Special fee. 4 cr.

CA 531. History and Organization of Advertising

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. 4 cr.

CA 535. Marital Communication

Introduces students to the study of communication in marital relationships. Examines the major theoretical orientations that characterize the mar-

riage 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. 4 cr.

CA 539. Communicating in Families

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. 4 cr.

CA 550. Special Topics in Communication Organization, History, and Policy

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. 1 to 4 cr.

CA 600. Research Methods in Media

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 courses from both areas A and B for which CMN 455 is prerequisite or permission. Writing intensive. 4 cr.

CA 601. Research Methods in Relational Communication

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 courses from both areas A and B for which CMN 457 is prerequisite or permission. 4 cr.

CA 610. Communication Technologies and Culture

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 subcultural appropriations of media forms and content. Prereq: any two courses from both areas A and B for which CMN 455 is prerequisite or permission. Writing intensive. 4 cr.

CA 611. Theories of Relational Communication

Critically examines a variety of theories which seek to explain the dynamics of interpersonal relationships including performance theory, racial

construction theory, systems theory, feminist theory, and narrative theory. Prereq: any two courses from both areas A and B for which CMN 457 is prerequisite or permission. Writing intensive. 4 cr.

CA 612. Narrative

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 courses from both areas A and B for which CMN 457 is prerequisite or permission. Writing intensive. 4 cr.

CA 615. Film History/Theory and Method

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 courses from both areas A and B for which CMN 455 is prerequisite or permission. Special fee. Writing intensive. 4 cr.

CA 617. Aesthetic Theory in Moving Image Media

Major theoretical approaches to film and video as modes for art, social communication, and cultural representation. Provides access to the work of important film and video artists and examines this work in relation to readings in aesthetic and cultural theory. Prereq: any two courses from both areas A and B for which CMN 455 is prerequisite or permission. Special fee. 4 cr.

CA 618. Documentary

Exploration of the epistemological status, historical development, ethics, funding, sociocultural significance, and communication strategies of documentary film and video. May focus on a particular genre or genres. Prereq: any two courses from both areas A and B for which CMN 455 is prerequisite or permission. Special fee. Writing intensive. 4 cr.

CA 720. Seminar

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. 4 cr.

CA 795. Independent Study

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. 1 to 4 cr.

Computer Information Systems

CIS 411. Introduction to Computer Applications
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. 4 cr.

CIS 425. Introduction to Computer Programming

This course is an introduction to computer programming and problem solving. This course will be divided into two parts. The first will cover algorithm development using Qbasic in the DOS environment. Emphasis will be on variables, expressions, iteration, conditionals, functions and files. The second will integrate the procedural techniques learned in part one into the event-driven Windows environment using Visual Basic. Emphasis will be Graphics User Interface issues and their relation to sub-programs. Assignments are drawn from applications in a wide range of business contexts. Students need familiarity with the Win95 operating system. Completion of CIS 411 is recommended. No credit for students who have completed CS 505. Special fee. 4 cr.

CIS 490. Doing Research on the Internet

This course will investigate the various resources and Internet tools for the purposes of research and documentation. Students will learn to use resources available through Telnet, FTP, Listserves, Usenet, and WWW to locate specific topics of research interest. Searching techniques and criteria for evaluating the document's credibility will also be covered. Lab activities are designed to locate, document, and evaluate the electronic materials. No previous computer experience is necessary. 1 cr.

CIS 495. Introduction to Web Authoring

This course provides an overview of the basic steps for creating Web documents. Topics include using HTML syntax conventions, techniques to format text and page elements, present graphics, create internal and external links, and organize the page content with lists and tables. Students will also learn the file structure for organizing a web site. A basic text editor is used to enter HTML code. Students should be familiar with Windows98 and a browser. No credit for students who have completed CS 403. 1 cr.

CIS 510. Computer Information Systems

Investigates the role and impact of computer applications on information systems in general and specifically as applied to business requirements. Surveys the components of an information system; explores information systems in areas such as manufacturing, medicine, education, and government; discusses the issues of computerizing information resources. Directs attention to information systems in business and identifies the need for and function of formal systems development methodologies. Students investigate the steps involved in transaction processing and develop a prototype of a business information system using a DBMS application. Prereq: CIS 411, CS 406, CIS 415; or permission. 4 cr.

CIS 515. Multimedia: Introduction and Applications

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 cur-

rent hypertext, and multimedia applications in education and business. Students gain practical experience in developing multimedia applications on the Macintosh platform. 4 cr.

CIS 520. Database Management Concepts

Introduces students to the basic concepts of file and database organization. Special emphasis on understanding the steps involved in designing a database and using a relational model to define, search, report, and maintain a database. Discusses database security, integrity, and concurrency control. Also addresses the current trends in database development, such as distributed databases, natural language processing and expert systems, and object oriented databases. Emphasis focused on the design and use of a relational model with practical experience using a DBMS application. Prereq: CIS 411; or permission. 4 cr.

CIS 542. Operating System Applications

Introduction to operating system concepts with relevant lab experiences. Operating systems for both micro- and mainframe computers; available utilities; the generation of batch files for operation of a LAN. Operating systems covered may include MS-DOS, UNIX, and VAX VMS. Prereq: CIS 411; CS 406; or permission. 4 cr.

CIS 590. Introduction to Javascript

An introduction to Javascript for adding interactivity to web pages. The course will survey the basic language features including data types, statements, functions, control structures, objects and events. Students will learn to code specific enhancements to a web page such as pop-up windows, rolling banners and cookies. Basic understanding of HTML is required and additional programming experience and/or one of the following: CS 403, 410, CIS 425, 495. 2 cr.

CIS 599. Special Topics

Topics covered will vary depending on contemporary computer topics, programmatic need, availability and expertise of faculty. Barring duplication of subject, may be repeated for credit. 1 to 4 cr.

Economics

ECN 411/411W. Introduction to Macroeconomic Principles

Studies how an economy functions. Develops measures and theories of economic performance to study such issues as unemployment, inflation, international trade and finance, and the level of national production. Examines government policies designed to correct for unemployment and inflation with close attention to the use of fiscal and monetary policies in the U.S. No credit for students who have received credit for ECON 401. 411W is writing intensive. 4 cr.

ECN 412/412W. Introduction to Microeconomic Principles

Studies the behavior and interaction of fundamental decision-making units in an economy, especially consumers and business firms. Applies such economic principles as scarcity, supply and demand, and elasticity to a variety of social issues. Topics include the resource allocation problems of households and business firms, economic theories of social problems (such as crime, divorce, and discrimination), and the economic implications of government policies affecting the environment, the workplace, and industrial organization. No credit for students who have received credit for ECON 402. 412W is writing intensive. 4 cr.

ECN 540. Law and Economics

Study of various concepts, functions, and implications of law from an economic perspective. Topics include economic theories of property, contract, tort, crime and punishment; implications for resource allocation of laws related to product liability, taxation, work, education, housing, patents, and the environment are examined using tools of economic analysis. Prereq: ECON 402; ECN 412; or permission of the instructor. No credit toward any major at the Whittemore School. 4 cr.

ECN 635. Money, Banking and Macroeconomic Activity

A study of the financial sector of the economy including commercial banks, thrifts, and other depository institutions. Examines the meaning and determinants of the money supply, credit and interest rates. Close attention paid to the role of the Federal Reserve and the economic effects of its monetary policy. Prereq: ECN 411, ECN 412. 4 cr.

Engineering Technology**ET 601. Data Structures and Data Bases**

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. 4 cr.

ET 627. Advanced Developmental Theory of E-Commerce

Beyond Web page development lies a complex emerging technology related to successfully conducting e-commerce within the Internet. Business and programming trends are studied and applied to the project developed in class. Testing of concepts with current commercial software provides hands-on evaluations for analysis and comparison. Prereq: ET 601 or intermediate programming skills with Web pages and databases or permission. Languages used will be at the instructor discretion and student interest. 4 cr.

ET 630. Analytical Methods in Engineering Technology

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. 3 cr.

ET 639. Heating, Ventilation and Air Conditioning I

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. 4 cr.

ET 640. Heating, Ventilation and Air Conditioning II

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. 4 cr.

ET 641. Production Systems

Market forecasting; waiting line theory; manufacturing inventories and their control; production scheduling; quality control. Prereq: differential and integral calculus. 4 cr.

ET 644. Mechanical Engineering Technology Concepts in Analysis and Design

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. 4 cr.

ET 647. Advanced Perspectives on Programming

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. 4 cr.

ET #649. Production Tooling and Processes

A design course offered as an alternative to ET 644, Mechanical System Design. Application of CAD and related techniques to three design projects which emphasize mechanical, electrical, pneumatic, and hydraulic systems. Five field trips to manufacturing companies. Three possible projects might be: 1) design a machine tool, including all electrical/electronic control systems to ensure proper operation, measurement, and MIS log interfacing; 2) design a tooling complex for making a part or assembly, including tolerancing, failure detection, JIT, visual inspection, and ease of maintenance; 3) design a material handling system to ensure production rate requirements, ergonomics, safety, scrap processing, and packaging. 4 cr.

ET 667. Graphics and Animation

The fields of graphics and animation are critical to programming applications. Advanced display techniques of information are critical to the success of many programmed applications. Current technology will be used in intensive hands-on projects. Prereq: ET 601 or intermediate programming skills in two or more of the following languages: Java, C++, Visual Basic, Visual C++ Windows, Visual Basic.Net and C# as well as intermediate level skills in data structures or by permission. 4 cr.

ET 671. Digital Systems

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. 4 cr.

ET 674. Control Systems and Components

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. 4 cr.

ET 675. Electrical Technology

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. 4 cr.

ET 677. Analog Systems

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. 4 cr.

ET 680. Communications and Fields

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. 4 cr.

ET 695. Independent Study

Individual reading, writing, or laboratory work carried out under the tutelage of a faculty member. Prereq: approval of the adviser. 1 to 4 cr.

ET 696. Topics in Mechanical Engineering

New or specialized courses not covered in regular course offerings. Prereq: permission. May be repeated to a maximum of 4 credits. 1 to 4 cr.

ET 697. Topics in Electrical Engineering

New or specialized courses not covered in regular course offerings. Prereq: permission. May be repeated to a maximum of 4 credits. 1 to 4 cr.

ET 706. Internship

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. Cr/F. 1 to 4 cr.

ET 707. Object Oriented Design and Documentation

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. 4 cr.

ET 733. Business Organization and Law

Corporations; proprietorships; product liability; contracts; federal agencies; commercial paper; conditions of employment; business ethics; bankruptcy; U.C.C. Special fee. Writing intensive. 4 cr.

ET 734. Economics of Business Activities

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. 4 cr.

ET 737. Web Server Databases

Multiple tiered database design and commercial databases are the focus of study. Practical application programs provide hands-on experiences. Prereq: ET 627 or by permission. 4 cr.

ET #745. Instrumentation

Statistics of experimentation; quantity standards and measurement; design of experiments; use of laboratory gear including dynamometers; field trips. Prereq: differential and integral calculus; ET 644 or equivalent. Lab. 4 cr.

ET 747. User Interface Design

Standards in user interface design of programs applied to practical programming applications. Consistency in look and feel often forms the core of software certification requirements. Prereq: intermediate Graphic User Interface programming skills in one or more of the following languages: Java, Visual Basic, Visual C++ Windows, Visual Basic.Net and C# or permission. 4 cr.

ET #750. Computer Integrated Manufacturing

Introduction to the basic concepts of manufacturing complex products with complex processes. This manufacturing implies a strong use of, and reliance on, the computer and data processing technologies. All aspects relative to product and process: planning, design, manufacturing, and shipping are addressed from a variety of perspectives. Elements of the production interfaces among these elements are defined. Methods and techniques for studying, managing, and engineering productivity are explored. 3 cr.

ET 751. Mechanical Engineering Technology Project

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. 4 or 8 cr.

ET 762. Illumination Engineering

Radiation; spectra, wave, and particle nature of light; physics of light production, light sources and circuits, luminaires; science of seeing, color theory, control of light, measurements, light and health, lighting calculations. Prereq: MATH 426, PHYS 408 or equivalent. Lab. 4 cr.

ET 763. Lighting and Design Applications

Lighting design process, modeling, interior and exterior lighting calculation and design, flux transfer, form and configuration factors, lighting quality and aesthetics, daylighting calculations, lighting economics, lighting power and energy analysis, selected applications of light in interior and exterior spaces. Prereq: ET 762 or equivalent. 2 or 4 cr.

ET 777. Advanced Distributed Programming Trends

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. 4 cr.

ET 783. Advanced Electronic Design Methods

Design methods for analysis and synthesis of state-of-the-art circuits and systems, with real-world examples. A design project will be required. Laboratory work will form an important part of the course. Prereq: intro. analog and digital design. Special fee. Lab. 4 cr.

ET 787. Artificial Intelligence and Expert Systems

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. 4 cr.

ET 790. Microcomputer Technology

Microcomputer systems design, including assembly language, interfacing, processor timing and loading, and interprocessor 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. 4 cr.

ET 791. Electrical Engineering Technology Project

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. 4 or 8 cr.

English Composition and Writing**ENG 301. Introduction to College Composition and Reading**

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. 4 cr.

Humanities**HUMA 411. Humanities I**

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. 4 cr.

HUMA 412. Humanities II

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. Special fee. Writing intensive. 4 cr.

HUMA 519. Humanities: Classical Greece

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 concentration. Special fee. 4 cr.

HUMA 520. Age of Mozart

Introduction to the literature, political writings, and historical developments of the period 1756-1791, the years of Wolfgang Amadeus Mozart's life. Materials from different fields—music, literature, theatre, film, political theory, and philoso-

phy—to explore the life and work of the composer and the times in which he lived. Examines topics such as individualism, political revolution, the beginnings of romanticism, the revolution in science and technology, and changes in economics and economic theory in readings and appropriate video and audio materials. No background in classical music is needed. 4 cr.

HUMA 622. Studies of Freedom and Liberty

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. 4 cr.

HUMA #625. Social Justice in America

Introduction to theories of social justice and examination of historical examples of the law, economy, society, and public policy affecting social justice from the Colonial period to the present. 4 cr.

HUMA 630. Development of Early Christianity

Examines the emergence of Western Christianity. Explores primary literature relating to religious concepts and theological positions during the first centuries of the Church from the Pauline letters, through the period of Roman Emperor Constantine, culminating in the writings of Augustine, Bishop of Hippo. Considers both Christian and non-Christian texts and assesses the forces that helped to shape the fledgling religion. Gives special attention to social, political, and cultural influences. 4 cr.

HUMA 632. Beginning and the End of the Western World: Genesis and Revelation in Western Humanities

Genesis and Revelation examined for the biblical views of history and time in general and then an exploration of various interpretations of this material in Western thought. After a careful reading of the texts, students examine how themes in these biblical works have influenced art and architecture, literature, science, history, and culture. Advantageous for students in English, literature, history, and humanities as well as for individuals who want a non-doctrinal reading of selections from one of the most influential literary works in the West. Special fee. 4 cr.

HUMA 640. Birth of Rock and Roll

An interdisciplinary study of the cultural forces that brought the birth of rock and roll in the 1950's. This study of prerock music and culture will be further enriched by art, literature, and photography which focuses on the roots of rock and roll. Writing intensive. 4 cr.

HUMA 645. American Culture and Communication Through the Life and Work of F. Scott Fitzgerald

Investigates the development of 20th Century American culture and communication through the prism of F. Scott Fitzgerald. A major writer, social observer, employee of the advertising and film industries and prominent public figure, Fitzgerald's life and work provide a rich context for examining various dimensions of American culture and for exploring the nature of authorship as an aspect of communication. Topics covered include: modernity, the rise of mass media, consumerism, social class, imperialism, mechanization, gender, youth culture and generational identity. Prereq: One 400- or 500-level HUMA course. 4 cr.

HUMA 660. Moral Dimensions of Economic Life

Interdisciplinary examination of the moral implications of economic decisions, practices, issues, and events from ancient and modern perspectives. Topics include morality of trade, interest, profit, entrepreneurship, corporate takeovers, poverty, and wealth. Materials include philosophical and religious works (Aristotle, St. Thomas Aquinas), drama (Shakespeare), art and literature (Andy Warhol, Theodore Dreiser, F. Scott Fitzgerald), economics and history (Adam Smith, Jacob Viner), and films (Werner Herzog). 4 cr.

HUMA 680. New England Culture: Roots and Branches

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. 4 cr.

HUMA 795. Study of Creativity

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. 4 cr.

HUMA 796. Study of Contemporary Issues

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. 4 cr.

Sign Language Interpreting**INTR 430. Introduction to Interpretation**

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. 4 cr.

INTR 438. A Sociocultural Perspective on the Deaf Community

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. 4 cr.

INTR 439. Ethics and Professional Standards for Interpreters

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 pro-

fessional 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. 4 cr.

INTR 539. Comparative Linguistic Analysis for Interpreters

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. 4 cr.

INTR 540. Principles and Practices of Translation

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. 4 cr.

INTR 599. Special Topics

Occasional offerings dependent on availability and interest of faculty. Barring duplication of subject, may be repeated for credit. 1 to 4 cr.

INTR 630. Principles and Practices of Consecutive Interpretation

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. 4 cr.

INTR 636. Principles of Simultaneous Interpretation

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. 4 cr.

INTR 658. Deaf/Hearing Cultural Dynamics

Deaf culture and mainstream American culture compared, contrasted, and analyzed from a variety of perspectives. Cultural interactions between deaf and hearing people are examined, and students will explore potential cultural conflicts between deaf and hearing people. This course is team taught by deaf and hearing instructors, and is conducted primarily in ASL. Students also engage in a research project related to course content. Prereq: ASL 532; INTR 438. 4 cr.

INTR 732. Simultaneous Interpretation of Discussions, Speeches, and Reports

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. 4 cr.

INTR 734. Field Experience and Seminar I

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. 4 cr.

INTR 735. Field Experience and Seminar II

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. 4 cr.

INTR 744. Principles and Practices of Transliteration

Introduces the theory and practice of literal transliteration. Students analyze pre-prepared transliterations to discover how expert transliterators produce semantically correct messages in signed and spoken English which are equivalent to the source texts. They will then produce transliterations which are semantically and pragmatically equivalent to the source texts. Students engage in a research project related to course content. Prereq: INTR 636. 4 cr.

INTR 798. Special Topics

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 pre-registration. Students engage in a research project related to course credit. Prereq: INTR 636; permission. May be repeated for credit if topics differ. 4 cr.

UNHM Independent Study**UMIS 599. Independent Study**

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. 1 to 4 cr.

UNHM Special Topics**UMST 500. Internship**

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. Cr/F. 1 to 4 cr.

UMST 521. Tutor Development

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; Cr/F. Prereq: permission of instructor is required. 2 or 4 cr.

UMST 522. Tutor Development II

This interdisciplinary course, team-taught by the director and assistant director of the learning center, expands and deepens undergraduate preparation for peer tutoring. Students study theories of adult development, learn additional approaches to tutoring in their discipline(s), and practice their tutoring and communication skills. Cr/F. Prereq: permission of instructor. 2 or 4 cr.

UMST 599. Special Topics

Occasional offerings dependent on availability and interest of faculty, barring duplication of subject, may be repeated for credit. 1 to 4 cr.

In addition to the above courses, the following courses are regularly offered at the University of New Hampshire at Manchester. Descriptions of these courses can be found in the department listings elsewhere in this catalog.

ANTH 411W

ARTS 480, 501, 532, 536, 544, 546, 551, 567, 570, 571, 572, 573, 574, 601, 608, 632, 633, 646, 651, 657

BCHM 658, 659

BIOL 541, 604

CHEM 403-404, 545, 546

CMN 455, 456, 457, 500

CS 403, 407, 410

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ESCI 401, 409

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MUSI 401, 511

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PHYS 407-408

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THDA 435, 450

WS 401

ZOOL 402

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University Librarian

Claudia J. Morner, Ph.D.

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FACULTY

(This list is current as of January 1, 2003. The date of appointment appears in parenthesis following the faculty member's name.)

Aber, John D. (1987)

Professor of Natural Resources and Earth, Oceans, and Space and Complex Systems Research Center; B.S., Yale University, 1971; M.F.S., Yale School of Forestry, 1973; Ph.D., Yale University, 1976.

Abrams, Eleanor D. (1994)

Associate Professor of Education; B.S., University of Massachusetts at Amherst, 1983; Ph.D., Louisiana State University, 1993.

Afolayan, Funso (1996)

Associate Professor of History; B.A., University of Ife, Nigeria, 1980; M.A., Obafemi Awolowo University, Nigeria, 1984; Ph.D., *ibid.*, 1991.

Aikins, Janet (1979)

Professor of English; B.A., Grinnell College, 1972; M.S., University of Chicago, 1973; Ph.D., *ibid.*, 1980.

Aitkenhead-Peterson, Jacqueline Ann (2002)

Research Assistant Professor of Natural Resources; B.Sc., University of Stirling, Scotland, 1995; M.Sc., University of Aberdeen, Scotland, 1996; Ph.D., University of New Hampshire, 2002.

Alexander, Lee (2000)

Research Associate Professor of Ocean Engineering; Ph.D., Yale University, 1986.

Alibrio, Eugene P. (1999)

Thompson School Assistant Professor of Food Service Management; A.O.S., Culinary Institute of America, 1974; B.A., Rhode Island College, 1973; M.S., Rochester Institute of Technology, 1998.

Amato-wierda, Carmela C. (1995)

Assistant Professor of Materials Science; B.A., Harvard University, 1988; Ph.D., Rensselaer Polytechnic Institute, 1993.

Andrew, David S. (1976)

Professor of Art History and the Humanities; B.A., University of Michigan at Ann Arbor, 1965; M.A., *ibid.*, 1968; Ph.D., Washington University, 1977.

Andrew, Michael D. (1966)

Professor of Education; B.S., Cornell University, 1960; A.M.T., Harvard University, 1961; Ed.D., *ibid.*, 1969.

Annicchiarico, Michael J. (1991)

Associate Professor of Music; B.M., University of New Hampshire, 1976; M.F.A., Brandeis University, 1981; Ph.D., *ibid.*, 1993.

Appel, Kenneth I. (1993)

Professor of Mathematics; B.S., Queens College, City University of New York, 1953; M.A., University of Michigan at Ann Arbor, 1956; Ph.D., *ibid.*, 1959.

Archer, John M. (1996)

Associate Professor of English; B.A., University of Toronto, Canada, 1982; M.A., *ibid.*, 1983; Ph.D., Princeton University, 1988.

†**Babbitt, Kimberly J.** (1996)

Associate Professor of Wildlife Ecology; B.S., University of New Hampshire, 1984; M.S., Texas A & M University, 1988; Ph.D., University of Florida, 1996.

Baber, Kristine M. (1984)

Associate Professor of Family Studies; B.A., Southern Illinois University at Carbondale, 1970; M.A., University of Connecticut, 1981; Ph.D., *ibid.*, 1983.

Bacon, Charlotte M. (1998)

Assistant Professor of English; B.A., Harvard University, 1988; M.F.A., Columbia University, 1994.

Bailey, Brigitte Gabcke (1987)

Associate Professor of English; B.A., University of Virginia, 1977; A.M., Harvard University, 1980; Ph.D., *ibid.*, 1985.

†**Baker, Alan L.** (1972)

Associate Professor of Plant Biology(Phycology); B.A., State University of New York at Binghamton, 1965; Ph.D., University of Minnesota, 1973.

Baldwin, Kenneth C. (1982)

Professor of Mechanical Engineering and Ocean Engineering and Director, Center for Ocean Engineering; B.S.M.E., Northeastern University, 1973; M.S.M.E., University of New Hampshire, 1977; Ph.D., University of Rhode Island, 1982.

Ballester, Thomas P. (1983)

Associate Professor of Civil/Environmental Engineering; B.S.C.E., Pennsylvania State University, 1975; M.S.C.E., *ibid.*, 1977; Ph.D., Colorado State University, 1981.

Balling, L. Christian (1967)

Professor of Physics; B.A., Oberlin College, 1960; M.A., Harvard University, 1961; Ph.D., *ibid.*, 1965.

Banach, Mary (1995)

Associate Professor of Social Work; B.A., University of Wisconsin at Milwaukee, 1975; M.S.W., New York University, 1978; D.S.W., Columbia University, 1995.

Banyard, Victoria L. (1995)

Associate Professor of Psychology; B.A., Brown University, 1988; M.A., University of Michigan at Ann Arbor, 1990; Ph.D., *ibid.*, 1994.

Barber, Heather (1993)

Associate Professor of Kinesiology; B.S., St. Lawrence University, 1978; M.S., Pennsylvania State University, 1982; Ph.D., University of Oregon, 1992.

Barcelona, Robert J. (2003)

Assistant Professor of Recreation Management and Policy; B.A., University of Mississippi, 1993; M.S., Indiana University at Bloomington, 1995; Ph.D., *ibid.*, 2001.

Barkey, Dale P. (1987)

Professor of Chemical/Environmental Engineering; B.A., Clark University, 1979; M.S., University of Cincinnati, 1982; Ph.D., University of California at Berkeley, 1987.

Barnett, Carole K. (1994)

Associate Professor of Management; B.A., University of Michigan at Ann Arbor, 1989; M.A., *ibid.*, 1992; Ph.D., *ibid.*, 1994.

Barney, Dwight E. (1971)

Thompson School Associate Professor of Applied Animal Science; B.S., University of New Hampshire, 1966; M.S., *ibid.*, 1971.

Barretto, Timothy E. (1986)

Thompson School Associate Professor of Communications; B.A., University of New Hampshire, 1974; M.A., *ibid.*, 1982.

Bartlett, David S. (2001)

Associate Director, Institute for the Study of Earth, Oceans, and Space, Director of N.H. Space Grant Program and Research Professor of Earth, Oceans, and Space; B.A., Amherst College, 1971; Ph.D., University of Delaware, 1979.

Bartos, Radim (1997)

Assistant Professor of Computer Science; M.S., Czech Technical University, 1987; M.S., University of Denver, 1996; Ph.D., *ibid.*, 1997.

Basterra, Maria (2001)

Assistant Professor of Mathematics; B.S., University of Texas at Austin, 1992; M.S., University of Chicago, 1993; Ph.D., *ibid.*, 1998.

Bauer, Christopher F. (1981)

Professor of Chemistry; B.S., University of Notre Dame, 1974; M.S., University of Illinois at Urbana-Champaign, 1976; Ph.D., Colorado State University, 1979.

†**Bean, Christine L.** (1990)

Assistant Professor of Medical Laboratory Science; B.S., University of New Hampshire, 1982; M.B.A., New Hampshire College, 1993.

Becker, Mimi Larsen (1993)

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Becker Blease, John R. (2001)

Assistant Professor of Accounting; B.A., University of New Hampshire, 1993; M.S., University of Florida, 1996; Ph.D., University of Oregon, 2001.

Bedker, Patricia D. (1985)

Associate Dean of the College of Life Sciences and Agriculture and Associate Professor of Animal Science and Adult Education; B.S., University of Massachusetts at Amherst, 1974; M.S., University of New Hampshire, 1980; Ph.D., Cornell University, 1985.

‡**Belford, Mary Kathleen** (1995)

Lecturer in Spanish; B.S., California State College of Pennsylvania, 1970; M.A., West Virginia University, 1972.

Bellamy, Elizabeth Jane (1993)

Professor of English; B.A., Goucher College, 1972; M.A., Duke University, 1973; Ph.D., *ibid.*, 1982.

Beller-McKenna, Daniel (1998)

Assistant Professor of Music; B.A., Temple University, 1985; M.M., *ibid.*, 1988; M.A., Harvard University, 1991; Ph.D., *ibid.*, 1994.

Bellinger, Christina (1991)

Associate Professor, Librarian; B.A., Windham College, 1975; M.S.L.S., Simmons College, 1978.

‡**Belozovsky, Arkady** (2001)

UNHM Lecturer of Sign Language Interpretation; B.S., Rochester Institute of Technology, 1997; M.S., *ibid.*, 1999.

Benassi, Victor A. (1982)

Professor of Psychology; B.S., California State College, 1969; M.A., Queens College, City University of New York, 1973; Ph.D., City College of New York, 1974.

Bennett, Albert B., Jr. (1967)

Professor of Mathematics; B.S., Maine Maritime Academy, 1954; B.S., University of Maine at Orono, 1958; M.A., *ibid.*, 1959; Ed.D., University of Michigan at Ann Arbor, 1966.

*Indicates time devoted to Cooperative Extension.

†Indicates time devoted to Agricultural Experiment Station.

‡Indicates part-time status (88–99 percent time).

- Benoit, Jean** (1983)
Professor of Civil Engineering; B.S., Ecole Polytechnique, University of Montreal, 1977; M.S., Stanford University, 1980; Ph.D., *ibid.*, 1983.
- Bérenquier, Nadine S.** (1995)
Associate Professor of French; D.E.U.G., Université De La Sorbonne, France, 1976; Licence, *ibid.*, 1980; M.A., University of Pittsburgh, 1983; Ph.D., Stanford University, 1988.
- Bergeron, Linda Rene** (1997)
Assistant Professor of Social Work; B.A., University of New Hampshire, 1973; M.S.W., University of Connecticut, 1981; Ph.D., Boston College, 1997.
- Bergeron, R. Daniel** (1974)
Professor of Computer Science; Sc.B., Brown University, 1966; Ph.D., *ibid.*, 1973.
- Berglund, N. Per** (2003)
Assistant Professor of Physics; B.Sc., University of Lund, Sweden, 1988; Ph.D., University of Texas at Austin, 1993.
- †**Berlinsky, David L.** (2001)
Assistant Professor of Zoology; B.S., Michigan State University, 1977; M.S., University of New Hampshire, 1981; Ph.D., University of Rhode Island, 1989.
- *†**Berndtson, William E.** (1979)
Professor of Animal Science and Associate Director of Agricultural Experiment Station; B.S., University of Connecticut, 1966; Ph.D., Cornell University, 1971.
- Berona, David A.** (1999)
Assistant Professor, Librarian; B.S., Wright State University, 1974; M.S.L.S., Simmons College, 1990; M.A., University of New Hampshire, 2002.
- Birch, Francis S.** (1972)
Professor of Earth Sciences; A.B., Harvard University, 1958; M.S., University of Wisconsin at Madison, 1964; Ph.D., Princeton University, 1969.
- Birch, Thomas D.** (1987)
UNHM Associate Professor of Economics; B.A., Kenyon College, 1977; M.A., Indiana University at Bloomington, 1980; Ph.D., *ibid.*, 1983.
- Black, Kelly J.** (1994)
Associate Professor of Mathematics; B.S., Rose-Hulman Institute of Technology, 1987; Sc.M., Brown University, 1989; Ph.D., *ibid.*, 1992.
- †**Blakemore, Richard P.** (1977)
Professor of Microbiology; B.S., State University of New York at Albany, 1964; M.S., *ibid.*, 1965; Ph.D., University of Massachusetts at Amherst, 1975.
- *†**Blanchard, Robert O.** (1972)
Professor of Plant Biology (Mycology); B.S., University of Southern Maine, 1964; M.Ed., University of Georgia, 1969; Ph.D., *ibid.*, 1971.
- Blum, Linda M.** (1996)
Associate Professor of Sociology and Women's Studies; B.A., University of California at Los Angeles, 1978; M.A., University of California at Berkeley, 1980; Ph.D., *ibid.*, 1987.
- Bobick, Melvin T.** (1958)
Professor of Sociology; A.B., University of Illinois at Urbana-Champaign, 1949; A.M., *ibid.*, 1952; Ph.D., *ibid.*, 1958.
- †**Bobilya, Dennis J.** (1991)
Associate Professor of Nutritional Sciences; B.S., Purdue University, 1982; M.S., Michigan State University, 1985; Ph.D., University of Missouri, 1989.
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- Selikowitz, Stuart M.** (1987)
Affiliate Professor of Electrical and Computer Engineering; B.A., Rutgers, The State University of New Jersey, 1958; M.D., State University of New York School of Medicine, 1962.
- Sendak, Paul Edwin** (1995)
Affiliate Professor of Natural Resources; B.S., Rutgers University, 1965; M.S., University of Massachusetts at Amherst, 1968; Ph.D., *ibid.*, 1972.
- Shortle, Walter C.** (1996)
Affiliate Professor of Plant Biology; B.S., University of New Hampshire, 1968; M.S., *ibid.*, 1970; Ph.D., North Carolina State University, 1974.
- Shwaery, Glenn T.** (2000)
Affiliate Assistant Professor of Animal and Nutritional Sciences; B.A., Denison University, 1974; M.A., Eastern Michigan University, 1977; Ph.D., University of New Hampshire, 1994.
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Affiliate Professor of Natural Resources; B.A., Pacific Lutheran University, 1969; Ph.D., University of Washington, 1973.
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Affiliate Assistant Professor of Communication Sciences and Disorders; B.S., University of Bombay, India, 1983; M.S., University of Oklahoma, 1987; Ph.D., *ibid.*, 1990.
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Affiliate Professor of Animal Science; Ph.D., University of Glasgow, 1978.
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Affiliate Associate Professor of Animal and Nutritional Sciences; B.S., Franklin Pierce College, 1975; M.S., University of New Hampshire, 1981; Ph.D., *ibid.*, 1988.
- Sullivan, Janet R.** (1985)
Affiliate Associate Professor of Plant Biology; B.S., University of Vermont, 1977; M.S., University of Connecticut, 1980; Ph.D., University of Oklahoma, 1984.
- Terry, Clark** (1988)
Affiliate Professor of Music; Ph.D., University of New Hampshire, 1978.
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Affiliate Assistant Professor of Entomology and State Entomologist; B.S., University of Georgia, 1964; M.S., University of Missouri at Columbia, 1967; Ph.D., *ibid.*, 1977.
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Affiliate Assistant Professor of Computer Science; B.S., University of Louisville, 1980; M.S., Georgia Institute of Technology, 1987; Ph.D., *ibid.*, 1989.
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Extension Faculty

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 Extension Educator, Forest Resources, Rockingham County; B.S.F., University of New Hampshire, 1974; M.S., *ibid.*, 1991.
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 Extension Educator, Sea Grant & Marine Resources, Rockingham County; B.Ed., Plymouth State College, 1963; M.Ed., University of New Hampshire, 1970.
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 Extension Educator, Merrimack County and Extension Specialist, Forest Resources; B.S.F., University of New Hampshire, 1979; B.S., *ibid.*, 1992.
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Extension Educator and Extension Specialist, Ornamental Horticulture; B.S., University of Massachusetts at Amherst, 1976; M.S., Cornell University, 1981; Ph.D., *ibid.*, 1983.
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Associate Extension Educator, Agricultural Resources and Environmental Horticulture, Strafford/Carro; B.S., Egerton University, Kenya, 1993; M.S., Wagenin Agricultural University, Netherlands, 1997.
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- Patmos, Raymond M., Jr.** (1972)
Extension Educator, Forest Resources, Cheshire County; B.S., University of New Hampshire, 1966; M.B.A., Plymouth State College, 1980.
- Peterson, Julia P.** (1993)
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Extension Educator, Forest Resources, Carroll County; B.S., University of New Hampshire, 1966; M.S., *ibid.*, 1978.
- Porter, John C.** (1974)
Extension Educator and Extension Specialist, Dairy, Merrimack County; B.S., University of New Hampshire, 1971; M.S., Cornell University, 1973.
- Reidy, Daniel F.** (1997)
Assistant Extension Educator, Family Development, Hillsborough County; B.S., Plymouth State College, 1976; M.Ed., *ibid.*, 1977.
- Savage, Tina M.** (2002)
Extension Instructor, Agricultural Resources and Environmental Stewardship, Carroll County; B.S., University of Connecticut, 1996.
- Schloss, Jeffrey A.** (1989)
Associate Extension Educator and Extension Specialist, Water Resources; B.S., Duke University, 1979; M.S., American University, 1985.
- Sciabarrasi, Michael R.** (1980)
Extension Educator and Extension Specialist, Agricultural Business Management; B.S., University of Massachusetts at Amherst, 1976; M.S., Virginia Polytechnic Institute and State University, 1978.
- Seavey, David C.** (1970)
Extension Educator, Agricultural Resources, Merrimack County; A.A.S., Thompson School of Applied Science, 1963; B.S., University of Rhode Island, 1966; M.S., University of New Hampshire, 1969.
- Smith, Cheryl A.** (1992)
Extension Educator, Plant Biology and Extension Specialist, Plant Health; B.A., Plymouth State College, 1978; M.S., University of Rhode Island, 1983; Ph.D., University of New Hampshire, 1992.
- Smith, Sarah Shea** (1989)
Associate Extension Educator and Extension Specialist, Forest Industry; B.S.F., University of New Hampshire, 1978; M.O.E., *ibid.*, 1989.
- Snyder, Ellen J.** (1993)
Associate Extension Educator and Extension Specialist, Biodiversity; B.S., University of Maine at Orono, 1982; M.S., Iowa State University, 1986.
- Stoddard, Samuel, III** (1990)
Extension Educator, Forest Resources, Coos County; B.S., University of Maine at Orono, 1968; M.S., Iowa State University, 1976.
- Sullivan, Marilyn L.** (1996)
Associate Extension Educator, Family Development, Merrimack County; B.S., Syracuse University, 1971; M.Ed., Boston State College, 1977.
- Swier, Stanley R.** (1978)
Extension Educator and Extension Specialist, Entomology; B.S., Utica College of Syracuse University, 1969; M.S., Northern Arizona University, 1974; Ph.D., Ohio State University, 1976.
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Assistant Extension Educator, Forest Resources, Rockingham County; B.S., University of New Hampshire, 1996; M.S., *ibid.*, 1999.
- Tebo, Mary P.** (2002)
Assistant Extension Educator, Community Forestry, Hillsborough County; B.A., *ibid.*, ; M.A., *ibid.*, 2002.
- Townson, Lisa** (2000)
Associate Extension Educator and Extension Specialist, 4-H Youth Development; B.S., Michigan State University, 1985; M.S., *ibid.*, 1997.
- Turaj, Steven J.** (1988)
Associate Extension Educator, Agricultural Resources, Coos County; B.S., University of Connecticut, 1974; M.S., West Virginia University, 1980.
- Turner, Penelope C.** (1994)
Assistant Extension Educator, 4-H Youth Development, Hillsborough County; A.A.S., Westbrook College, 1960; M.A., Cambridge College, 1992.
- Violette, Catherine A.** (1986)
Extension Educator and Extension Specialist, Food & Nutrition; B.S., University of Maine at Orono, 1974; B.S., *ibid.*, 1975; M.S., *ibid.*, 1977; Ph.D., Pennsylvania State University, 2002.
- Wilner, Seth** (2000)
Assistant Extension Educator, Agricultural Resources and Environmental Stewardship, Sullivan County; B.S., University of Connecticut, 1991; M.S., University of Wisconsin, 1997.
- Wood, Stephen A.** (1974)
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Emeriti Faculty

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- Adams, Robert L.A.**
Associate Professor Emeritus of Geography; B.A., Williams College, 1961; M.A., Clark University, 1966; Ph.D., *ibid.*, 1971; (1967 to 1994).
- Adamsky, Cathryn**
Associate Professor Emerita of Women's Studies; B.A., Clark University, 1955; Ph.D., University of Rochester, 1959; (1981 to 1996).
- Allen, Fred E.**
Professor Emeritus of Animal Science; B.S., University of New Hampshire, 1932; D.V.M., Ohio State University, 1936; (1940 to 1976).
- Allmendinger, E. Eugene**
Associate Professor Emeritus of Naval Architecture; B.S., University of Michigan at Ann Arbor, 1941; M.S., University of New Hampshire, 1950; D.N.A., O.E.(Hon.), *ibid.*, 1992; (1958 to 1983).
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Thompson School Professor Emeritus of Food Services Management; B.S., Boston University, 1953; M.B.A., Western New England College, 1961; Ed.D., Nova University, 1978; (1969 to 1996).
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Professor Emeritus of Chemistry; B.S., University of Massachusetts at Amherst, 1947; Ph.D., University of Wisconsin at Madison, 1950; (1955 to 1988).
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Associate Professor Emerita of Kinesiology; A.B., Sweet Briar College, 1953; M.S., Smith College, 1956; Ph.D., University of Southern California, 1967; (1967 to 1992).
- Andersen, Kenneth K.**
Professor Emeritus of Chemistry; B.S., Rutgers, The State University of New Jersey, 1955; Ph.D., University of Minnesota, 1959; (1960 to 1996).
- Anderson, Charlotte K.**
Professor Emerita and Library; B.A., University of Michigan at Ann Arbor, 1935; A.B.L.S., *ibid.*, 1936; A.M.L.S., *ibid.*, 1951; (1943 to 1980).
- Anderson, Franz E.**
Professor Emeritus of Geology; B.A., Ohio Wesleyan University, 1960; M.A., Northwestern University, 1962; Ph.D., University of Washington, 1967; (1967 to 2001).
- Annis, William H.**
Professor Emeritus of Occupational Education; B.S., University of Maine at Orono, 1951; M.Agri.Ed., University of New Hampshire, 1959; Ed.D., Cornell University, 1961; (1962 to 1995).
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Associate Professor Emerita of Italian and the Humanities; A.B., Brown University, 1954; Ph.D., University of California at Los Angeles, 1971; (1970 to 1998).
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Professor Emeritus of Physics and Earth, Oceans, and Space; B.S., St. Mary's College, 1956; M.S., University of Minnesota, 1959; Ph.D., *ibid.*, 1962; (1967 to 2002).
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Associate Professor Emeritus of Education; A.B., Dartmouth College, 1957; M.Ed., University of New Hampshire, 1960; Ed.D., Boston University, 1969; (1969 to 1999).

- Balderacchi, Arthur E.**
Professor Emeritus of Art(Drawing); A.B., Duke University, 1960; M.F.A., University of Georgia, 1965; (1965 to 2001).
- Barrett, James P.**
Professor Emeritus of Forest Biometrics and Management; B.S., North Carolina State University, 1954; M.F., Duke University, 1958; Ph.D., *ibid.*, 1962; (1962 to 1997).
- Barstow, Thomas R.**
Assistant Professor Emeritus of Kinesiology; B.S., St. Lawrence University, 1961; M.Ed., *ibid.*, 1965; (1965 to 1999).
- Batchelder, Gerald M.**
Thompson School Professor Emeritus of Civil Engineering; B.S.C.E., University of New Hampshire, 1950; M.S.C.E., Purdue University, 1952; (1953 to 1991).
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Professor Emeritus of Psychology; A.B., Harvard University, 1961; Ph.D., *ibid.*, 1966; (1977 to 1999).
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Associate Professor Emeritus of Materials Science; B.S., Harvard University, 1946; S.M., Massachusetts Institute of Technology, 1965; (1957 to 1984).
- Bechtell, Homer F., Jr.**
Professor Emeritus of Mathematics; B.S., Grove City College, 1951; M.A., University of Wisconsin at Madison, 1956; Ph.D., *ibid.*, 1963; (1966 to 1996).
- Blanchard, Fletcher A., Jr.**
Professor Emeritus of Electrical and Computer Engineering and Associate Director of Engineering Design and Analysis Laboratory; B.S., Union College, 1948; M.S., Lehigh University, 1950; (1972 to 1987).
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Professor Emeritus of Entomology; B.S., Ohio State University, 1937; M.S., University of New Hampshire, 1939; Ph.D., Ohio State University, 1942; (1939 to 1941, 1946 to 1979).
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Professor Emeritus of Plant Biology; B.S., University of Washington, 1958; M.S., *ibid.*, 1961; Ph.D., University of Minnesota, 1968; (1970 to 1999).
- Bonnice, William E.**
Associate Professor Emeritus of Mathematics; B.A.E., Syracuse University, 1951; M.S., University of Washington, 1960; Ph.D., *ibid.*, 1962; (1962 to 1998).
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Professor Emeritus of Zoology and Affiliate Professor of Zoology; B.S., Ohio State University, 1956; M.S., *ibid.*, 1958; Ph.D., Florida State University, 1961; (1961 to 1995).
- Bowman, James S.**
Professor Emeritus of Entomology and Extension Entomologist; B.Sc., Ohio State University, 1951; M.Sc., *ibid.*, 1954; Ph.D., University of Wisconsin at Madison, 1958; (1971 to 1994).
- Boy, Angelo V.**
Professor Emeritus of Education; A.B., University of Notre Dame, 1953; Ed.M., Boston University, 1955; Ed.D., *ibid.*, 1960; (1965 to 2002).
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Associate Professor Emeritus of Education; B.Ed., Plymouth Teachers College, 1949; M.Ed., University of New Hampshire, 1952; (1966 to 1983).
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Professor Emeritus of Philosophy; A.B., Dartmouth College, 1957; M.A., Northwestern University, 1963; Ph.D., *ibid.*, 1968; (1963 to 2001).
- Bruns, Paul E.**
Professor Emeritus of Forest Resources; A.B., New York University, 1937; M.F., Yale University, 1940; Ph.D., University of Washington, 1956; (1958 to 1980).
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Professor Emeritus of Sociology; B.A., Brown University, 1952; Ph.D., University of Wisconsin at Milwaukee, 1958; (1971 to 1989).
- Bullock, Wilbur L.**
Professor Emeritus of Zoology; B.S., Queens College, City University of New York, 1942; M.S., University of Illinois at Urbana-Champaign, 1947; Ph.D., *ibid.*, 1948; (1948 to 1987).
- Burton, David M.**
Professor Emeritus of Mathematics; B.A., Clark University, 1954; A.M., University of Rochester, 1956; Ph.D., *ibid.*, 1961; (1959 to 1997).
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Professor Emeritus of Soil and Water Science; B.S., MacDonald College, 1948; M.S.A., Ontario Agricultural College, Canada, 1950; (1956 to 1986).
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Professor Emeritus of Geology; B.A., University of Michigan at Ann Arbor, 1927; M.A., *ibid.*, 1928; Ph.D., *ibid.*, 1931; (1931 to 1974).
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Professor Emeritus of Microbiology; B.S., Illinois Institute of Technology, 1951; M.S., *ibid.*, 1955; Ph.D., *ibid.*, 1959; (1959 to 1994).
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Associate Professor Emeritus of Theatre and Dance; B.A., Case Western Reserve University, 1956; Certification, Naval Intelligence School, 1958; M.A., University of Denver, 1961; Ph.D.C., Indiana University at Bloomington, 1970; (1962 to 1996).
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Associate Professor Emerita and Loan Librarian; A.B., Hunter College, 1933; M.L.S., Pratt Institute, 1960; (1964 to 1975).
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Professor Emeritus of English; B.A., University of Minnesota, 1960; M.A., Stanford University, 1964; Ph.D., *ibid.*, 1966; (1972 to 2002).
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Associate Professor Emeritus of Classics; A.B., Boston College, 1960; A.M., University of Wisconsin at Madison, 1961; Ph.D., University of North Carolina at Chapel Hill, 1969; (1965 to 2000).
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Professor Emeritus of Sociology; A.A., Pasadena Junior College, 1934; M.A., Oberlin College, 1939; Ph.D., University of Wisconsin at Madison, 1946; (1958 to 1978).
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Professor Emeritus of English; B.A., University of Pittsburgh, 1961; Ed.M., Harvard University, 1964; Ph.D., *ibid.*, 1967; (1972 to 2000).
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Professor Emeritus of Theatre and Dance; B.S., Northwestern University, 1950; M.A., *ibid.*, 1952; Ph.D., *ibid.*, 1963; (1961 to 1995).
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Associate Professor Emerita of Music; B.M., Northwestern University, 1949; M.M., *ibid.*, 1950; (1966 to 1995).
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Professor Emeritus of Chemistry; B.S.Ch.E., Northeastern University, 1935; Ph.D., University of Washington, 1940; (1945 to 1978).
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Professor Emeritus of Environmental and Resource Economics and Community Development; B.S., University of Illinois at Urbana-Champaign, 1960; M.S., North Carolina State University, 1964; Ph.D., *ibid.*, 1966; (1969 to 2002).
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Professor Emeritus of History; A.B., Harvard University, 1951; M.A., *ibid.*, 1952; Ph.D., *ibid.*, 1958; (1962 to 1996).
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Associate Professor Emerita of Medical Laboratory Science; B.S., Salve Regina - The Newport College, 1973; M.S., State University of New York, Brooklyn, 1977; Ph.D., *ibid.*, 1984; (1989 to 2000).
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Associate Professor Emerita of Nursing; Diploma, Peter Bent Brigham Hospital, 1955; B.S., Boston University, 1959; M.S., *ibid.*, 1966; (1965 to 1999).
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Professor Emeritus of Kinesiology; B.S., Brooklyn College, City University of New York, 1960; M.S., University of Illinois at Urbana-Champaign, 1961; Ph.D., Michigan State University, 1965; (1965 to 2001).
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Professor Emeritus of Sociology; Intermediate Certificate, British Government Arab College, Jerusalem, 1948; B.A., Hebrew University of Jerusalem, Israel, 1952; M.A., University of Michigan at Ann Arbor, 1954; Ph.D., Johns Hopkins University, 1957; (1967 to 1997).
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Professor Emeritus of Plant Biology and Genetics; B.S., Taiwan Normal University, 1957; M.A., Ohio State University, 1962; Ph.D., University of California at Berkeley, 1970; (1970 to 1994).
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Professor Emeritus of Education; B.S., University of New Hampshire, 1942; M.Ed., *ibid.*, 1949; Ed.D., Harvard University, 1958; (1963 to 1990).
- Klotz, Louis H.**
Associate Professor Emeritus of Civil Engineering; B.S.C.E., Pennsylvania State University, 1951; M.S.C.E., New York University, 1956; Ph.D., Rutgers, The State University of New Jersey, 1967; (1965 to 1986).
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Associate Professor Emeritus of Mathematics; B.A., Amherst College, 1957; M.A.T., Harvard University, 1961; Ed.D., Stanford University, 1971; (1983 to 1999).
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Associate Professor Emerita of Spanish; B.S., State University of New York College at Plattsburgh, 1954; M.A., University of Arizona, 1967; Ph.D., *ibid.*, 1974; (1976 to 1999).
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Professor Emeritus of Computer Science; B.S., National Chung Chen University, China, 1944; M.S., Ohio State University, 1948; M.E., Harvard University, 1954; D.Eng., Yale University, 1958; (1964 to 1996).
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Professor Emeritus of Physics; B.S., St. Lawrence University, 1952; M.A., Harvard University, 1954; Ph.D., *ibid.*, 1963; (1955 to 1956, 1961 to 2001).
- Larson, Barbara K.**
Associate Professor Emerita of Anthropology; B.A., Stanford University, 1962; M.A., Harvard University, 1964; Ph.D., Columbia University, 1975; (1976 to 2002).
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Professor Emeritus of Political Science; A.B., Dartmouth College, 1952; A.M., Fletcher School of Law and Diplomacy, Tufts University, 1957; M.A.L.D., *ibid.*, 1958; Ph.D., *ibid.*, 1963; (1965 to 1996).
- Laurent, John L.**
Professor Emeritus of the Arts; B.F.A., Syracuse University, 1948; M.A.T., Indiana University at Bloomington, 1954; (1954 to 1985).
- Lavoie, Marcel E.**
Associate Professor Emeritus of Zoology; B.A., St. Anselm College, 1940; M.S., University of New Hampshire, 1952; Ph.D., Syracuse University, 1956; (1950 to 1952, 1955 to 1984).
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Professor Emeritus of Spanish and the Humanities; A.B., Harvard University, 1951; A.M., *ibid.*, 1953; Ph.D., *ibid.*, 1961; (1956 to 1994).
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- Linsky, Arnold S.**
Professor Emeritus of Sociology; A.B., Dartmouth College, 1954; M.A., University of Washington, 1963; Ph.D., *ibid.*, 1966; (1966 to 1997).
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Professor Emeritus of Physics; A.B., Dartmouth College, 1941; M.S., Lafayette College, 1943; Ph.D., Yale University, 1948; (1948 to 1989).
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- Rogers, Owen M.**
Professor Emeritus of Plant Biology and Genetics; B.V.A., University of Massachusetts at Amherst, 1952; M.S., Cornell University, 1954; Ph.D., Pennsylvania State University, 1959; (1959 to 1995).
- Romoser, George K.**
Professor Emeritus of Political Science; A.B., Rutgers University, 1951; A.M., University of Chicago, 1954; Ph.D., *ibid.*, 1958; (1961 to 1962, 1967 to 1996).

Rosen, Sam

Professor Emeritus of Economics; B.A., University of Wisconsin at Madison, 1942; M.A., Harvard University, 1948; Ph.D., *ibid.*, 1952; (1957 to 1985).

Ross, Shepley L.

Professor Emeritus of Mathematics; A.B., Boston University, 1949; A.M., *ibid.*, 1950; Ph.D., *ibid.*, 1953; (1955 to 1993).

Rothwell, Kenneth J.

Professor Emeritus of International Economics; B.A., University of Western Australia, 1949; M.A., *ibid.*, 1954; Ph.D., Harvard University, 1961; (1963 to 1991).

Rouman, John C.

Professor Emeritus of Classics; B.A., Carleton College, 1950; M.A., Columbia University, 1951; Ph.D., University of Wisconsin at Madison, 1965; (1965 to 1999).

Routley, Douglas G.

Professor Emeritus of Plant Biology; B.S.A., University of British Columbia, 1952; M.S., Pennsylvania State University, 1953; Ph.D., *ibid.*, 1957; (1957 to 1991).

Rupp, Nancy C.

Assistant Professor Emerita of Kinesiology; B.S., Sargent College, Boston University, 1950; M.A., University of Iowa, 1955; (1970 to 1991).

Samuels, Frederick

Professor Emeritus of Sociology; B.S., City College of New York, 1950; M.A., University of Hawaii, 1963; Ph.D., University of Massachusetts at Amherst, 1966; (1966 to 1993).

Sasner, John J.

Professor Emeritus of Zoology and Affiliate Professor of Zoology; B.A., University of New Hampshire, 1957; M.S., *ibid.*, 1959; Ph.D., University of California at Los Angeles, 1965; (1965 to 2000).

Savage, Godfrey H.

Professor Emeritus of Mechanical and Ocean Engineering; B.S.E., Princeton University, 1950; M.B.A., Harvard University, 1954; Ph.D., Stanford University, 1970; (1965 to 1997).

Sawyer, Albert K.

Professor Emeritus of Chemistry; A.B., Colby College, 1940; M.S., University of Maine at Orono, 1947; (1949 to 1985).

Schlobohm, Starr F.

Associate Professor Emeritus of Marketing; B.A., Ohio Wesleyan University, 1950; M.B.A., Harvard University, 1952; M.Phil., Graduate School of Business Administration, New York University, 1978; Ph.D., *ibid.*, 1980; (1975 to 1992).

Schneer, Cecil J.

Professor Emeritus of Geology and the History of Science; A.B., Harvard University, 1943; A.M., *ibid.*, 1949; Ph.D., Cornell University, 1954; (1954 to 1988).

Schroeder, Calvin E.

Extension Educator Emeritus of Agricultural Resources, Strafford County; A.A.S., Thompson School of Applied Science, 1963; B.S., University of New Hampshire, 1968; M.O.E., *ibid.*, 1980; (1969 to 2000).

Schweickart, Patrocino P.

Professor Emerita of English; B.S., University of the Philippines, 1963; M.Ch.E., University of Virginia, 1965; M.A., *ibid.*, 1969; M.A., Ohio State University, 1974; Ph.D., *ibid.*, 1980; (1979 to 1998).

Shore, Carol

Professor Emerita of Art; B.F.A., Boston University, 1963; M.A., University of Chicago, 1965; (1980 to 1999).

Silverman, Robert J.

Professor Emeritus of Mathematics; S.B., University of Chicago, 1947; S.M., *ibid.*, 1948; Ph.D., University of Illinois at Urbana-Champaign, 1952; (1962 to 1987).

Simpson, Robert E.

Professor Emeritus of Physics; B.S., University of Rochester, 1955; A.M., Harvard University, 1956; Ph.D., *ibid.*, 1960; (1963 to 2002).

Sir, W. Niel

Associate Professor Emeritus of Music; B.A., University of Chicago, 1952; B.A., University of California at Berkeley, 1954; M.A., *ibid.*, 1962; (1970 to 2000).

Skoglund, Winthrop C.

Professor Emeritus of Animal Science; B.S., University of New Hampshire, 1938; M.S., Pennsylvania State University, 1940; Ph.D., *ibid.*, 1958; (1950 to 1981).

Smith, Gerald L.

Associate Professor Emeritus of Animal Science and Extension Animal Scientist; B.S., University of New Hampshire, 1948; M.S., Pennsylvania State University, 1951; (1948 to 1980).

Smith, M. Daniel

Associate Professor Emeritus of Education; A.B., Dartmouth College, 1948; M.M., University of Michigan at Ann Arbor, 1950; M.Ed., Harvard University, 1958; Ed.D., *ibid.*, 1961; (1967 to 1997).

Smith, Mark R.

Professor Emeritus of English; B.A., Northwestern University, 1960; (1966 to 1999).

Sorensen, David C.

Extension Educator Emeritus of Agricultural Resources, Carroll County; B.S., University of Rhode Island, 1964; M.S., *ibid.*, 1967; (1969 to 1998).

Spears, Margaret W.

Associate Professor Emerita of Nursing; B.S.N., University of Pittsburgh, 1952; M.S., University of Lowell, 1979; Ed.D., Vanderbilt University, 1985; (1981 to 1996).

Sproul, Otis J.

Dean Emeritus of the College of Engineering and Physical Sciences and Professor Emeritus of Civil Engineering; B.S., University of Maine at Orono, 1952; M.S., *ibid.*, 1957; Sc.D., Washington University, 1961; (1982 to 1995).

Stewart, James A.

Professor Emeritus of Biochemistry; B.A., St. Anselm College, 1963; Ph.D., University of Connecticut, 1967; (1968 to 2001).

Stocking, Marion I.

Associate Extension Educator Emerita and County Extension Agent, Home Economics, Carroll County; B.S., Simmons College, 1949; M.A., University of Connecticut, 1971; (1958 to 1988).

Stone-McAdams, Deborah E.

Associate Professor Emerita of Education; B.Ed., Plymouth Teachers College, 1940; M.Ed., Boston University, 1951; Ed.D., *ibid.*, 1971; (1962 to 1990).

Sweet, Paul C.

Coach of Track and Cross Country and Professor Emeritus of Kinesiology; B.S., University of Illinois at Urbana-Champaign, 1923; M.S., University of Southern California, 1941; (1924 to 1970).

Szymujko, Joseph A.

Assistant Extension Educator Emeritus of Forestry, Sullivan County; B.S., University of New Hampshire, 1954; (1958 to 1989).

Taft, Charles K.

Professor Emeritus of Mechanical Engineering; B.A., Amherst College, 1951; B.S., Massachusetts Institute of Technology, 1953; M.S., Case Western Reserve University, 1956; Ph.D., *ibid.*, 1960; (1967 to 1991).

Tillinghast, Edward K.

Professor Emeritus of Zoology and Affiliate Professor of Zoology; B.S., University of Rhode Island, 1955; M.S., *ibid.*, 1959; Ph.D., Duke University, 1967; (1967 to 1999).

Tischler, Herbert

Professor Emeritus of Geology; B.S., Wayne State University, 1950; M.A., University of California at Berkeley, 1955; Ph.D., University of Michigan at Ann Arbor, 1961; (1965 to 1997).

Tovey, Barbara S.

Associate Professor Emerita of Philosophy and the Humanities; B.A., Swarthmore College, 1945; Ph.D., University of Massachusetts at Amherst, 1975; (1978 to 1994).

Ulrich, Gael D.

Professor Emeritus of Chemical Engineering; B.S., University of Utah, 1959; M.S., *ibid.*, 1962; Sc.D., Massachusetts Institute of Technology, 1964; (1970 to 1997).

Urban, Willard E., Jr.

Professor Emeritus of Biometrics; B.S., Virginia Polytechnic Institute and State University, 1958; M.S., Iowa State University, 1960; Ph.D., *ibid.*, 1963; (1963 to 1997).

Ury, Ann D.

Associate Professor Emerita of Occupational Therapy; B.S., University of New Hampshire, 1956; M.A., Brown University, 1968; C.A.G.S., Rhode Island College, 1973; M.S.W., University of Connecticut, 1985; (1973 to 1997).

Valenza, Daniel L.

Professor Emeritus of Art; A.A.S., School for American Craftsmen at Rochester Institute of Technology, 1956; B.F.A., *ibid.*, 1958; M.F.A., *ibid.*, 1966; (1959 to 1999).

Van Osdol, Donovan H.

Professor Emeritus of Mathematics; A.B., Earlham College, 1964; A.M., University of Illinois at Urbana-Champaign, 1966; Ph.D., *ibid.*, 1969; (1970 to 2002).

Verrette, Paul F.

Associate Professor Emeritus of Music and Affiliate Associate Professor; B.A., University of New Hampshire, 1952; M.A., Boston University, 1971; (1962 to 1995).

Vreeland, Robert P.

Associate Professor Emeritus of Civil Engineering; B.S., Yale University, 1932; M.S., Columbia University, 1933; M.E., Yale University, 1941; (1966 to 1977).

Wallace, Oliver P., Sr.

Professor Emeritus of Forest Resources; B.S., University of New Hampshire, 1937; B.S.F., University of Michigan at Ann Arbor, 1938; M.F., *ibid.*, 1947; Ph.D., *ibid.*, 1954; (1958 to 1982).

Wallace, William H.

Professor Emeritus of Geography; B.S., Beloit College, 1948; M.S., University of Wisconsin at Madison, 1950; Ph.D., *ibid.*, 1956; (1957 to 1997).

Wang, Rosemary Y.

Associate Professor Emerita of Nursing; Diploma, Good Samaritan School of Nursing, Cincinnati, 1957; B.S., College of Mount St. Joseph, 1959; M.S., Boston College, 1962; Ph.D., *ibid.*, 1982; (1971 to 1999).

Wang, Tung-Ming

Professor Emeritus of Civil Engineering; B.S., National Chiao-Tung University, China, 1945; M.S., University of Missouri at Columbia, 1954; Ph.D., Northwestern University, 1960; (1961 to 1992).

Wear, Robert E.

Associate Professor Emeritus of Kinesiology; B.A., Oberlin College, 1941; M.A., University of Michigan at Ann Arbor, 1946; Ph.D., *ibid.*, 1955; (1964 to 1986).

Weber, James H.

Professor Emeritus of Chemistry; B.S., Marquette University, 1959; Ph.D., Ohio State University, 1963; (1963 to 1999).

Webster, Robert G.

Professor Emeritus of English; B.A., University of New Hampshire, 1926; M.A., *ibid.*, 1930; (1927 to 1970).

Weeks, Silas B.

Associate Professor Emeritus of Environmental and Resource Economics and Extension Community Resource Development Specialist Emeritus; B.S., Cornell University, 1937; (1955 to 1981).

Weiland, Walter E.

Associate Professor Emeritus of Kinesiology; B.S., State University of New York College at Cortland, 1957; M.S., Pennsylvania State University, 1958; Ph.D., *ibid.*, 1964; (1964 to 1996).

Wells, Otho S.

Professor Emeritus of Plant Biology and Extension Horticulturist, Vegetables; B.S., North Carolina State University, 1961; M.S., Michigan State University, 1963; Ph.D., Rutgers, The State University of New Jersey, 1966; (1966 to 1999).

Wetzel, William E., Jr.

Professor Emeritus of Business Administration; B.A., Wesleyan University, 1950; M.B.A., Temple University, 1964; M.B.A., University of Chicago, 1967; (1967 to 1993).

Wheeler, Charles M., Jr.

Professor Emeritus of Chemistry; B.S., West Virginia University, 1947; M.S., *ibid.*, 1949; Ph.D., *ibid.*, 1951; (1950 to 1983).

White, Barbara A.

Professor Emerita of Women's Studies; A.B., Cornell University, 1964; M.A., University of Wisconsin at Madison, 1965; Ph.D., *ibid.*, 1974; (1976 to 1999).

White, Susan O.

Professor Emerita of Political Science; A.B., Bryn Mawr College, 1958; M.A., University of Minnesota, 1966; Ph.D., *ibid.*, 1970; (1969 to 1997).

Wicks, John D.

Professor Emeritus of Music; A.B., Harvard University, 1944; A.M., *ibid.*, 1947; Ph.D., *ibid.*, 1959; (1956 to 1989).

Williams, Charles H.

Associate Extension Educator Emeritus and Extension Specialist, Ornamentals; B.S., Pennsylvania State University, 1956; M.S., Michigan State University, 1967; Ph.D., University of New Hampshire, 1981; (1969 to 1998).

Willits, Robin D.

Professor Emeritus of Administration and Organization; A.B., Middlebury College, 1949; B.S., Massachusetts Institute of Technology, 1948; Ph.D., *ibid.*, 1965; (1965 to 1990).

Wilson, John A.

Associate Professor Emeritus of Mechanical Engineering; B.S., Tufts University, 1958; M.S., Northeastern University, 1960; Ph.D., *ibid.*, 1970; (1960 to 1999).

Wing, Barbara H.

Associate Professor Emerita of Spanish; B.A., Middlebury College, 1955; M.A.T., Harvard University, 1956; M.A., Middlebury College, 1971; Ph.D., Ohio State University, 1980; (1970 to 1996).

Wing, Henry J., Jr.

Associate Professor Emeritus of Music; B.M., Oberlin Conservatory, 1952; M.M., *ibid.*, 1953; Ph.D., Boston University, 1966; (1970 to 1996).

Winn, Alden L.

Professor Emeritus of Electrical and Computer Engineering; B.S., University of New Hampshire, 1937; S.M., Massachusetts Institute of Technology, 1948; (1948 to 1983).

Wood, Dorothy

Associate Extension Educator Emerita of Home Economics, Hillsboro County; B.S., Boston University, 1949; (1971 to 1989).

Wright, Paul A.

Professor Emeritus of Zoology; S.B., Bates College, 1941; A.M., Harvard University, 1942; Ph.D., *ibid.*, 1944; (1958 to 1983).

Wrightman, Dwayne E.

Professor Emeritus of Finance; B.S., Manchester College, 1958; M.B.A., Indiana University at Bloomington, 1959; Ph.D., Michigan State University, 1964; (1964 to 1993).

Yamamoto, Yutaka

Associate Professor Emeritus of Philosophy; B.S., University of California at Berkeley, 1957; M.A., University of Michigan at Ann Arbor, 1967; Ph.D., *ibid.*, 1973; (1973 to 1997).

Yount, John A.

Professor Emeritus of English; B.A., Vanderbilt University, 1960; M.F.A., University of Iowa, 1962; (1962 to 1964, 1965 to 1997).

Zabarsky, Melvin J.

Professor Emeritus of Art; B.F.A., Boston University, 1958; M.F.A., University of Cincinnati, 1960; (1969 to 1997).

Zaso, Gus C.

Associate Professor Emeritus of Tourism Planning and Development; A.B., Syracuse University, 1957; M.A., Central Michigan University, 1962; Re.D., Indiana University at Bloomington, 1965; (1970 to 1997).

ENROLLMENT STATISTICS—FALL SEMESTER

UNH Durham	1999-2000	2000-2001	2001-2002	2002-2003
	(Men/Women —Total)			
Freshman	1026/1576 — 2602	1063/1582 — 2645	1091/1507 — 2598	1205/1546 — 2751
Sophomore	884/1298 — 2182	998/1518 — 2516	1067/1524 — 2591	1110/1464 — 2574
Junior	934/1362 — 2296	888/1223 — 2111	962/1458 — 2420	1020/1450 — 2470
Senior	1067/1594 — 2661	988/1462 — 2450	954/1330 — 2284	1013/1542 — 2555
1st Year—T.S.A.S.	145/101 — 246	169/109 — 278	151/112 — 263	180/107 — 287
2nd Year—T.S.A.S.	77/65 — 142	84/55 — 139	91/66 — 157	75/56 — 131
D.C.E.—A.A.	43/47 — 90	55/45 — 100	43/44 — 87	51/48 — 99
Graduate—Master's*	529/824 — 1353	521/819 — 1340	535/784 — 1319	602/882 — 1484
Graduate—Doctoral	201/192 — 393	231/208 — 439	221/193 — 414	230/200 — 430
Total	4906/7059 — 11965	4997/7021 — 12018	5115/7018 — 12133	5486/7295 — 12781
Graduate Continuing**	137/194 — 331	128/171 — 299	124/147 — 271	121/124 — 245
Total Degree Candidates	5043/7253 — 12296	5125/7192 — 12317**	5239/7165 — 12404	5607/7419 — 13026
Continuing Education Credit	508/752 — 1260	495/614 — 1109	714/482 — 1196	725/451 — 1176
Summer Session	1091/2105 — 3196	979/1865 — 2844	1804/1103 — 2907	1703/1034 — 2737

Baccalaureate Curricula

	1999-2000	2000-2001	2001-2002	2002-2003	1999-2000	2000-2001	2001-2002	2002-2003
Life Sciences and Agriculture				Liberal Arts				
Freshman	455	393	354	360	1032	1205	1232	1304
Sophomore	334	362	367	325	964	1153	1246	1321
Junior	399	329	357	368	881	826	967	1057
Senior	486	432	379	395	892	837	818	944
Total	1674	1516	1457	1448	3769	4021	4263	4626
Engineering and Physical Sciences				Whittemore School				
Freshman	338	335	325	358	429	385	417	415
Sophomore	235	251	274	252	315	401	382	384
Junior	213	232	244	279	355	333	435	391
Senior	294	263	262	280	353	345	326	424
Total	1080	1081	1105	1169	1452	1464	1560	1614
Health and Human Services								
Freshman	348	327	270	314				
Sophomore	334	349	322	292				
Junior	448	391	417	375				
Senior	636	573	499	512				
Total	1766	1640	1508	1493				

UNH Manchester	1999-2000	2000-2001	2001-2002	2002-2003
	(Men/Women —Total)			
Associate	104/135 — 239	82/131 — 213	90/149 — 239	111/160 — 271
Baccalaureate	148/317 — 465	126/327 — 453	147/330 — 477	160/332 — 492
Total Degree Candidates	252/452 — 704	208/458 — 666	237/479 — 716	271/492 — 763
Continuing Education Credit	159/223 — 382	183/240 — 423	217/261 — 478	209/257 — 466

*Master's counts include Certificate of Advanced Graduate Study.

**Since Fall 1995, graduate continuing enrollment students have been counted separately from traditional degree candidates. Beginning Fall 2000, those counts are included in the UNH degree candidate total.

2003-2004 UNDERGRADUATE CALENDAR

SEMESTER I

September 1, Monday

Labor Day holiday, offices closed.

September 2, Tuesday

8 a.m. Classes begin, follow Tuesday schedule.

September 12, Friday

Last day to withdraw, to drop to part-time, or to reduce part-time load and qualify for tuition refund based on 3/4 difference in tuition.

September 19, Friday

Last day to add courses or Honors designation.
Last day to drop courses or change to Audit without \$25 late fee.
Last day to choose pass/fail grading option.

September 26, Friday

Last day to file Intent-to-Graduate form for December, 2003 graduation without late fee.

Saturday, September 27

Rosh Hashanah*

October 3, Friday

Last day to withdraw, to drop to part-time, or to reduce part-time load and qualify for tuition refund (refund based on 1/2 difference in tuition).
Last day to drop courses or change to Audit (\$25 late fee continues to apply).
Last day to drop Honors designation.
Last day to carry more than 20 credits without a surcharge.

October 6, Monday

Yom Kippur*

October 13, Monday

Fall break; no classes.

October 17, Friday

Mid-semester.

Last day to withdraw from the University without grades of WP or WF.

November 4, Tuesday

Election day; no exams may be scheduled.

November 11, Tuesday

Veterans' Day holiday, offices closed, no classes.

November 26, Wednesday

Classes follow MONDAY schedule.

November 27-28, Thursday-Friday

Thanksgiving holidays, offices closed, no classes.

December 1, Monday

Classes resume.

December 5, Friday

Last day an announced oral or written exam may be given before finals.

December 12, Friday

Last day of classes.

Last day to file Completion of Minor form for December graduates.

Last day to change college until January.

December 15, Monday

Reading Day.

Final exams begin 6:00 p.m.

December 16-20, Tuesday-Saturday

Final exams.

December 25-January 4

Holiday break, offices closed.

December 31, Wednesday

Graduation date (no ceremony).

April 9, Friday

Good Friday*/Orthodox Good Friday*

May 1, Saturday

Honors Convocation

May 3, Monday

Last day an announced oral or written exam may be given before finals.

May 10, Monday

Last day of classes.

Last day to file Completion of Minor form for May graduates.

May 11, Tuesday

Reading Day.

May 12, Wednesday

Reading Day; Thompson School final exams begin.

May 13, Thursday

AA/Baccalaureate/Graduate final exams begin.

May 15, Saturday

Thompson School Commencement ceremony.

May 17, Monday

Thompson School final exams end.

May 20, Thursday

AA/Baccalaureate/Graduate final exams end.

May 21, Friday

Senior Day.

May 22, Saturday

AA/Baccalaureate/Graduate Commencement ceremony.

SEMESTER II

January 19, Monday

Martin Luther King, Jr. holiday, offices closed.

January 20, Tuesday

8 a.m. classes begin. Follow Tuesday schedule.

January 30, Friday

Last day to withdraw, to drop to part-time, or to reduce part-time load and qualify for tuition refund based on 3/4 difference in tuition.

February 6, Friday

Last day to add courses or Honors designation.
Last day to drop courses or change to Audit without \$25 late fee.
Last day to choose pass/fail grading option.

February 13, Friday

Last day to file Intent-to-Graduate card for May 2004 graduation without late fee.

February 20, Friday

Last day to withdraw, to drop to part-time, or to reduce part-time load and qualify for tuition refund (refund based on 1/2 difference in tuition).

Last day to drop courses or change to Audit (\$25 late fee continues to apply).

Last day to drop Honors designation.

Last day to carry more than 20 credits without a surcharge.

March 12, Friday

Midsemester.

Last day to withdraw from the University without grades of WP or WF.

March 15-19, Monday-Friday

Spring recess.

March 22, Monday

8 a.m. classes resume.

April 6, Tuesday

Passover *

SUMMER SESSION 2004

May 24-August 15

DIRECTIONS TO CAMPUS

By Car

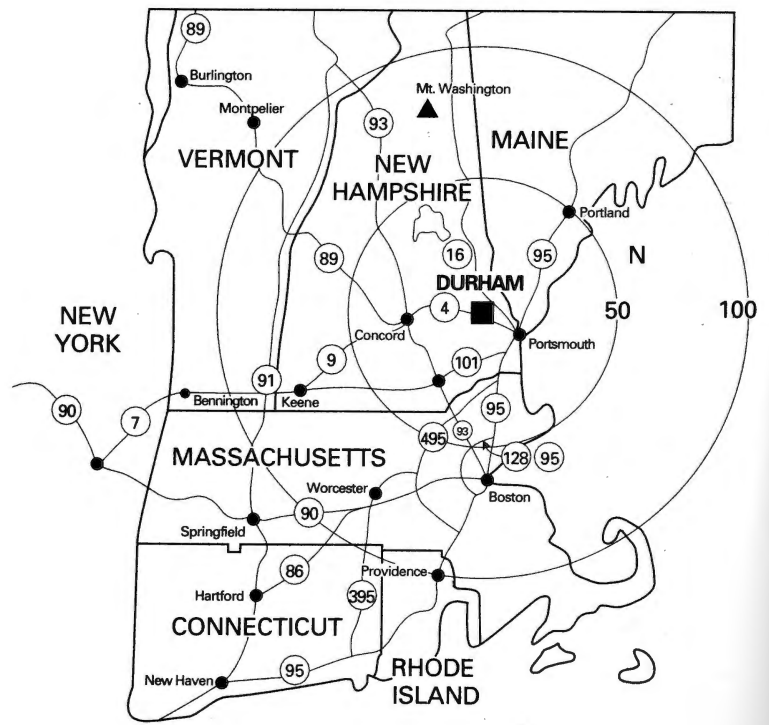
FROM BOSTON, MASS. Follow I-95 North. When approaching the Portsmouth, N.H., area, take the exit bearing left, marked "NH Lakes and White Mountains, Routes 4 & 16." Continue on that road to Exit 6W (Concord-Durham) and follow Route 4 West. Exit at 155A and turn toward Durham. Follow 155A through a short stretch of farmlands and fields to the UNH campus.

FROM HARTFORD, CONN. Take I-84/I-86 East out of Hartford to the Mass. Pike (I-90) to Auburn Exit 10 then East on I-290 to I-495 North. Drive east on I-495 North, Exit 26. Continue north on I-95, then follow the directions above for driving from Boston.

FROM PORTLAND, ME. Follow either I-95 or Route 1 South to the Portsmouth traffic circle. Take the Spaulding Turnpike north to Exit 6W (Concord-Durham). Then follow the directions above for driving from Boston.

FROM CONCORD, N.H. Follow Route 4 East, and take the UNH/Durham exit at 155A. Follow a short stretch of farmlands and fields to the UNH campus.

FROM MANCHESTER, N.H. Take Route 101 to the junction of Route 125. Follow Route 125 North to the Lee traffic circle. Drive east on Route 4, and then follow the directions above for driving from Concord.



By Plane

From Logan International Airport, Boston, you may use the C & J Trailways bus service. Advance reservations are not required. For further information call (603) 742-5111 or, outside New Hampshire, (800) 258-7111.

By Bus

Depart C & J Trailways bus service across from South Station in Boston. For further information call (603) 742-5111 from New Hampshire or (800) 258-7111 outside of New Hampshire.

FREQUENTLY CALLED NUMBERS

Directory Assistance and Information

University operators (603) 862-1234 (off campus)
Dial 0 (on campus)

Office of Admissions	862-1360
Financial Aid Office	862-3600
Department of Housing	862-2120
Business Services	862-2230
Registration and Records	862-1505
Academic Advisers	
College of Liberal Arts	862-2064
College of Engineering and Physical Sciences	862-1783
School of Health and Human Services	862-1177
College of Life Sciences and Agriculture	862-1451
Whittemore School of Business and Economics	862-3885
Thompson School of Applied Science	862-1025

Health Services	862-1530
Honors Program	862-3928
Orientation Scheduling	862-4318
E-mail: First.Year@unh.edu	
Memorial Union and Information Center	862-2600
Off-Campus Housing	862-3612
Traffic Services/Parking	862-1010
University Police	862-1427
The Access Office: Support Services for Students with Disabilities	862-2607
Office of Multicultural Student Affairs	862-2050
The Whittemore Center	862-1379
Campus Recreation	862-2031
Athletics	862-1850

WEB: www.unh.edu

CAMPUS MAP

Student Activities/ Lodging

Athletic Arena
Dairy Bar
Field House
New England Center
Memorial Union Building
Whittemore Center

Apartment Complexes

The Gables
Forest Park Apartments
Woodside Apartment

Administrative Offices/ Support Services

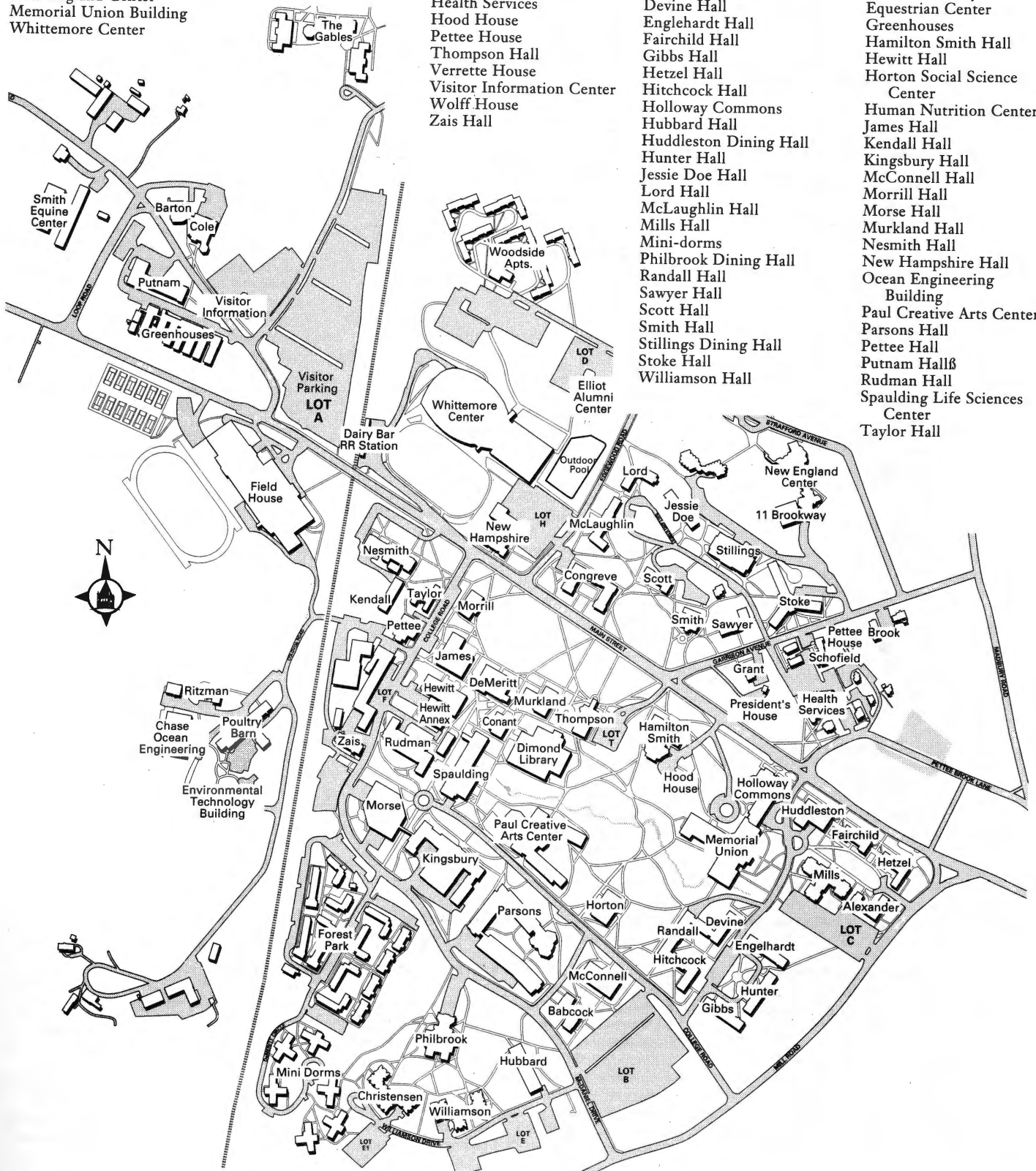
Elliott Alumni Center
Grant House, Office of Admissions
Health Services
Hood House
Pettee House
Thompson Hall
Verrette House
Visitor Information Center
Wolf House
Zais Hall

Residence and Dining Halls

Alexander Hall
Babcock House
Christenson Hall
Congreve Hall
Devine Hall
Engelhardt Hall
Fairchild Hall
Gibbs Hall
Hetzel Hall
Hitchcock Hall
Holloway Commons
Hubbard Hall
Huddleston Dining Hall
Hunter Hall
Jessie Doe Hall
Lord Hall
McLaughlin Hall
Mills Hall
Mini-dorms
Philbrook Dining Hall
Randall Hall
Sawyer Hall
Scott Hall
Smith Hall
Stillings Dining Hall
Stoke Hall
Williamson Hall

Academic Buildings

Barton/Cole Hall
Conant Hall
DeMerritt Hall
Dimond Library
Equestrian Center
Greenhouses
Hamilton Smith Hall
Hewitt Hall
Horton Social Science Center
Human Nutrition Center
James Hall
Kendall Hall
Kingsbury Hall
McConnell Hall
Morrill Hall
Morse Hall
Murkland Hall
Nesmith Hall
New Hampshire Hall
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Paul Creative Arts Center
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Pettee Hall
Putnam Hall
Rudman Hall
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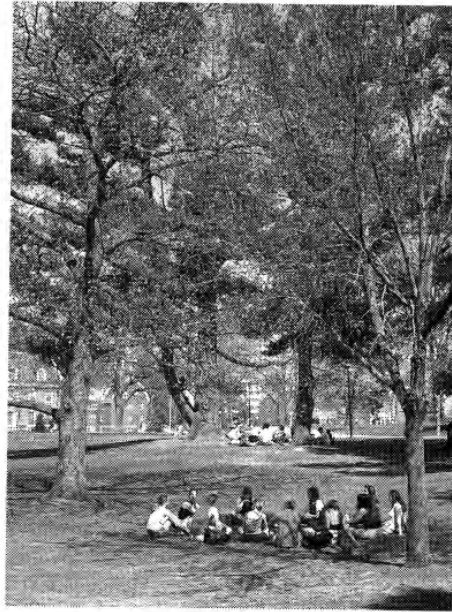
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APPENDIX



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