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University of Maine Undergraduate Catalog, 2003-2004, part 2

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Division of Lifelong Learning

The Division of Lifelong Learning ovides experiences that enhance quality of :, empower individuals and organizations d improve professional practice. The vision promotes learning as a continuous d lifelong process and provides a broad ectrum of innovative and alternative ucational programs and services primarily r the ongoing needs of adult learners and ganizations. Enabling educational access d equality of opportunity, the Division tends University resources to non-iditional and non-matriculating constituen-:s, and serves as an important linkage tween the University of Maine, the people Maine, and Maine's work force. By fering tailor made, instructional delivery stems for external constituencies (e.g., off-mpus, on-site instruction; Web-based urses; interactive television; video nferencing; computer conferencing and her forms of electronic instruction) the ivision provides lifelong learning opportuni-:s that reflect the University's outreach ission and land-grant heritage. Established 1996, the Division of Lifelong Learning is mposed of the Bureau of Labor Education, e Conferences Services Division, the ontinuing Education Division and Summer ssion, the Hutchinson Center, the Onward ogram, the Peace Studies Program, and the Vomen's Resource Center. dll.umaine.edu/

CADEMIC PROGRAMS:

Bachelor of University Studies
Interdisciplinary Curriculum in Peace udies

ureau of Labor Education

The Bureau of Labor Education (BLE), tablished in 1966 by the 102nd Maine egislature and the Trustees of the University Maine, is guided by the principle that lucation is a necessary and vital component a democratic society, as well as a lifelong rocess. The BLE conducts educational rograms, presentations and research on bor and labor-related issues of interest to orkers, students, educators, leaders of nployee organizations, and public policy akers. General topics include employment w, labor management relations, leadership evelopment, and labor economics. Through e publication of briefing papers, the Bureau so analyzes important public policy issues ch as the US health care system, occupa-onal health and safety, workforce demo-raphics, and economic development. ssentially, through teaching, research and ublic service, the Bureau helps Maine orkers and others assess their own situation in relation to the global economic, political and social environment. For more information on the Bureau, or to request a program, call (207) 581-4124. Fees, charges, and program costs are determined by arrangement. dll.umaine.edu/ble.

Conference Services Division

The Conference Services Division furthers the academic mission of the University of Maine by bringing together groups of participants and qualified resource people to share information and ideas, to develop new skills and insights, and to find solutions to current problems. It accomplishes this by professionally coordinating a varied and rich selection of conferences, meetings, seminars and symposia annually, thereby showcasing the University's facilities and resources through its research and educational endeavors. The Conference Services Division is also responsible for the administration of CEUs for all externally initiated non-credit programs. www.umaine.edu/conferences.

Continuing Education Division

The Continuing Education Division (CED) facilitates the educational aspirations of part-time, evening, weekend, on-campus and distance students who are working toward an undergraduate or graduate degree, or who are taking credit courses and/or non-credit courses for personal and professional growth. The Division conducts professional development certificate programs, in-house contract programs, and community programs designed to meet the educational needs of the Maine workforce or the lifelong learning pursuits of Maine citizens.

The Continuing Education Division coordinates the part-time study of non-traditional and non-degree students on the Orono campus and in a wide geographical area surrounding the Orono campus. Over 500 courses are conducted each year during the late afternoon and evening. The Division provides a source of continuing education for mature and qualified persons who wish to supplement an earlier education. Courses offered may be applied toward degree programs or may be primarily for professional or personal growth. However, all programs offered are designed to prepare adults to meet the challenge of change and to provide experiences in learning, which will lead to a fuller and richer life. Adult students in CED classes have varied backgrounds and interests. Most of them carry on full-time occupations, have graduated from high school some time ago and have determined for themselves the need for earning a degree or for enrolling in courses for personal or occupational development. In addition, some students who are recent high school graduates are beginning their college career by enrollment in CED classes.

A large variety of degree credit courses are available on campus as well as at selected outreach centers. Courses offered might be for degree credit or non-degree credit. Academic advisors are available to advise students on course selection and registration procedures. Regular tuition rates are charged for courses offered. Adults who wish to enroll in a CED course are encouraged to visit the CED office in 122 Chadbourne Hall, (207) 581-3144 or visit the web page at dll.umaine.edu/cd/

Bachelor of University Studies

The Bachelor of University Studies Program presents to the highly motivated part-time student the opportunity to coordinate the offerings of the Continuing Education Division and Summer Session into an individually planned degree program. This program is designed specifically and solely for part-time students. The program is offered for individuals who did not continue directly to higher education after high school and who find that family, job, and other responsibilities do not allow a full-time program of study; those who have discontinued college or university programs and who now wish to re-enter a degree program and those with associate degrees who may wish to pursue a broader based baccalaureate program. The Bachelor of University Studies is not intended to duplicate or displace current programs or offerings of the University or of other schools and colleges. The degree differs in two major respects from traditional BA and BS degrees. First, it is offered only through the Continuing Education Division and only for adults who attend the University on a part-time basis. Second, each student, in consultation with a CED advisor, will design a program leading to specific educational goals but not necessarily within any one department, division, school, or college. A Steering committee composed of representatives of each of the University's colleges approves individual plans. Students in the Bachelor of University Studies must complete the University of Maine's general education requirements in addition to program requirements including: UST 100, Introduction to the Bachelor of University Studies; UST 300, Special Topics: and, UST 499, Senior Capstone and 30 UMaine program hours. The program is designed to be flexible and adaptable to the needs of the individual

part-time adult student. Prior to the submission of a University of Maine admission application form, prospective students must meet with an advisor of the Continuing Education Division. For an appointment or for further information call (207) 581-3305 or visit the web page at dll.umaine.edu/bus/

Certificate Programs Offered through the Continuing Education Division

Certificate of Postgraduate Studies in Business Administration (18 Credits)

The Certificate of Postgraduate Studies in Business Administration provides an understanding of the functional areas common to all business enterprises. This program furnishes the broad training necessary for successful business management in a rapidly changing environment. The certificate program consists of courses in management, production, finance, marketing, accounting, and economics.

Each applicant must have a bachelor's degree from an accredited institution and provide a transcript from each institution attended. Students must be proficient in college algebra and the use of word processing and spreadsheet software.

For an application and further information contact:

The Graduate Program Office,
Maine Business School
University of Maine
5723 Donald P. Corbett Business Building
Orono, ME 04469-5723
Telephone: (207) 581-1973
E-mail: MBA@maine.edu

Certificate in Health Care Administration (15 Credits)

The Certificate in Health Care Administration is a collaborative effort of Business, Public Administration, Nursing and Social Work to meet the growing need for advanced professional development and education in health care administration.

- Professionals with public or business administration background who wish to prepare for leadership positions in health care management and administration.
- Professionals working in the health care field such as doctors, nurses, social workers and allied health professionals who seek advanced knowledge and skills in health care administration.
- Individuals also interested in pursuing a graduate degree in conjunction with the certificate program.

All classes (except the Business courses and the business course prerequisites) will be taught live at the Acadia Hospital (Bangor, Maine) and viewed through Eastern Maine Healthcare's interactive videoconference system at Inland Hospital (Waterville, Maine), the Aroostook Medical Center (Presque Isle), and the Acadia Clinic at the Blue Hill Hospital, (Blue Hill, Maine).

For futher information, to enroll in the certificate program or to make an appointment, contact Becky Fielder, Public Administration Department, North Stevens Hall, Orono. E-Mail: Becky.Fielder@umit.maine.edu or phone (207) 581-1886.

The 15 credit Certificate in Health Care Administration includes the following courses:

BUA 678 - Marketing Management 3
(See prerequisites)
NUR 693 - Ethical Inquiry in Health Care 3
PAA 625 - Health Care and Human Services Policy and Administration 3
PAA 645 - Financial Management in Health Care 3
SWK 680 - Health Policy 3
Prerequisites:Must be completed prior to enrollment in BUA 678 - Marketing Management. Prerequisites may be taken in conjunction with other classes: BUA 201, BUA 370, ECO 310.

Graduate Certification Information Systems (18 Credits)

Technology is transforming today's organizations and information has become the lifeblood of modern enterprises. Information systems are vastly increasing the efficiency and effectiveness of organizations and allowing industry and commerce to provide innovative new services and products. As the need for information and its supply expands, the demand for knowledgeable analysts, integrators, designers, developers and administrators of such systems will continue to grow.

Three of the required six courses are offered in the fall (COS 598, SIE 451 and SIE 525) and the other three are offered typically in the spring (BUA 465, BUA 661 and COS 545). The courses may be taken on campus or by distance methods. Assuming that specific course prerequisites have been met, students may take up to two courses prior to formal admission into the graduate school. However, formal admission is highly recommended prior to taking a course to ensure that it counts towards a graduate program.

Applicants to the Graduate Certificate in Information Systems program must qualify for and be admitted to the University of Maine Graduate School in either the Graduate Certificate in Information Systems program of the Master of Science in Information Systems. The graduate school standards for admission to either program are identical. In addition to an application and official transcripts showing completion of an undergraduate degree, applicants must submit scores from the Graduate Record Exam and three letters of reference. For an application for admission, contact the Graduate School.

Distance Education Issues All lectures for the courses offered through this program will be videotaped and offered on-line using video streaming from the Continuing Education server. Other than textbooks, instructors are placing all or most of their course materials on-line. Some courses may require some travel to campus to complete laboratory exercises. The courses may be taken in any order provided prerequisites for each individual course have first been completed. In order to take the Graduate Certificate in Information Systems courses by distance methods, access, software and hardware requirements must be met.

Course Prerequisites The minimum general prerequisites for admission to the certificate program include the following:

- MAT 126 - Calculus I
- MAT 232 - Principles of Statistical Inference or
- MAT 215 - Introduction to Statistics for Business and Economics
- COS 220 - Introduction to Computer Science I (C++ programming)

Comparable courses completed at other universities may fulfill these prerequisite requirements.

Students Eligibility and Admission Criteria

Application for admission to the Graduate Certificate in Information Systems is through submittal of an application for admission to this specific certificate program through the graduate school. Only those formally admitted to the graduate school will be allowed to pursue this graduate certificate program. Those with less than a GRE of 1500 (or GMAT equivalent) and lower than an undergraduate grade point average of 3.0 are discouraged from submitting an application to the program. The time limit for completion of the Graduate Certificate is the same as that set by the Graduate School for completion of a master's degree.

For further information - www.spatial.maine.edu

The Graduate Certificate in Information Systems requires completion of the following six courses:

BUA 465 - Information Systems Development 3
BUA 661 - Knowledge Management and Decision Support Systems 3
COS 545 - Data Communications and Networking 3
COS 598 - Advanced Topics in Computer Science 1-3
SIE 451 - Engineering Databases and Information Systems 3
SIE 525 - Information Systems Law 3

Certificate of Studies in Accounting (21Credits)

The University of Maine Business School Certificate of Studies in Accounting (CSA) is designed for individuals who possess a bachelor's degree (or higher) in a field other than accounting and who want to prepare to enter the accounting profession. The CSA provides an understanding of the body of technical knowledge common to all practicing accountants. The program furnishes the broad training in accounting necessary to take the Certified Public Accounting (CPA) exam in Maine. The Certificate Program requires twenty-four credit hours in accounting (8 courses).

Each applicant must have a bachelor's degree from a regionally accredited institution and provide a transcript from each institution attended.

All courses must be taken for credit (no pass/fail permitted).

All course work must be completed with at least a 2.0 overall grade point average.

Including the last 12 credit hours, at least 50% of the candidate's coursework must be taken at the University of Maine.

Beginning with the May 2003 exam, the State of Maine will require 150 hours of education, including a bachelor's degree and 24 credit hours of accounting prior to applying to sit for the CPA exam. Students planning to take the CPA exam should take as many of the non-required accounting courses as possible plus business law (BUA 220 or its equivalent).

Students must be advised by an accounting professor regarding their program of study.

BUA 201 and BUA 202 may be taken in separate 3-week May or summer sessions to accelerate the student's progress through the program.

Certificate students who are planning to pursue a M.S. in Accounting at UMaine and are admitted to the Graduate School may take any 600-level accounting course as an elective.

BUA 201 - Principles of Financial Accounting I	3
BUA 202 - Principles of Managerial Accounting	3
BUA 301 - Intermediate Accounting I	3
BUA 302 - Intermediate Accounting II	3
BUA 305 - Cost Accounting	3
BUA 310 - Auditing	3
BUA 312 - Federal Taxation of Individuals	3

In addition, choose one of the following courses:

BUA 306 - Advanced Managerial Accounting	3
BUA 507 - Advanced Accounting	3
BUA 515 - Federal Taxation of Business Entities	3

Certificate in Classical Studies (18 Credits)

Interested in Classics? Want to read the Great Books from Classical Antiquity? Are you interested in Learning Latin?

And Mythology, and the Origin of Customs, Values, and Ideas from the Great Melting Pot of the Multicultural World of Classical Antiquity?

If these ideas are appealing to you, you may want to consider a New Program in Classical Studies offered through the Division of Lifelong Learning.

The classical period in Western history, defined as the period from the Bronze Age to the fail of the Roman Empire in the fifth century CE, comprises the roots of modern society. In order to understand where we are and where we are going, it is necessary to know where we have been. European and American literature, philosophy, law, religion, politics, language, and art have all been directly or indirectly formed in reaction to Classical culture. By examination and study of classical civilization, the student will develop a sense of how the ancients responded to the universal questions of human experience. Through an implicit comparison of the cultures of ancient Greece and Rome to our own, the student will also come to have a fuller understanding of the humanist and cultural impulses which have formed and which continue to form our own experience.

This program is available through the Division of Lifelong Learning, Continuing Education/Summer Session. Courses will be available through a combination of distance education and evening or weekend on-site courses at the University of Maine. For more information, please contact:

Kristina Passman,
Coordinator of Classical Studies Program
Associate Professor of Classical Languages and Literatures
Department of Modern Languages and Classics,
(207) 581-2073
Passman@maine.edu

Certificate in Equine Studies (18 Credits)

The Certificate in Equine Studies is designed for individuals from various backgrounds who wish to improve their knowledge of equine management and reproduction. The program is designed to cater to the needs of each individual, from beginners with no horse experience, to equine professionals who wish to strengthen their equine credentials. Although the Certificate can provide a broad education on horses, possible areas of specialization include harness race horse training, assisted equine reproduction, and draft horse management.

Currently there is no program providing further education about equine management and reproduction available to the horse-owning public in Maine. As a result of this lack of information, horses, and their owners, frequently suffer unnecessary economic and physical hardship. The University of Maine now has the expertise available to correct this deficiency by offering this Certificate in Equine Studies through Animal and Veterinary Sciences and the Division of Lifelong Learning.

Prior to entry into the program, applicants must complete BIO 100 at the University of Maine or an equivalent course at another institution.

Requirements for Completion of the Certificate:

The student must complete the following three classes.

AVS 203 - Equine Management	3
AVS 353 - Equine Reproduction and Breeding Management	3
AVS 397 - Equine Internship	4

The student selects an additional 8 or more credits from this list:

No more than 8 credits of AVS 397 may be counted towards the 18-credit total.

AVS 145 - Animal Science	4
AVS 150 - History of the Human-Animal Relationship	3
AVS 151 - History of Veterinary Medicine	3
AVS 243 - Centered Riding Principles of Equitation	3
AVS 343 - Draft Horses in Sustainable Forestry and Agriculture	2
AVS 368 - Independent Study in the Animal Sciences Ar	
AVS 393 - Training the Standardbred Horse	3
AVS 397 - Equine Internship	4
BUA 201 - Principles of Financial Accounting I	3
EDB 202 - Schools, Students, and Society	3
EES 100 - Human Population and the Global Environment	3
KPE 378 - Physiology of Exercise	3

Certificate in Landscape Horticulture Studies

The Certificate in Landscape Horticulture Studies (LHS) is a new program at the University of Maine, which offers students the opportunity to pursue the study of landscape horticulture through a series of core courses. Optional satellite certificate programs allow students to specialize in an area of their choice.

Certificate in Ornamental Plant Materials (12 Credits - The CORE)

LHC 110 - Horticultural Science	3
LHC 219 - Herbaceous Landscape Plants	3
LHC 221 - Woody Landscape Plants I	3
LHC 222 - Woody Landscape Plants II	3

Certificate in Ornamental Plant Production (16 credits)

The CORE plus (12 cr.)

LHC 423 - Plant Production 4

Certificate in Landscape Management (15 credits)

The CORE plus (12 cr.)

LHC 425 - Landscape Management 3

Certificate in Garden Design (19 credits)

The market potential for the certificate program is mainly the non-traditional student who is looking for opportunities that would allow them to take specific courses in an area of horticulture interest This certificate program is based on the premise potential students will only take one course per semester. Therefore the core can be finished in five sequential semesters. The Core program will begin in the spring semester only with LHC 110 Horticultural Science. This will accomplish two major objectives, 1) allows entering students to take the prerequisite course (LHC 110) before the fall semester. Secondly this allows students transferring into the LHC Program in the spring semester the opportunity to take the prerequisite course (LHC 110) before the fall semester thus allowing the student to mainline into the LHC Program sooner. The satellite certificate programs can be started upon completion of the core.

The CORE plus (12 cr.)

LHC 225 - Landscape Graphic Communication 3

LHC 328 - Landscape Design 4

Certificate in Maine Studies (18 Credits)

http://www.ume.maine.edu/ced/mainestudy/

The Certificate in Maine Studies offers students an opportunity to specialize in the study of Maine through courses in history, literature, women's studies, Franco-American studies, Native American studies, economics, political science, sociology, geology, geography and biology. The program recognizes the value of a multidisciplinary approach to understanding historical and contemporary issues such as developing Maine's economy, protecting its environment and appreciating the cultures of the state's diverse population.

Courses are available through Continuing Education during fall and spring semesters, May Term and Summer Session. Students may take courses as distance learners through interactive television, video conferencing, computer conferencing, the World Wide Web, or through a combination of technologies. With faculty approval, students may also make special arrangements for readings courses, independent studies, or field studies. In recognition of the completion of 18 credits in courses offered through the Maine Studies program, the Division of Lifelong Learning will award the Certificate.

Courses in Maine Studies will lead teachers, government workers, service providers and business people to a greater understanding of historical and present-day Maine; and people with a general interest in Maine will enjoy an enriched appreciation for the state's land and people, the history and culture, the flora and fauna. For more information or to enroll in the program, please contact:

Carol Nordstrom Toner
Coordinator, Certificate in Maine Studies
Division of Lifelong Learning
5713 Chadbourne Hall
The University of Maine
Orono, Maine 04469-5713
E-mail: carol.toner@umit.maine.edu
Telephone: (207) 581-3147
Fax: (207) 581-3141

Child and Family Services Post-Baccalaureate Certificate (15 Credits)

The Child and Family Services Certificate is a 15 credit post-baccalaureate certificate program focusing on the knowledge, values and skills necessary for practice with children and families. The core curriculum is built around the foundation year courses of the University of Maine's Master of Social Work program, and utilizes distance education technology and off site locations to meet the needs of a statewide audience. At least one course per semester (Fall, Spring, Summer) will be offered over the UNET system via compressed video. Off-site location courses will be offered at the Bangor Department of Human Services office. All courses taken through the Child and Family Services Certificate program are recorded on a transcript and credits earned can be applied towards the M.S.W. degree if the student is accepted into the UM School of Social Work. Enrolling in the Child and Family Services Certificate Program does not guarantee admission into the matriculated M.S.W. program. Please contact School of Social Work, (207) 581-2389 for further information.

Certificate in School-Based Adventure Education (12 Credits)

The Certificate in School-Based Adventure Education prepares students for entry level positions and provides continuing education opportunities to current practitioners and teachers, The certificate focuses primarily on the use and management of the ropes course and artificial climbing walls in the public school, camp, and organizational settings. The curriculum also introduces the student to generic skills in wilderness travel and wilderness medicine.

Suggested courses and sequence:

KPE 209 - Wilderness First Responder 3

KPE 284 - Rock Climbing-Principles and Movement 1

KPE 285 - Artificial Climbing Wall Management 1

KPE 286 - Adventure Activities and Initiatives 1

KPE 287 - Ropes Course Management 1

KPE 311 - Wilderness Education Skills 3

KPE 384 - Practicum in Kinesiology and Physical Education 1-3

Corporate and Organizational Learning Services

The University of Maine provides customized educational programs on the latest topics and techniques for companies, institutions and organizations. These programs address specific needs in content, delivery method and timing. For example, non-credit certificates currently offered by the Continuing Education Division include: Certificate in Supervision, Certificate in Human Resource Management and Advanced Human Resource Management. All instructors are professionals in their fields selected for their knowledge, teaching effectiveness and training expertise. For more information call (207) 581-3414. visit the web page at dll.umaine.edu/pdp/

Distance and Online Education

Distance and Online Education offer courses in many disciplines throughout the year. Courses are delivered through various technologies and formats including interactive television, compressed video, internet, intranet, video streaming technologies and combinations of these systems. Depending on the technology utilized, students participate in the class "live" or asynchronously through materials archived online.

Distance Education satisfies the needs of a diverse student population as near as the University of Maine and as far as the most remote international location. The program offers maximum flexibility, allowing students to plan courses around their demanding schedules. Technology brings previously inaccessible courses to many more students, facilitating degree completion for some and opening new learning pathways for others.

Interactive Television Courses (ITV)

ITV courses are broadcast real-time by faculty from the University of Maine campus to over 100 centers and sites across Maine. Students attending at these sites view the class on TV monitors and interact with the instructor and the other students using a toll-free classroom telephone.

Compressed Video Courses

Using a computer, television signals can be compressed and sent through phone lines. Through television monitors, students interact with classmates throughout Maine and all over the world. Students see, hear, and speak with people anywhere in the world, creating a global classroom environment.

Online Courses

While the ITV and compressed video courses are available at sites and centers throughout Maine, the online and video streaming courses offer prospective students significant flexibility. Regardless of the time (or time zone) students may access courses at their own convenience. Students contemplating enrolling in an online course should always refer to the course web page to ensure that they meet all technical requirements.

Video Streaming Courses

University of Maine online courses are not simply text-based but deliver audio and video on-demand viewing. Audio and video files are delivered through "streaming" technologies which allow for immediate access. There is no waiting for the material to download, and the files do not use any storage space on student's computer. Student contemplating enrolling in a course that utilizes video streaming should always refer to the course web page to ensure that they meet all technical requirements.

Students can obtain further information about specific courses at http://Learnonline.umaine.edu/

Direct questions and comments to (207)581-3075, toll free @ 1-877-947-HELP or email LearnOnline@umit.maine.edu.

Institutes (Non-Credit Continuing Education Course Offerings)

The University of Maine will award an appropriate number of Continuing Education Units (CEUs) to those who satisfactorily complete a non-credit course/program. The CEU, generally recognized throughout the country, has been adopted as a uniform means of recording, measuring, and recognizing efforts in noncredit, post-secondary education. The CEU is defined nationally as ten contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction. The Continuing Education Division maintains permanent records. An official transcript showing the course titles and the number of CEUs earned will be issued upon request. The Continuing Education Division is responsible for the administration of internally initiated courses/programs. The Conference Services Division administers the CEUs for all externally initiated Programs. CEUs may not be converted to degree credit. For more information call (207) 581-3414.

Summer Session

Summer Session offers courses and programs to meet the needs of full-time, part-time, day, evening, weekend, on-campus and distance students during the months of May, June, July, and August. Serving degree and non-degree students, Summer Session offers over 500 courses in three-week, five-week, six-week, and eight-week calendars to those seeking educational experiences for personal and/or professional growth.

Summer Session, established in 1895, is designed to meet the needs of regularly enrolled college students, educators, and those seeking cultural and professional growth in specific fields. Regularly enrolled students of the University of Maine and other collegiate institutions likewise find an opportunity to make up work they have missed during the regular school year or to secure additional credits in anticipation of individual needs. Those not engaged in formal study who desire to attend the session for general purposes may do so when prerequisites are met. Credit earned in Summer Session is fully recognized and may be counted toward the degrees that the University of Maine confers or may be transferred to other colleges and universities.

To allow students the greatest degree of flexibility in scheduling, 7 three-week sessions, 2 five-week sessions, 2 six-week sessions and 3 eight-week evening sessions are scheduled between mid May and the end of August.

The Summer Session Office is located in 122 Chadbourne Hall, (207) 581-3144. Students who are not matriculated in one of the colleges of the University may receive academic advising in the Summer Session Office for planning their educational programs. http://dll.umaine.edu/summer/

Travel Study Program

The Continuing Education Division collaborates with faculty members to offer travel study opportunities, which enhance classroom learning and provide direct contact with diverse cultures in a variety of international settings. Credit is awarded depending upon the length of the course and its academic requirements. Recent programs have included courses in Ireland, England, Italy, Honduras, Nicaragua, Quebec, Jamaica and Mexico. To learn more about Travel Study Programs contact the Continuing Division office at (207) 581-3414. http://dll.umaine.edu/travelstudy/

Hutchinson Center

The Hutchinson Center provides the people of mid-coast Maine with opportunities to pursue a college degree, professional development, and lifelong learning. The Hutchinson Center also offers a variety of community education and outreach programs geared toward the interests and needs of the region's citizens. Located one hour south of the University of Maine's campus, educational opportunities include UMaine Bachelor's Degrees in Business Administration and in Psychology, the first two years of a Bachelor of Arts degree in a number of fields, and Master's degrees in Business Administration and in Social Work. Graduate courses in K-12 education and other credit and non-credit courses and programs are also offered. A Bachelor of University Studies degree may be completed on site. A state-of-the art telecommunications facility, the Hutchinson Center combines courses, programs and events offered live on-site with lectures and meetings offered through distance education media, including courses delivered through the University Network for Education and Technology Services (UNET). For further information contact: The Hutchinson Center, 80 Belmont Avenue, Belfast, ME 04915, (207) 338-8000/ 1-800-753-9044, Fax: (207) 338-8001 or visit the web at www.hutchinsoncenter.umaine.edu.

Onward Program

The Onward Program offers academic support services to students enrolled at the University of Maine. Services include college preparatory courses in writing, mathematics, science and reading; individual and group counseling; tutoring; and services for students with disabilities. All program services are designed to assist non-traditional students, low income students and students with disabilities to achieve their educational goals. At the heart of the Onward Program is the one-to-one personal involvement and contact, especially the development of a close personal relationship between student and staff. Students who want more information about these services or who feel they could benefit from participation in these services should contact the Onward Program, 5757 Onward Building, University of Maine, Orono, ME 04469-5757. Phone: (207) 581-2319/2320. www.umaine.edu/Onward/

Counseling:

The Onward Program counselors help students, through individual and small group counseling, to achieve their academic, vocational and personal goals. Counseling provides students with opportunities to gain information, explore values, make decisions, address concerns and resolve problems and conflicts. Counselors provide a safe, confidential atmosphere where students may discuss and explore attitudes, feelings, values, plans, life styles and problems. Individuals requiring ongoing therapy will be provided with an appropriate referral. Peer Advisors, a special group of upper-class students, assist Counselors in providing support and orientation activities for the new students.

Office of Services for Students with Disabilities:

The Counselor/Coordinator of Services for Students with Disabilities facilitates the education of students with physical, emotional or learning disabilities by providing a point of coordination for special services they may need while attending the University of Maine.

Some of the services provided or coordinated for disabled students are advising, special orientation to campus, readers, recorders, the ordering of taped texts, classroom relocation, priority registration, mediation and advocacy, classroom accommodations, as well as personal, educational, and vocational counseling. Students believed to be learning disabled without documentation can be screened through this office and referred for assessment outside of the University at their own expense.

The Counselor/Coordinator of Services for Students with Disabilities has an office in the Onward Building and will be happy to supply further information and answer questions. Students are encouraged to contact the Counselor/Coordinator of Services for Students with Disabilities, 5757 Onward Building, University of Maine, Orono, ME 04469-5757. Phone (207) 581-2319. TTY for the Deaf (207) 581-2311.

Tutoring:

The Tutor Program provides tutorial services for University of Maine students who need academic assistance in most 100 and 200-level courses. Tutorial assignments are made in small groups to promote and encourage collaborative learning. By working together, students learn how to process course material and sharpen their reasoning and questioning skills. Sessions are process-oriented, learner-centered, and require the active participation of each group member.

To be eligible for services, students must be enrolled in at least six credits and enrolled in a degree program.

Requests for tutors are accepted during the first eight weeks of the semester or until funds are exhausted, whichever comes first Assignments are made based upon the availability of qualified tutors, funding and course demand. For further information contact the Tutor Program, 104 Dunn Hall, (207) 581-2351.

Onward College Preparatory Courses:
Onward Courses earn no degree credit. Grades earned are calculated into the semester grade point average. Each college determines how developmental course grades will be treated in the accumulative grade point average. Onward courses and descriptions can be found in the course description section of this catalog.

Peace Studies

The University of Maine Peace Studies Program focuses on education for peace, justice, human rights, nonviolence, tolerance, global understanding, interdependence and mutuality, and environmental responsibility. Through its academic studies and various educational, research, and outreach programs, Peace Studies infuses concerns for peace and the practice of transformative conflict resolution into the University of Maine campus and community. The Peace Studies Program joins with the people of Maine in creating cultures of peace in our state, nation and world. dll.umaine.edu/peace/.

Conflict Management at the University of Maine (CMUM)

Peace Studies sponsors CMUM, which provides conflict management services to students and other members of the campus community. Peace Studies offers PAX 451 - Mediation: Its Premises, Practices, and Policies, a 3 credit course which trains students in basic mediation skills and prepares students for the opportunity to mediate with the Conflict Management Program. Additionally, students who want further training in mediation can take PAX 452 - Advanced Study in Transformative Mediation. For more information about CMUM, call (207) 581-2639.

Peace Studies Interdisciplinary Curriculum

The Peace Studies Interdisciplinary Curriculum requires a minimum of 18 credits of study: 12 credits of required PAX courses and 6 credits of electives. Required courses include PAX 201, Introduction to Peace Studies (which satisfies the general education requirement in the Human Values and Social Context category, both in Social Contexts and Institutions, and Cultural Diversity and International Perspectives), PAX 410 - Theories in Peace Studies and two PAX courses chosen from PAX offerings each semester. Also available is Special Projects in Peace Studies (PAX 498, section 001, for 1-6 credits), which offers advanced individual study, research, and written projects in Peace Studies and related areas. This course is conducted under the guidance of a faculty member associated with the Peace Studies Program. Students who wish to enroll in the Peace Studies Interdisciplinary Curriculum should visit the Peace Studies office, 211 East Annex, (207) 581-2609, for assistance or further information. Enrollment is open to all undergraduate students at the University of Maine and there are no admissions requirements beyond those of the college a student is entering.

Curriculum

Required courses (12 credits):

PAX 201 - Introduction to Peace Studies	3
PAX 410 - Theories in Peace Studies	3
2 courses from the following list:	
PAX 350 - Buddhism, Peace and Contemplative Traditions	3
PAX 351 - This Sacred Earth: Ecology and Spirituality	3
PAX 360 - Conflict Resolution: A Relational Approach To Working Through Conflict	3
PAX 398 - Topics in Peace Studies	3
PAX 451 - Mediation: Its Premises, Practices and Policies	3
PAX 452 - Advanced Study in Transformative Mediation	3
PAX 491 - Forgiveness: Creating a Culture of Peace and Reconciliation	3
PAX 495 - Advanced Topics in Peace Studies	3
PAX 498 - Special Projects in Peace Studies	1-6

Elective Courses (6 credits):

In conversation with a Peace Studies advisor, select two additional university courses.

Women's Resource Center

The Women's Resource Center (WRC) promotes and maintains a close relationship between the women on the University of Maine campus and women in the larger Maine community. Located at 101 Fernald Hall, the WRC works with women of all ages and offers mentoring opportunities with women activists, support for women in non-traditional career fields, and gender equity programs for pre-college girls and educators. Leadership, skill development and research opportunities are available to University of Maine undergraduate and graduate students who are work-study and work-merit eligible. The WRC assists women who have specific needs and special concerns and brings together women with similar values and goals. Each year, the WRC embarks on new initiatives that reflect the interest and needs of the campus community.

The Women's Resource Center seeks to promote within the University community a broader understanding of the diverse experiences of all women. The Center serves as a resource for individuals and organizations, offering information and referrals for women's programs and services, on and off campus. In addition to an extensive collection of books, periodicals and videos of interest to women, the Center provides an accessible meeting space for small groups, a dedicated office and meeting space for the Student Women's Association, a semester calendar of events and resource/referral manual. To find out more about the WRC, go to our web site: www.wrc.umaine.edu/ or call (207) 581-1508.

University Wide Academic Programs

General Education

Every University of Maine academic program is based upon a strong foundation in the liberal arts and sciences. The University's goal is to ensure that all of its graduates, regardless of the academic major they pursued, are broadly educated persons who can appreciate the achievements of civilization, understand the tensions within it, and contribute to resolving them. This component of every program is called general education, and it amounts to about one third of every program. The design of general education at the University of Maine is meant to be flexible within the broad goals it seeks to achieve. It affords each student many ways of meeting its requirements, which fall under the six broad categories outlined below.

Science

Each program must include two courses in the physical or biological sciences. This may be accomplished in two ways:

1. By completing two courses with laboratories in the basic or applied sciences;
2. By completing one laboratory course in the basic or applied sciences, and a second approved course that incorporates a laboratory experience and stresses the applications of scientific knowledge.

Human Values and Social Context

Each program must include 18 credits in this broad area, selected from lists of approved courses to satisfy each of the five sub-categories. (Courses that satisfy requirements in more than one sub-category may be counted in each appropriate sub-category, but credits may be counted only once.)

1. Western cultural tradition
2. Social context and institutions
3. Cultural diversity and international perspectives
4. Population and the environment
5. Artistic and creative expression

Mathematics

Each program must include at least six credit hours in mathematics, including statistics and certain courses in computer science. No more than three of the six credit hours may be in computer science.

Writing Competency

The ability to write well is one of the most important attributes of an educated person. To help ensure this outcome the University requires its students to write throughout their academic careers, focusing both on general-purpose writing and professional writing within their majors. Each program must include:

1. ENG 101, College Composition. All students must complete this course with a grade of C or better, or be excused from this course on the basis of a placement exam or completion of HON 111 and HON 112 with a grade of C or better in each.
2. At least two courses designated as writing-intensive, at least one of which must be within the academic major.

Ethics

Each program must include at least one approved course or series of courses placing substantial emphasis on the discussion of ethical issues.

Capstone Experience

Every program must include an approved capstone experience within the major. The goal is to draw together the various threads of the undergraduate program that bear directly upon the academic major in an experience that typifies the work of professionals within the discipline. Normally, the Capstone would conclude at the end of the student's senior year. Students should consult closely with their academic advisor to explore the range of options available for meeting this requirement.

Up-to-date listings of all courses approved for the general education program can be found at the Office of Student Records Web site at: www.records.ume.maine.edu . Click on the General Education Requirements title listed under the Academic Information area. Background information about the general education requirements is given along with explanations of the requirements of each category. Courses approved for each category can be found by clicking on the category.

A student need complete only one set of UMaine General Education Requirements, even if completing more than one academic major or baccalaureate degree. For example, a student completing a double major need complete the "writing intensive course in the major" and the capstone experience only for the designated primary major. Exception: some departments may specifically require their writing intensive and capstone courses as part of the major, aside from their role in general education. In this case the double-major student must complete them, not because of general education policy, but because the major program requires them.

The University Honors College

The University of Maine offers one of the nation's oldest continuing programs for honors-level students. Open to students in all colleges and majors, The Honors College provides a unique opportunity for motivated students to investigate diverse academic areas of the University, to be challenged in a supportive intellectual environment, and to engage fellow students and enthusiastic, distinguished faculty in thoughtful, provocative discussion. Students in The Honors College complete an academic major in one of the University's five academic colleges while completing most of their general education program and a thesis in The Honors College. The benefits and rewards are substantial, and the program is flexible enough to be tailored to each student's needs and interests.

Students and faculty involved in The Honors College represent all of the five academic colleges and most of the departments that comprise the University. As a community of five hundred students within the University of Maine, the Honors College offers small, interdisciplinary classes, where students and faculty members interact closely, sharing ideas and insights developed through critical exploration of primary sources.

The College is based on the belief that genuine excellence in college-level studies means substantial competence in areas outside a major field of specialization as well as excellence within it. An emphasis on learning that both broadens and deepens has been the foundation for the building of courses in The Honors College. They expand students' perspectives by exploring areas of thought not closely related to their major fields and to allow them to work in their majors with greater intensity than would be possible within a conventional course pattern. Honors study begins with interdisciplinary broadness and concludes with unparalleled depth in the major field.

First- and second-year Honors preceptorials are limited to twelve students. Together with a faculty preceptor they study the origins and development of civilization and culture. Each year the College offers ten diverse third-year Honors tutorials (HON 310), each of which brings together eight students, a member of the faculty, and a topic that engages them in a focused academic inquiry. The curriculum culminates with a yearlong senior thesis (HON 498/499) in which each Honors student, working closely with a faculty advisor, embarks on a course

of independent scholarship, developing and completing a research or creative project.

Administrative Structure

The Honors College is university-wide and is administered by a director who reports to the Associate Vice President for Academic Affairs. The policy-advising body for the College is the Honors Council that includes faculty, staff, and students. Honors Secretaries are faculty members designated by their college to represent the college on the Honors Council and to work with students, faculty, and the administration of the college on matters concerning The Honors College. A Student Advisory Board consisting of Honors College students representing various years and disciplines also advises the director.

Admission

Entering first-year students are invited to join The Honors College on the basis of their admission records. To be eligible, students should have a strong academic record, score well on the SAT (ACT), and show curiosity, initiative, and intellectual flexibility in academic work. Students may also enter the College by applying to the director. Second-semester first-year students and first-semester second-year students are invited into the College through faculty recommendations. Transfer students wishing to join The Honors College should consult with the director.

Degree

The level of honors awarded - no Honors, Honors, High Honors, or Highest Honors - depends on the quality of the senior thesis or project and the performance on the senior oral examination. Honors designations are recommended by the student's thesis committee to the Honors College director. The designation appears on both the student's degree and on the transcript; the thesis title also appears on the transcript.

College and University Requirements

Successful completion of HON 111, HON 112, HON 211, HON 212, and a Honors tutorial satisfies all of the Undergraduate General Education Human Values and Social Context and Ethics requirements. In addition, successful completion of HON 111 and HON 112 with a grade of C or better in each satisfies the University's basic composition requirement (ENG 101), and a number of departments accept the honors thesis as a capstone experience. For specific information, contact the appropriate college honors secretary or department chair.

For Further Information

Questions about The Honors College should be addressed to Professor Charlie Slavin, Director, The University of Maine Honors College, Colvin Hall, Orono ME 04469-5716. The phone number is (207) 581-3263 and information can also be requested at honors@maine.edu. The College maintains a web site at www.honors.umaine.edu.

Requirements

The Honors College requires its students to complete the four core courses HON 111, HON 112, HON 211, and HON 212; one HON 309 or HON 310 tutorial; and the senior thesis (HON 498 and HON 499). To graduate in Honors, students must attain a minimum 3.3 grade point average in all their course work.

Courses offered by the College on a regular basis include:

HON 111 - Civilizations: Past, Present and Future I	4
HON 112 - Civilizations: Past, Present and Future II	4
HON 151 - Honors First-year Summer Seminar	3
HON 211 - Civilizations: Past, Present and Future III	4
HON 212 - Civilizations: Past, Present and Future IV	4
HON 309 - The Honors Read Tutorial	3
HON 310 - Honors Tutorial	3
HON 391 - Introduction to Thesis Research	1

On an individual basis, students also enroll in:

HON 190 - Honors Summer Readings: Basic	1
HON 290 - Honors Summer Readings: Intermediate	1
HON 396 - Honors Independent Study	1-3
HON 397 - Honors Specialized Study	1-3
HON 398 - Honors Independent Research	1-3
HON 498 - Honors Directed Study	3
HON 499 - Honors Thesis	3

Academic and Career Exploration Program

Students entering college are often undecided about a major or to have several areas of academic interests. These students can apply for admission to the Academic and Career Exploration program (ACE) rather than to one of the baccalaureate degree colleges at UMaine. ACE provides undecided students the opportunity to assess their abilities, interests and goals while systematically investigating various academic programs.

Through special seminars and close contact with their advisor, ACE students engage in structured activities, which enable them to make an informed choice of major and to consider potential careers. Under the guidance of their advisors, ACE students select courses to investigate disciplines of interest as well as to fulfill general education requirements.

Generally, students continue in the ACE program for up to one year. By the end of the second semester many ACE students will feel confident they have identified an academic program that matches their abilities and intellectual or career interests. At the time of declaration of major or transfer to a college, students must meet the eligibility requirements (e.g., GPA) of the program or college of interest. ACE students may choose to major in any of the undergraduate programs at the university, provided they meet the eligibility standards and space is available. Further information may be obtained by calling the ACE Coordinator at (207) 581-1831.

Health Professions

(Pre-Medical and Related Pre-Professional Programs)

Few careers are as challenging or as satisfying as the practice of medicine or one of the related health professions (dentistry, optometry, veterinary medicine, and others). Admission to post-baccalaureate professional schools is highly competitive, but is a realistic goal for able students who plan their undergraduate programs carefully. Most professional schools value well-rounded applicants possessing a strong background in the liberal arts and solid preparation in the sciences. For this reason the University of Maine does not recommend one specific academic major for students planning to apply to medical or other professional schools. Instead, we advise students in any academic major who are interested in a health-professions career to pursue the minor in Pre-Professional Studies outlined below in addition to their major.

Here are some of the special advantages The University of Maine offers to students planning careers as physicians, optometrists, dentists, podiatrists, physician assistants, and in related health professions.

Introduction to the Health Professions

The University of Maine offers a special course in the sophomore year for students thinking about a career in the health professions. Dr. Mark Jackson, D.O., Director of the University's Cutler Health Center teaches this three-credit course. The course introduces students to the many different components of the modern health care system, and gives them practical, hands-on experience assisting professionals in the Cutler Health Center.

Minor in Pre-Professional Studies

The courses outlined below meet the entrance requirements of the majority of

professional schools and colleges offering post-baccalaureate programs in the health professions. Students should plan these courses in addition to the specific requirements of their academic major. The Health Professions specialist can help students research the admission requirements of specific schools.

First Year-First Semester

BIO 100 - Basic Biology	4
CHY 121 - Introduction to Chemistry	3
CHY 123 - Introduction to Chemistry Laboratory	1

First Year-Second Semester

BIO 200 - Biology of Organisms	4
CHY 122 - The Molecular Basis of Chemical Change	3
CHY 124 - The Molecular Basis of Chemical Change Laboratory	1

Second Year-First Semester

CHY 252 - Organic Chemistry II	3
CHY 254 - Organic Chemistry Laboratory II	2
INT 200 - (BSC) Orientation to Health Professions	3
MAT 126 - Calculus I	4
or MAT 151 - Calculus for the Life Sciences	4

Second Year-Second Semester

CHY 251 - Organic Chemistry I	3
CHY 253 - Organic Chemistry Laboratory I	2

Third Year-First Semester

BMB 322 - Biochemistry	3
BMB 323 - Introductory Biochemistry Laboratory	1
PHY 111 - General Physics I	4
or PHY 121 - Physics for Engineers and Physical Scientists I	4

Third Year-Second Semester

PHY 112 - General Physics II	4
or PHY 122 - Physics for Engineers and Physical Scientists II	4

Health Professions Specialist

The University of Maine's Health Professions specialist provides wide-ranging support services to students planning to attend medical school or other professional schools. The Health Professions Specialist

- advises students about the entrance requirements of professional schools
- helps students schedule courses and entrance examinations
- helps them prepare for admissions interviews
- prepares letters of recommendation and assists with the application process
- arranges group visits to medical schools and visits of medical school admissions officials to the University of Maine
- provides support to the Health Professions Club
- coordinates the Health Professions Mentor Program

The Health Professions Mentor Program

This program, offered in conjunction with Eastern Maine Medical Center, places qualified undergraduates with physicians and other professionals in the Bangor area to job-shadow and learn first hand the challenges of a medical career. This kind of experience, coupled with a record of volunteer service in medically related fields, is very important for students applying to medical schools.

Undergraduate Research

The University of Maine offers qualified students outstanding opportunities to work with its research faculty in a wide variety of disciplines. Participation in research helps students to develop critical thinking skills and the habits of independent scholarship, and therefore is highly valued by medical and other professional schools. Students planning careers in the health professions should work with their academic advisors and the Office of Health Professions to identify research opportunities early in their undergraduate careers.

Three plus Four Medical School Program

The University of Maine and the University of New England College of Osteopathic Medicine (UNECOM) cooperatively offer a special program for the most capable students enabling them to be admitted to UNECOM after completing three years at the University of Maine as majors in Biology, Biochemistry, or Microbiology. Students accepted into this program by UNECOM earn their baccalaureate degree from the University of Maine upon completion of their first year of medical school at UNECOM. For more details and a complete UMaine curriculum, contact the Office of Health Professions at (207) 581-2587.

Dedicated Undergraduate Scholarships

Each year the University awards approximately $30,000 in scholarships to undergraduates planning careers in the health professions.

Gilbert Loan Fund

Each year the University of Maine makes low-interest loans totaling several hundred thousand dollars to its graduates who are in medical school to help finance their professional studies. This unusual program is made possible through a multi-million-dollar bequest to the University in the name of Charles E. Gilbert to assist students of modest means to become physicians. Loans may also be made to undergraduates planning careers in the health professions.

Pre-Law Program

Law schools do not require specific undergraduate majors or courses. A special pre-law advisor, who supplements the academic advisor within the major program, counsels University of Maine students planning to attend law school.

ROTC Programs

Both Army and Navy ROTC programs are available to University of Maine students who want to become commissioned officers. The Army program is headquartered on campus, while the Navy program is offered in cooperation with Maine Maritime Academy. Both programs have offices on campus and offer a variety of scholarships.

Army

The Army ROTC program leads to a commission as a second lieutenant in the United States Army, Army Reserves or Army National Guard. Students enrolled in ROTC classes may pursue any university curriculum that leads to a baccalaureate or higher degree.

The Army ROTC program is designed around two levels: the Basic and Advanced courses of military studies. The Basic Course of MIS 100 and MIS 200 level courses is open to all university students with the exception of MIS 100 - Leadership laboratory, which is only open to enrolled or contracted ROTC students. Students taking classes in the Basic Course are not under any obligation to the Army.

Students may take MIS courses at the 300 and 400 levels only with the permission of the Professor of Military Science. Students wishing to contract and pursue a commission as a second lieutenant in the United States Army may do so in one of four ways:

1. Be selected and accept a ROTC Scholarship
2. Complete MIS 101, 102, 201, and 202 classes with an average grade of "C" or better, be accepted by the Professor of Military Science, and sign a contract at the end of the sophomore year or during the first semester of the junior year
3. Complete a five-week summer training session before the start of the junior year, after which the student may contract
4. Veterans of any branch of the military may be eligible to contract at the start of their junior year.

The Department of the Army offers four, three and two-year Scholarships, a four and a two-year Dedicated National Guard Scholarship, and two-year Guaranteed

Reserve Forces Duty Scholarships to selected students who have demonstrated outstanding leadership and scholastic ability. These scholarships pay up to $17,000 per year toward tuition and mandatory fees, $600 per year for textbooks, and $250 - $400 per month tax free stipend during the academic year for the duration of the scholarship. Four-year scholarship winners (with 1100+ SAT scores) or three-year Advanced Designee scholarship winners (with 1200+ SAT scores) who attend the University of Maine will receive an additional $2,500 grant annually from the University of Maine. Non-scholarship contracted students in the last two years of the program also receive the tax-free $350 - $400 monthly stipend during the academic year.

Army ROTC at the University of Maine is an Army Partnership in Nursing Education program, and has special, designated scholarships and programs for qualified UMaine nursing students.

The program has administrative and medical requirements which must be met in order to qualify for a scholarship, contract and commission.

Specific information regarding the program and Army ROTC classes may be obtained by contacting a Military Science advisor at (207) 581-1121, or toll free at 1-888-942-ROTC.

Program Requirements:
Professional Military Education Courses:

All Army ROTC students must complete courses in each of the following areas in order to qualify for a commission as an Army officer. See a Military Science faculty member for which specific courses fulfill these requirements.

1. Written communication skills
2. Military history
3. Computer literacy

Recommended courses:
1. Management Skills
2. National Security Studies

Most UMaine colleges accept some Military Science courses toward degree completion. Check with the individual college to determine credit awarded. All Military Science credits count toward a student's overall GPA.

Navy

The Naval ROTC program is designed to train and educate qualified students for commissioning and active service as officers in the United States Navy and United States Marine Corps. Commissionees also receive a minor in Naval Science.

Program requirements:

In order to be eligible for application to this program a student must:

1. Be a US citizen
2. Be at least 17 but less than 21 years of age
3. Be physically qualified
4. Possess satisfactory records of academic ability and moral integrity
5. Demonstrate those characteristics desired of a Naval Officer and
6. Have no moral obligation or personal conviction that will prevent the bearing of arms.

The Naval ROTC Scholarship Program offers the following benefits: all tuition paid, up to $400 per month subsistence allowance during the school year and a substantial uniform allowance. Eligible graduates of this program receive commissions in the United States Navy or Marine Corps and serve on active duty a minimum of four years. High school students may apply for the national scholarship program between March 1 of their high school junior year to November 15 of their high school senior year. Application forms are available from any Navy recruiter and most guidance counselors. Early application is recommended as this program is highly competitive. Students already enrolled at UMaine may also be eligible for non-national scholarships.

The Naval ROTC College Program offers students not on scholarship an opportunity to participate in ROTC. The monetary benefits of the College Program include: a substantial uniform allowance and up to $400 per month subsistence allowance during the junior and senior years. Graduates of the College Program receive commissions and are required to serve on active duty for three years. Students may apply for the College Program from the beginning of their first year to the end of their sophomore year.

Students in the College Program may apply for 2 and 3-year scholarships. Selection is based on academic and Naval ROTC performance. Scholarships are also available for students in the technical majors (engineering, physics, etc.) who have successfully completed at least one semester of college. Special Navy and Marine Corps scholarships are available to Hispanic and African-American students.

Specific information regarding the program and Naval Science courses may be obtained by calling (207) 581-1551.

Interdisciplinary Curricula:

Interdisciplinary curricula provide students the opportunity to integrate substantive material across several formal disciplines to broaden their perceptions in a systematic and controlled fashion. Like the major, the interdisciplinary curriculum is directed toward a special learning goal rather than toward a special category of student. Successful completion is noted on the student's transcript. The interdisciplinary curriculum supplements but does not replace an academic major.

A Dean's Office administers most interdisciplinary curricula. A program director or associate director administers some (such as Canadian Studies, Disability Studies, Franco American Studies, and Peace Studies). Forms for declaring an interdisciplinary curriculum may be obtained from the Office of Student Records.

Canadian Studies: (18 credits)

The curriculum in Canadian Studies requires 18 credits or 6 courses. These must include CAN 101 - Introduction to Canadian Studies, two additional Canadian core courses, and three Canadian related courses. Courses taken at a Canadian university through the Canada Year Program can be included in the curriculum.

The Canadian Year Program is administered by the Canadian American Center. It offers students the opportunity to study for one or two semesters at English-speaking Canadian universities. It also provides the opportunity to participate in Canadian French immersion program.

Participating universities are: University of British Columbia, Simon Fraser University, Carleton University, Concordia University, McGill University, Bishop's University, University of New Brunswick, Saint Mary's University, Université Laval and Université du Québec à Chicoutimi. The Canada Year Program is a University of Maine Study Abroad program.

For complete information about Canadian Studies, visit the Canadian-American Center, 154 College Avenue, or at www.umaine.edu/canam or telephone (207) 581-4220.

Canadian Core Courses

ANT 422 - Folklore of Maine and The Maritime Provinces	3
ANT 472 - North American Prehistory	3
ARH 268 - Canadian Art	3
BUA 328 - Canadian/U.S. Business: A Comparison	3
CAN 101 - Introduction to Canadian Studies	3
CAN 401 - Readings in Canadian Studies	3

ECO 340 - Canadian Economics: Issues and Policies 3
ECO 343 - North American Economic Integration 3
ENG 236 - Canadian Literature 3
ENG 529 - Studies in Literature 3
FRE 250 - Multidisciplinary Readings in French 1
FRE 305 - French Conversation and Composition I 3
FRE 306 - French Conversation and Composition II 3
FRE 397 - French (May Term) 3
FRE 442 - French Language of North America 3
FRE 463 - Qu ébec Poetry 3
FRE 464 - Québec Theatre 3
FTY 444 - Forest Resources Economics 3
GEO 450 - Historical Geography of Canada 3
HTY 459 - Colonial Canada 3
HTY 460 - Modern Canada 3
HTY 482 - History of Canadian-American Relations 3
HTY 499 - Contemporary Problems in History 1-3
HTY 520 - Canadian Historiography 3
HTY 521 - Canada and the United States, 1783 to the Present 3
HTY 550 - Readings in Bibliography and Criticism in: Ar
HTY 609 - Seminar in New England-Québec Atlantic Provinces History Ar
POS 243 - Canadian Government and Politics 3
POS 344 - Public Policy in Canada 3
POS 372 - Canadian Foreign Policy 3
POS 496 - International Affairs Internship 6 or 9

Canadian Related Courses
ANT 221 - Introduction to Folklore 3
ANT 317 - Fundamentals of Archaeology 3
ANT 425 - Oral History and Folklore: Fieldwork 3
ANT 451 - North American Indian Ethnology 3
ANT 473 - Historical Archaeology of North America 3
ANT 474 - Artifacts of Colonial America 4
ANT 573 - Advanced Methods in Historical Archaeology 3
ANT 576 - Method and Theory in Archaeology 3
BUA 343 - Introduction to International Business 3
BUA 376 - International Marketing 3
BUA 449 - Administrative Policy and Business Environment 3
CMJ 314 - International Mass Communication 3
ECO 445 - Urban-Regional Economics 3
ECO 449 - International Trade 3
ENG 442 - Native American Literature 3
FAS 101 - Introduction to Franco American Studies 3
FAS 220 - Franco American Literature in English 3
FRE 211 - Intermediate French I: Modules 1-4
FRE 212 - Intermediate French II: Modules 1-4
FRE 307 - French for Business 3
FRE 310 - Readings in French Literature II 3
FRE 440 - Franco-American Civilization 3
FTY 446 - Forest Resources Policy 3
FTY 546 - Forest Policy Analysis 3
FTY 617 - Forest Policy Problems Ar
GEO 201 - Introduction to Human Geography 3
GES 110 - Coastal Geology of New England and the Canadian Maritimes 3
GES 324 - Geology of North America 3
GES 543 - Quaternary History of Northeastern North America 3
HTY 458 - History of French Canada and Franco Americans 3
HTY 481 - Amerindians of the Northeast: A History 3
HTY 483 - Violence in North American History 3
POS 377 - International Law 3
STT 496 - Advanced Internship (Elementary) 2-6
STT 497 - Advanced Internship (Secondary) 2-6

Classical Studies: (18 credits)

The classical period in Western history, defined as the period from the Bronze Age to the fall of the Roman Empire in the 5th century CE, comprises the "roots" of modern society. In order to understand where we are and where we are going, it is necessary to know where we have been. European and American literature, philosophy, law, religion, politics, language, and art have all been either directly or indirectly formed in reaction to Classical culture. By examination and study of classical civilization, the student will develop a sense of how the ancients responded to the universal questions of human experience. Through an implicit comparison of the cultures of ancient Greece and Rome to our own, the student will also come to have a fuller understanding of the humanist and cultural impulses which have formed and which continue to form our own experience. This curriculum is particularly useful to the student with interests in ancient history, philosophy, art history, anthropology, literature and political science. It will also prove useful to the student preparing for a career in law.

A minimum of 18 credits or 6 courses is required. The student who elects this curriculum normally chooses Latin as a fulfillment of the language requirement. The advanced student may choose ancient Greek rather than Latin (as available), with permission of the instructor. The student will take either two semesters of Latin beyond the elementary level or two semesters of Greek at elementary level or above. In addition, the student will take HTY 401, History of Greece or HTY 402, Roman History, and the remaining 3 courses in one or two areas in the following listing. The list is flexible; new courses, special seminars, pertinent readings in upper level Honors courses, and independent study may be approved for Classical Studies.

Art History
ARH 155 - Art History I 3
ARH 251 - Classical Art and Architecture 3
ARH 361 - Topics in Art History 3

Classics
CLA 101 - Greek Literature in English Translation 3
CLA 102 - Latin Literature in English Translation 3
CLA 201 - Women in the Ancient World 3
CLA 202 - Mythology of the Ancient Near East, North African and Greece 3

English
ENG 231 - Western Tradition in Literature: Homer Through the Renaissance 3
ENG 435 - The Bible and Near Eastern Literature: A Multicultural Perspective 3

Greek (As Offered)

History
HTY 105 - History of European Civilization I 3
HTY 401 - History of Greece 3
HTY 402 - Roman History 3
HTY 433 - Greek and Roman Mythology 3

Latin
LAT 203 - Readings in Latin Literature I 3
LAT 204 - Readings in Latin Literature II 3

Modern Languages
MLC 231 - Western Tradition in Literature: Homer Through the Renaissance 3

Philosophy
PHI 210 - History of Ancient Philosophy 3

Political Science
POS 201 - Introduction to Political Theory 3
POS 301 - Classical Political Thought 3

Theatre
THE 112 - Masterpieces of World Drama I 3

Disability Studies: (21-24 credits)

The interdisciplinary curriculum in Disability Studies provides students a means to explore professional practice, leadership, research and policy related to persons with disabilities. Administered through the Center for Community Inclusion, Maine's University Center for Excellence in Developmental Disabilities, the curriculum is designed to provide students with the professional skills and knowledge to improve the quality of life of people with disabilities.

Foundation Courses
Choose two courses: (6cr.)
CHF 201 - Introduction to Child Development 3
CHF 433 - Adolescence 3
CHF 434 - Adult Development and Aging 3
CSD 380 - Language Development 3
CSD 481 - Phonological Development and Phonetics 4
KPE 367 - Mainstreaming in Physical Education-Recreation 3
PSY 312 - Abnormal Psychology 3
PSY 323 - Psychology of Childhood 3
PSY 324 - Psychology of Adolescence 3
SED 402 - Adapting Instruction for Students with Disabilities 3
SOC 316 - Sociology of Aging 3

Core Requirements
DIS 400 - Introduction to Interdisciplinary Disability Studies 3
DIS 450 - Seminar in Interdisciplinary Disability Studies 3
DIS 470 - Practicum in Disability Studies 1-6

Electives
Choose a minimum of two courses from two disciplines (6 credits). These courses may not include requirements for the student's major or for any additional curriculum or in which the student is enrolled.
CHF 201 - Introduction to Child Development 3
CHF 433 - Adolescence 3
CHF 434 - Adult Development and Aging 3
CSD 130 - Introduction to Communication Sciences and Disorders 3
CSD 302 - Issues in Hearing Loss 3
CSD 380 - Language Development 3
DIS 480 - Independent Project in Disability Studies 1-6
DIS 490 - Selected Topics in Interdisciplinary Disability Studies 1-6
FSN 101 - Introduction to Food and Nutrition 3
FSN 270 - World Food and Nutrition 3
FSN 301 - Life Cycle Nutrition 3
KPE 270 - Motor Development and Learning 3
KPE 367 - Mainstreaming in Physical Education-Recreation 3
NUR 420 - Women's Health 3
NUR 423 - Ethical Issues in Health Care 3
PAA 100 - Introduction to Public Administration 3
PAA 200 - Public Management 3
PAA 425 - Health Care System Management 3
PAA 430 - Organizational Change in Public Service 3
PHI 235 - Biomedical Ethics 3
PSY 308 - Theories of Personality 3
PSY 312 - Abnormal Psychology 3
PSY 323 - Psychology of Childhood 3
PSY 324 - Psychology of Adolescence 3
PSY 325 - Psychology of Infant Development 3
PSY 425 - Social Issues in Developmental Psychology 3
SED 401 - Introduction to Students with Severe Disabilities 3
SED 402 - Adapting Instruction for Students with Disabilities 3
SOC 201 - Social Inequality 3
SOC 316 - Sociology of Aging 3
SOC 319 - Domestic Violence and Social Structure 3
SOC 337 - Sociology of Mental Illness 3
SOC 339 - Sociology of Health and Medicine 3
SWK 320 - Values, History and Practice in Social Work and Social Welfare 3
SWK 350 - Human Behavior and the Social Environment I 3
SWK 365 - Problems of Child Abuse and Neglect: A Multidisciplinary Approach 3
SWK 440 - Social Welfare Policy and Issues 3

Franco American Studies: (18 credits)

In New England, and particularly in Maine, citizens of French Canadian and Acadian descent comprise approximately 35 percent of the population. The long-neglected story of this ethnic community represents a crucial element in the history and the current social dynamic of Maine and the Northeast, and constitutes a cultural bridge to French Canada, particularly the neighboring provinces of Québec and the Maritimes.

Franco American Studies is an interdisciplinary program that explores the French cultures of the United States and Canada, emphasizing the people of Franco American heritage in Maine and the Northeast region. It studies Franco American culture within the broader context of American ethnic communities and other French-speaking people worldwide. The curriculum is designed to teach the Franco American past and present: topics of study include problems of identity, the politics of language, literature, historical struggles, women's issues and experience, economic structures, and the role of family.

The program offers a minor in Franco American Studies as well as courses at all levels. Students who wish to minor in Franco American Studies complete eighteen credits, including FAS 101, and at least 3 other core courses, a selection of "Related Courses" from the list below and a capstone experience. FAS 440 and FAS 442 are strongly encouraged, but not required. For more information, contact the Franco American Studies Office, 213 Little Hall, at (207) 581-3791.

Core Courses
FAS 101 - Introduction to Franco American Studies 3
FAS 220 - Franco American Literature in English 3
FAS 230 - Franco American Women's Experience 3
FAS 329 - Topics in Franco American Studies 3
FAS 440 - Franco American Civilization 3
FAS 442 - French Language of North America 3
FAS 458 - History of French Canada and Franco Americans 3
FAS 459 - Colonial Canada 3

Related Courses
ANT 221 - Introduction to Folklore 3
ANT 422 - Folklore of Maine and The Maritime Provinces 3
FRE 201 - Intermediate French I 3-4
or FRE 211 - Intermediate French I: Modules. 1-4
FRE 202 - Intermediate French II 3-4
or FRE 212 - Intermediate French II: Modules. 1-4
FRE 397 - French (May Term) 3

Geography: (15-21 credits)

The discipline of geography is broadly based in earth sciences and humanities as well as in the social sciences. Geographers pursue research and teaching in areas as diverse as geomorphology, hydrology, transportation, urban planning, cultural ecology, and human-environment relationships and pre-history. The geography curricula will appeal to undergraduates seeking a general yet practical University education. Geographers find employment in such career fields as resource management, urban and regional planning, and environmental assessment, as well as in the traditional occupations of elementary and secondary school teaching.

The interested student should take GEO 201, Introduction to Human Geography, or GEO 210, Geography of Maine, in the first or second year. The student is also urged to discuss and plan course selection with the Coordinator.

Core Curriculum: 3-6 credit hours
Prerequisites:
GEO 201 - Introduction to Human Geography 3
GEO 210 - Geography of Maine 3

Students are urged to select one of the following courses:

ANT 497 - Department Projects	Ar
FTY 206 - Photogrammetry and Remote Sensing	3
SIE 211 - Surveying	4

Elective Courses: 12 to 15 credit hours

With no more than 3 credit hours below the graduate level. Most students will find it useful to select courses which lead to typical teaching and career orientations in geography. The elective courses are grouped to reflect such orientations.

Cultural-Historical

Like historians, some geographers are concerned with the past, and, like anthropologists, others are involved in the study of different cultures. In both respects, a geographical perspective adds considerable breadth of knowledge on topics such as the spread of settlements, the diffusion of cultural traits, and the nature of past landscapes. Students, particularly those selecting majors in anthropology and history, can enrich and broaden their programs of study with courses in historical and cultural geography.

ANT 464 - Cultural Ecology	3
ANT 472 - North American Prehistory	3
ANT 473 - Historical Archaeology of North America	3
ANT 475 - Environmental Archaeology	3
GEO 401 - Historical Geography of the United States	3
GEO 450 - Historical Geography of Canada	3
HTY 465 - American Landscapes, 1600-1850	3
HTY 479 - U.S. Environmental History	3

Human Use of Earth

The human relationship with the environment is a matter of increasing concern to society. This theme has always been a major consideration of geography. The student interested in the human use of the earth, whether as a step to a career in environmental resource management or to gain a broader understanding of the human place in the environment, is urged to select courses from the following:

ANT 475 - Environmental Archaeology	3
BIO 319 - General Ecology	3
FTY 457 - Forest Watershed Management	3
HTY 465 - American Landscapes, 1600-1850	3
HTY 479 - U.S. Environmental History	3
INT 219 - (BSC) Introduction to Ecology	3
INT 500 - (ANT, BSC, GES, PSE, QUS) Seminar in Quaternary Studies	Ar
LHC 428 - Professional Practices in Landscape Horticulture	4
PSE 344 - Soil and Water Quality	3
REP 371 - Introduction to Natural Resource Economics and Policy	3
REP 474 - Land Use Planning	3

Latin American Studies: (18 credits)

The interdisciplinary Latin American Studies curriculum contains courses concerning Latin America in modern languages and literature, anthropology, history and economics, and other subjects. These courses broaden students' undergraduate education, increasing and enhancing employment opportunities. North Americans and Latin Americans share a hemisphere and should have a good understanding of each other, yet the United States has often ignored Latin America or has had misconceptions about it.

The Latin American Studies curriculum combines training in various disciplines, encouraging students to begin to comprehend this very different and important part of the world. Faculty member involved with this curriculum have spent substantial time in Latin America and/or have conducted considerable research in topics related to the various countries, cultures and environments.

Language Competence. Students must demonstrate proficiency in Spanish at the intermediate level. Proficiency may be demonstrated either by examination or by completing SPA 203/204 with a grade of at least "B." To be admitted to the program, students must complete SPA 101/102. Course work in Intermediate Spanish will be credited toward the curriculum.

Social Sciences and Literature

Students are required to take at least one course in three of the following four areas:

Anthropology

ANT 453 - People and Cultures of Mesoamerica	3
ANT 459 - Peoples and Cultures of South America	3
ANT 467 - Peasant Studies	3
ANT 480 - South American Prehistory	3

Economics

ECO 336 - Marxian Economics	3
ECO 338 - Economic Development	3

History

HTY 109 - Introduction to Latin America	3

Literature

SPA 308 - Readings in Spanish American Literature	3
Other 400 level courses in Latin American Literature	

Students may select other courses from the list below as appropriate:

SPA 409 - Contemporary Latin-American Short Story	3
SPA 490 - Topics and Individual Authors in Spanish	1-3

Additional courses in Anthropology, History, Latin American Literature, Art History, Spanish and Portuguese language (through the Critical languages Program) are recommended.

Study Abroad is highly encouraged. Study programs or study tours offer options for work in Mexico, Ecuador, Costa Rica, Brazil, or Spain. Other sites are under consideration and may be approved with consultation.

Legal Studies: (18 credits)

In antiquity, Socrates held that the laws were his "true parent." For then as now, laws help to constitute and regulate family, school, church, commercial, and governmental institutions. They therefore affect the lives of everyone throughout, although conversely human beings make the law. Legal foundations, developments, and effects are consequently of intrinsic interest and concern to many disciplines and their students. The Legal Studies curriculum is accordingly designed not so much for the pre-law student, as for any student whose liberal education seeks to understand the formative bases of human civilization and culture.

Courses "About" Law

ENG 229 - Topics in Literature (Law)	3
PHI 244 - Philosophy of Law	3
PHI 344 - Theories of Justice	3
POS 282 - Introduction to American Law	3
SOC 314 - Law and Society	3

Courses "In" Law

CMJ 375 - Mass Media Law and Regulation	3
HTY 499 - Contemporary Problems in History (Law)	1-3
PAA 405 - Administrative Law	3
PAA 410 - Local Government Law	3
POS 377 - International Law	3
POS 383 - American Constitutional Law	3
POS 384 - American Civil Liberties	3
SIE 522 - Environmental Law and Resource Regulation	3
SIE 525 - Information Systems Law	3
SOC 214 - Crime and Criminal Justice	3

Marxist and Socialist Studies: (18 credits)

The Marxist and Socialist Studies curriculum encourages students to look at the world from a variety of Marxist and Socialist perspectives. Many departments offer approaches that have their foundation in the work of such economic theorists as Adam Smith and such political philosophers as Thomas Hobbes and John Locke. Such approaches seem to assume that capitalist values are "natural," "according to human nature," progressive, just, or simply the only way that rational people would view the world. Marxism and Socialist perspectives challenge such assumptions and judgments and such a world outlook.

All students who elect the Marxist and Socialist Studies curriculum should take PHI 342, Marxist Philosophy I: The Philosophy of Karl Marx, and at least three other courses from the "core courses" and two courses from the "elective courses." In addition, these courses should be taken from at least three different disciplines.

Required
PHI 342 - Marxist Philosophy I: The Philosophy of Karl Marx 3

Core Courses (9 credits)
ECO 329 - Global Political Economy 3
ECO 336 - Marxian Economics 3
ENG 470 - Topics in Literary Theory and Criticism 3
HTY 467 - Early 20th Century America, 1914-1945 3
HTY 468 - America Since 1945 3
PHI 343 - Marxist Philosophy II: Twentieth-Century Marxist Philosophy 3

Elective Courses (6 credits)
ARH 262 - Early Modern Art: From Fauvism to Surrealism 3
ARH 263 - Late Modern Art: From Abstract Expressionism Through New Forms 3
ARH 351 - Art Theory and Criticism 3
ARH 352 - Critical Methods in History of Art 3
ARH 362 - Medieval Art and Architecture Seminar 3
ARH 363 - Renaissance Art and Architecture Seminar 3
CMJ 410 - Social Influence of Mass Communication 3
CMJ 444 - Political Rhetoric 3
ECO 335 - History of Economic Thought 3
ECO 338 - Economic Development 3
ENG 453 - The Works of Shakespeare 3
ENG 456 - The English Romantics 3
ENG 481 - Topics in Women's Literature 3
HTY 407 - The Age of Revolution, 1789-1860 3
HTY 409 - Twentieth Century Europe I, 1914-1945 3
HTY 424 - History of Russia II:The Russian Revolution, 1881-1991 3
HTY 442 - The United States and Vietnam: A History 3
HTY 473 - History of U.S. Foreign Relations I 3
HTY 474 - History of U.S. Foreign Relations II 3
HTY 477 - The American Worker 3
HTY 482 - History of Canadian-American Relations 3
PHI 236 - Feminist Ethical, Social and Political Theory 3
PHI 240 - Social and Political Philosophy 3
PHI 344 - Theories of Justice 3
POS 336 - Government and Politics in Russia 3
SOC 101 - Introduction to Sociology 3
SOC 202 - Social Problems 3
SOC 314 - Law and Society 3
SOC 460 - Major Ideas in Sociology 3

Medieval and Renaissance Studies: (18 credits)

The Medieval and Renaissance Studies curriculum opens to students the diverse cultures of Europe, Western Asia, and Northern Africa that thrived within the period from the third century through the seventeenth. It incorporates offerings from the departments of English, History, Modern Languages and Classics, and Art to explore issues of social structure, philosophy, religion, politics, language, poetry, prose, and artistic expression from an interdisciplinary perspective.

Students who elect this curriculum usually begin their exploration of the period through introductory courses, such as ARH 155, HON 111, HTY 105, or HTY 202, only one of which counts towards the total credits of the curriculum. Students are encouraged to take courses from all of its disciplines.

Art History
ARH 155 - Art History I 3
ARH 252 - Mediterranean Medieval Art and Architecture 3
ARH 253 - Northern European Medieval Art and Architecture 3
ARH 255 - Italian Renaissance Art 3
ARH 257 - Northern Renaissance Art 3
ARH 362 - Medieval Art and Architecture Seminar 3
ARH 363 - Renaissance Art and Architecture Seminar 3
ARH 493 - Medieval Research Seminar 3
ARH 494 - Renaissance Research Seminar 3

English
ENG 231 - Western Tradition in Literature: Homer Through the Renaissance 3
ENG 251 - English Literature Survey: Beginnings Through Neoclassicism 3
ENG 253 - Shakespeare: Selected Plays 3
ENG 451 - Chaucer and Medieval Literature 3
ENG 454 - Elizabethan and Seventeenth Century Lyric and Narrative Poetry 3
ENG 476 - History of the English Language 3

History
HTY 105 - History of European Civilization I 3
HTY 402 - Roman History 3
HTY 403 - Early Middle Ages 3
HTY 404 - Late Middle Ages 3
HTY 405 - Early Modern Europe: Renaissance, Reformation and the Foundation of the Modern World-System 3
HTY 423 - History of Russia I 3
HTY 455 - History of England I 3

Modern Languages and Classics
FRE 404 - Medieval and Renaissance French Literature 3
FRE 504 - Seminar in Medieval and Renaissance Literature 3
LAT 482 - Medieval Latin 3
MLC 231 - Western Tradition in Literature: Homer Through the Renaissance 3

Peace Studies (see Division of Lifelong Learning)

Religious Studies: (18 credits)

Traditionally, questions about the ultimate meaning of human existence have been posed in the form of religion. Today we live in a world in which religion and religious ideas are often in serious conflict; it is thus also important to understand some of the problems connected to religion. Courses included in the religious studies curriculum are designed to help students understand what these questions are, what kind of answers people have found to them, and how societies have given institutional form to the world-views which emerge from the answers. A student who elects this curriculum should develop an awareness of the broad range of religious phenomena and an ability to analyze and elucidate the significance of such phenomena.

Required
All Religious Studies students must complete the following:
PHI 105 - Introduction to Religious Studies 3

Option A: Religion in the Development of Western Civilization
Students must select five of the following courses (15 credits):
ARH 252 - Mediterranean Medieval Art and Architecture 3
ARH 253 - Northern European Medieval Art and Architecture 3
ARH 255 - Italian Renaissance Art 3
ARH 257 - Northern Renaissance Art 3
ARH 258 - Baroque Art and Architecture 3
CLA 101 - Greek Literature in English Translation 3
CLA 102 - Latin Literature in English Translation 3
CLA 201 - Women in the Ancient World 3
CLA 202 - Mythology of the Ancient Near East, North African and Greece Greece 3
ENG 241 - American Literature Survey: Beginnings Through Romanticism 3
ENG 435 - The Bible and Near Eastern Literature: A Multicultural Perspective 3
ENG 451 - Chaucer and Medieval Literature 3

ENG 454 - Elizabethan and Seventeenth Century Lyric and Narrative Poetry 3
FRE 404 - Medieval and Renaissance French Literature 3
FRE 405 - Seventeenth Century French Literature 3
HTY 401 - History of Greece 3
HTY 402 - Roman History 3
HTY 403 - Early Middle Ages 3
HTY 404 - Late Middle Ages 3
HTY 405 - Early Modern Europe: Renaissance, Reformation and the Foundation of the Modern World-System 3
HTY 433 - Greek and Roman Mythology 3
HTY 499 - Contemporary Problems in History 1-3
LAT 482 - Medieval Latin 3
MLC 490 - Topics in Modern Languages 3
MUL 101 - The Art of Listening to Music: Elements 3
MUL 120 - World Music 3
MUL 202 - The Art of Listening to Music: Historical Survey 3

Option B: Theoretical Perspectives on Religion

Students must select five of the following courses (15 credits):

ANT 120 - Religions of the World 3
ANT 469 - Theories of Religion 3
ANT 470 - Religion and Politics 3
PHI 364 - Views of Self: East and West 3
PHI 382 - Theories of Myth 3
SOC 482 - The Sociology of Religion 3

Option C: Religion in the Non-Western World

Students must select five of the following courses (15 credits):

ANT 441 - People and Cultures of the Pacific Islands 3
ANT 451 - North American Indian Ethnology 3
ANT 453 - People and Cultures of Mesoamerica 3
ANT 454 - Cultures and Societies of the Middle East 3
ANT 456 - Ethnic Conflict in the Modern World 3
ANT 461 - Islamic Fundamentalism 3
HTY 436 - History of China 3
HTY 437 - History of Modern Japan 3
PHI 286 - Religions and Philosophies of the East: Hinduism 3
PHI 287 - Religions and Philosophies of the East: Buddhism 3

Key to Abbreviations

Course Prefixes

ACE - Academic and Career Exploration
AED - Art Education
ANT - Anthropology
ARH - Art History
ART - Art
AST - Astronomy
AVS - Animal and Veterinary Sciences
BIO - Biological Sciences
BLE - Biological Engineering
BLS - Black Studies
BMB - Biochemistry, Microbiology and Molecular Biology
BUA - Business Administration
CAN - Canadian Studies
CEC - Education-Counseling
CET - Civil Engineering Technology
CHB - Chemical and Biological Engineering
CHE - Chemical Engineering
CHF - Child Development and Family Relations
CHY - Chemistry
CIE - Civil and Environmental Engineering
CLA - Classics
CMJ - Communication and Journalism
COS - Computer Science
CSD - Communication Sciences and Disorders
DAN - Dance
DIS - Disability Studies
EAD - Education-Administration
EAE - Education-Adult Education
ECE - Electrical and Computer Engineering
ECO - Economics
EDA - Education-Measurement and Testing
EDB - Education-Basic Professional
EDC - Education-Curriculum
EDF - Education-Liberal Studies
EDG/EDU - Education-General
EDH/EDL/EDM - Education-History and Philosophy
EDS - Education-Research
EDT - Education-Telecommunications
EDW - Education-Workshops
EEL - Education-Early Literacy
EES - Ecology and Environmental Science
EET - Electrical Engineering Technology
EGS - Education-Gender Studies
EHD - Education-Human Development
ELS - English Language Skills
EMA - Education-Mathematics
EML - Education-Middle Level
ENG - English
EPT - Education-Psychology
ERL - Education-Literacy
ERR - Education-Reading Recovery
ESC - Education-Science
ESS - Education-Social Studies
FAS - Franco American Studies
FES - Forest Ecosystem Science
FRE - French
FSC - Forest Operations Science
FSN - Food Science and Nutrition
FTY - Forestry
GEE - General Engineering
GEO - Geography
GER - German
GES - Geological Sciences
GRE - Greek
HED - Education-Higher Education
HON - Honors
HTY - History
HUD - Human Development
IEI - Intensive English Instistute
INA - International Affairs
INT - Interdisciplinary
ISE - Information Systems Engineering
KPE - Kinesiology and Physical Education
LAS - Liberal Arts and Sciences
LAT - Latin
LBR - Library
LHC - Landscape Horticulture
LIB - Liberal Studies
MAT - Mathematics and Statistics
MEE - Mechanical Engineering
MET - Mechanical Engineering Technology
MIS - Military Science
MLC - Modern Languages and Classics
MSE - Museum Education
MUE - Music-Education
MUH - Music-History
MUL - Music-Literature
MUO - Music-Organizations and Ensembles
MUP - Music-Performance
MUS - Music-General
MUY - Music-Theory
NAS - Native American Studies
NAV - Naval Science
NFA - Natural Sciences, Forestry and Agriculture
NMD - New Media
NUR - Nursing
ONE - Onward-English
ONM - Onward-Mathematics
ONO - Onward-Orientation
ONR - Onward-Reading
ONS - Onward-Science
PAA - Public Administration
PAX - Peace Studies
PHI - Philosophy
PHY - Physics
POS - Political Science
PPA - Pulp and Paper Technology
PRT - Parks, Recreation and Tourism
PSE - Plant, Soil and Environmental Science
PSY - Psychology
REP - Resource Economics and Policy
SED - Education-Special Education
SEI - Special Education-Early Intervention
SIE - Spatial Information Engineering
SMS - Marine Sciences
SOC - Sociology
SPA - Spanish
STT - Education-Student Teaching
SVT - Surveying Engineering Technology
SWK - Social Work
THE - Theatre

TME - Technical Mathematics for Engineering

TSO - Technology and Society

UST - University Studies

WLE - Wildlife Ecology

WSC - Wood Science and Technology

WST - Women's Studies

College Abbreviations

BPPH - College of Business, Public Policy and Health

EDHD - College of Education and Human Development

EGR - College of Engineering

LAS - College of Liberal Arts and Sciences

NSFA - College of Natural Sciences, Forestry and Agriculture

DLL - Division of Lifelong Learning

Department and Discipline Abbreviations

ACE - Academic and Career Exploration

AVS - Animal and Veterinary Sciences

ANT - Anthropology

ART - Art

BLS - Black Studies

BMB - Biochemistry, Microbiology and Molecular Biology

BSC - Biological Sciences

CAN - Canadian Studies

CHB - Chemical and Biological Engineering

CHY - Chemistry

CIE - Civil and Environmental Engineering

CMJ - Communication and Journalism

COS - Computer Science

CSD - Communication Sciences and Disorders

DIS - Disability Studies

ECE - Electrical and Computer Engineering

ECO - Economics

EDU - Education

EES - Ecology and Environmental Sciences

ENG - English

FAS - Franco American Studies

FES - Forest Ecosystem Science

FMT - Forest Management

FSC - Forest Operations Science

FSN - Food Science and Human Nutrition

GEE - General Engineering

GES - Geological Sciences

HDF - Human Development and Family Studies

HON - Honors

HTY - History

IEI - Intensive English Institute

INT - Interdisciplinary Studies

ISE - Information Systems Engineering

KPE - Kinesiology and Physical Education

LBR - Library

MBS - Maine Business School

MAT - Mathematics and Statistics

MEE - Mechanical Engineering

MIS - Military Science

MLC - Modern Languages and Classics

NAS - Native American Studies

NAV - Naval Science

NFA - Natural Sciences, Forestry and Agriculture

NMD - New Media

NUR - School of Nursing

ONW - Onward

PAA - Public Administration

PAX - Peace Studies

PHI - Philosophy

PHY - Physics and Astronomy

POS - Political Science

PRT - Parks, Recreation and Tourism

PSE - Plant, Soil and Environmental Sciences

PSY - Psychology

REP - Resource Economics and Policy

SET - School of Engineering Technology

SIE - Spatial Information Engineering

SMS - School of Marine Science

SOC - Sociology

SPA - School of Performing Arts

SSWK - School of Social Work

TSO - Technology and Society

UST - University Studies

WLE - Wildlife Ecology

WSC - Wood Science and Technology

WST - Women's Studies

Academic and Career Exploration (ACE)

ACE 100 Academic and Career Explorations Seminar
Introduction to UMaine resources, academic programs and strategies for achieving academic success and is taught by students' academic advisors. Activities designed to foster exploration and evaluation of interests, goal and abilities and their relationship to potential majors and careers. (Pass/Fail Grade Only.) Prerequisite: First year ACE student or permission of ACE Coordinator. Cr 1.

ACE 196 Academic and Career Exploration Field Experience
Field experience for students seeking to explore their academic and career interests. Prior approval of the field experience is required and will be based on a detailed written plan and documentation presented by the student and approved by the Career Center Director or the student's Faculty Advisor or Academic Dean. Open to students in all majors as well as students with undeclared majors. Prerequisite: permission. Cr 0-3.

Art Education (AED)

AED 171 The Teaching of Art
Current approaches, methods and materials for the teaching of art in the elementary grades. Art Education theory and curricula taught in conjunction with general art knowledge and experiences. Not open to art education majors. Satisfies the General Education Artistic and Creative Expression Requirement. Lec 2, Lab 1. Prerequisite: Junior or senior elementary education majors or permission. Cr 3.

AED 270 Introduction to Visual Culture and Learning
An introduction to visual culture and its relationship to the development and maintenance of human knowledge and experience. Students will explore and gain insight into diverse forms of visual culture, including those different from and similar to their own cultural experiences; and will become aware of the relationship between visual culture and the theory and practice of contemporary education as it takes place within the contexts of schools, museums and other community-based settings. Developed primarily for Art Education, Museum Education and Community Practice students. Prerequisite: minimum of Sophomore standing. Cr 3.

AED 371 Methods and Materials in Art Education
Introduction to instructional methods and strategies in art education. Exploration, development and evaluation of approaches to teaching, teaching and learning styles, educational materials, media and technologies. Required for art education majors. Lec 1, Lab 2. Prerequisites: EDB 202 and EDB 221; 21 credits in Studio Art; 12 credits in Art History; 15 credits of General Education requirements. Corequisites: AED 372 and AED 373. Cr 3.

AED 372 Foundations of Art Education
Includes historical, philosophical, political, psychological and sociological foundations of art education; theories of child art; and critical examination of current research, trends and issues in art education. Art education majors or art certification students only. Satisfies the General Education Writing Intensive Requirement. Lec 3. Corequisites: AED 371 and AED 373. Cr 3.

AED 373 Introduction to Curriculum
Introduction to art curricula strategies and development. Includes instructional planning, lesson writing and organization, and practicum experience. Art education majors or art certification students only. Lec 2, Lab 1. Corequisites: AED 371 and AED 372. Cr 3.

AED 473 Advanced Curriculum in Art Education
An examination of current theory, research and practice pertaining to curriculum development in art education. Including an exploration of traditional and innovative approaches to curriculum development in art education, problems and issues relevant to art curricula design and implementation, critical examination of existing curricula, and practice in developing and evaluating art curricula. Art education majors, art certification students or by instructor's permission only. Lec 3. Prerequisite: AED 371, AED 372 and AED 373 or permission. Cr 3.

AED 474 Topics in Art Education
Seminar in advanced research and practice in art education and related areas. Specific topic to be announced. Cr 3.

AED 496 Field Experience in Art Education
Students involved in pre-professional activities with art education in schools or community agencies may apply for supervision and credit for the project. Prerequisite: AED 371, AED 372, AED 373 and permission. Cr Ar.

AED 497 Independent Study in Art Education
Advanced projects, readings, or seminars in art education. Topic and form of study to be determined by student in consultation with faculty member. Prerequisite: AED 371, AED 372, AED 373 or equivalents and permission. Cr Ar.

AED 498 Directed Study in Art Education
Advanced projects, readings, or seminars in art education. Topic and form of study to be determined by student in consultation with faculty member. Prerequisite: AED 371, AED 372, AED 373 or equivalents and permission. Cr Ar.

AED 574 Topics in Art Education
Advanced seminar and workshop with research projects in art education and related areas. Specific topic to be announced or arranged. The course may be repeated once for credit. Prerequisite: Art teaching experience. Cr 3.

AED 597 Independent Study in Art Education
Advanced level projects, readings or seminars in art education. Topic and form of study to be determined by the student in consultation with faculty member. May be repeated for credit. Prerequisite: graduate standing and permission. Cr 1-3.

AED 598 Directed Study in Art Education
Structured projects, readings or seminars in art education at an advanced level. Topics and form of study to be determined by the student under the direction of a faculty member. May be repeated for credit. Prerequisite: graduate standing and permission. Cr 3.

Anthropology (ANT)

ANT 101 Introduction to Anthropology: Human Origins and Prehistory
A survey course focusing on the evolution of humankind, the development of culture, and the beginnings of civilization. Required for Anthropology majors. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

ANT 102 Introduction to Anthropology: Diversity of Cultures
A survey course focusing on the nature of culture, similarities and differences among the world's cultures, relationships among cultures, and culture change. Required for Anthropology majors. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

ANT 120 Religions of the World
A survey of the distinctive features of the major world religions and the most studied Native American, African and aboriginal Australian religions. Focuses on the fit between myth and ritual, the problems involved in trying to understand both "from the believer's point of view," and what generalizations can be made about religion in general. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirement. Cr 3.

ANT 170 Popular Archaeology
Many popular ideas about the past are at odds with what professional archaeologists think they know. Most of us find the past inherently interesting, without embellishment. But we are commonly confronted by intriguing beliefs in visits by ancient astronauts, the lost continent of Atlantis, etc. While some of these ideas may have merit, many do not. Develops methods for evaluating critically the archaeological record, sorting out science from pseudoscience and distinguishing that which is plausible from that which is unlikely. Cr 3.

ANT 173 Archaeology of American Civilization
The spread of European culture to the Americas, particularly during colonial and early American periods, as seen through its archaeological sites and artifacts. This introductory survey entails a chronological and topical survey of the evolution of American civilization covering Native American-European contact, early colonial sites, 18th-century society, and the industrial revolution. Emphasis on North America. Satisfies the General Education Western Cultural Tradition Requirement. Cr 3.

ANT 207 Introduction to World Archaeology
An overview of the human record as determined by archaeology using examples drawn from the global experience. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ANT 101 or ANT 170. Cr 3.

ANT 210 Physical Anthropology
Introduces current topics in human biology and evolution including human origins and the fossil record, human genetics and population variability, and human and non-human primate behavior. Satisfies the General Education Applications of Scientific Knowledge Requirement. Cr 3.

ANT 221 Introduction to Folklore
A survey of the different genres of folklore, its forms, uses, functions and modes of transmission. Emphasis on belief, custom and legend. Satisfies the General Education Western Cultural Tradition and the Cultural Diversity and International Perspectives Requirements. Cr 3.

ANT 300 Basic Theory in Cultural Anthropology
A seminar in which the most important theories shaping modern cultural and social anthropology will be presented through the analysis of key monographs. Emphasis placed on developing critical thinking and library research skills. Required of all Anthropology majors. Satisfies the General Education Social Context and Institutions, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: ANT 102 and major standing or permission. Cr 3.

ANT 317 Fundamentals of Archaeology
Techniques of excavation and analysis; theoretical basis of methods and fundamental principles; application to specific case studies; the use of geological, biological, chemical and other tools in archaeological research. A one-day compulsory weekend field trip to local archaeological sites. Required for Anthropology majors. Satisfies the General Education Applications of Scientific Knowledge and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 101 or ANT 170 or ANT 173 or ANT 207 or permission. Cr 3.

ANT 422 Folklore of Maine and The Maritime Provinces
A survey of the genres of folklore found in the major linguistic traditions (English, French, Native American) of the Northeast, with emphasis on Maine. Special attention given to the occupational traditions of farming, fishing and lumbering. Prerequisite: ANT 221 or permission of instructor. Cr 3.

ANT 423 Folksong
A study of the place of music in human culture, its forms, functions, uses, methods of composition, manner of performance, esthetic theories. Illustrative material chiefly drawn from Euro- and African-American folksongs (ballads, blues, worksongs). No musical background or training required. Satisfies the General Education Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Prerequisite: ANT 221 or permission of the instructor. Cr 3.

ANT 424 Narrative
Considers narrative and storytelling as universals in human culture including definitions and distinctions (myths, legends, history, story, truth, fiction), uses and functions, performance and creativity. Illustrative material drawn from a variety of cultures, including Native American groups. Prerequisite: ANT 221 or permission of instructor. Cr 3.

ANT 425 Oral History and Folklore: Fieldwork
Training and experience in collecting materials of folklore, folklife and oral history, especially through use of tape recorders. Covers advance preparations, interviewing techniques, processing of transcripts, and utilization of materials so gathered in writing and research. Tape and equipment provided. Satisfies the General Education Ethics Requirement. Prerequisite: permission. Cr 3.

ANT 426 Native American Folklore
An overview of folklore and folklife covering various genres of traditional expressive culture. Satisfies the General Education Cultural Diversity and Inter-national Perspectives Requirement. Cr 3.

ANT 437 Medical Anthropology
Examines health systems in western and non-western societies from ethnomedical and medical ecological perspectives. Focus on social and cultural implications of health-related beliefs and practices and their relationship to evolution, ecology and epidemiology. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 439 Psychological Anthropology
An introduction to the concepts, theories and techniques involved in anthropological Investigations of the relationships of culture, society, and the individual. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 441 People and Cultures of the Pacific Islands
Topics include Pacific geography, the history and prehistory of the Pacific islands, cultural traditions of the ancient Polynesians with special reference to the political evolution of their societies, cultural traditions of the Melanesians with special reference to art, warfare and ritual, cultural traditions of the Micronesians with special reference to the problems of these Oceanic people in the modern world. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 445 Sex and Gender in Anthropology
An exploration into the commonality and diversity of sex and gender roles in cross-cultural perspective and an examination of cultural and bio-social explanations for why such diversity exists. Foci include contemporary approaches to sex and gender, changing views about men's and women's roles in human evolution, the conditions under which gender roles vary in contemporary societies and the issues surrounding gender equality, power and politics. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ANT 101 or ANT 102 or permission. Cr 3.

ANT 450 Hunters-Gatherers
The economy, ecology and culture of peoples whose subsistence economy depends extensively upon hunting animals and collecting non-domesticated plants. Focus will be on the prehistory of hunting and gathering, interactions between hunter-gatherers and their environment, explaining the diversity in patterns of culture and behavior among pre-colonial populations, and the effects of colonialism and culture change on hunter-gatherer life-ways. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 451 North American Indian Ethnology
Covers both traditional culture patterns and modern developments and problems. Includes consideration of traditional culture areas, emphasizing adaptations and cultural dynamics, past and present. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 452 Civilization in South Asia
An exploration into the nature of civilization in South Asia, focusing on India. The central religious tradition of Hinduism and the caste order are investigated, with complementary perspectives provided by non-Hindu traditions. The impact of colonialism and development of national identities are also considered. Anthropological views are distinguished from and supplemented by other disciplinary perspectives. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission of instructor. Cr 3.

ANT 453 People and Cultures of Mesoamerica
A study of contemporary peasant and tribal societies of Mexico and Guatemala including their history since the Spanish Conquest. Focuses on Mestizo and Native American communities, relations between folk societies and urban areas, current theory concerning Middle American societies. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 454 Cultures and Societies of the Middle East
Emphasis on Arab world, Turkey, Iran and Afghanistan. Covers religious organization, kinship, political organization, and economics as well as contemporary life and the current problems in the ethnography. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 456 Ethnic Conflict in the Modern World
An exploration of ethnic conflict and revival today including a survey of anthropological theories of ethnicity, focusing on ethnic revival in the modern world. European and other ethnic groups of the industrialized West provide the major cases to be considered. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission of instructor. Cr 3.

ANT 458 Anthropology of War
Surveys war in human prehistory and history and the anthropological theories developed to explain it. The primary focus is on pre-industrial warfare, especially the contact-era Pacific. Throughout the course, however, this comparative perspective will be brought to bear on what pre-modern warfare tells us about war in the modern world. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or permission. Cr 3.

ANT 459 Peoples and Cultures of South America
Social, political, economic and religious institutions of native and mestizo peoples in South America, using examples from selected areas (Amazonian lowlands, Andean highlands, southern cone.) Traditional culture patterns and modern developments and problems, including syncretism of European and native systems and role of modern beliefs about pre-European lifeways. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or permission. Cr 3.

ANT 461 Islamic Fundamentalism
A survey of the distinctive ideological and social features of Islamic fundamentalist movements of the twentieth century including comparisons with other religious revitalization movements. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements.) Prerequisite: one course in Anthropology or Sociology or permission. Cr 3.

ANT 462 Numerical Methods in Anthropology
Introduction to how numerical methods are used in anthropological research. Topics include: survey and history of numerical methods in anthropology, presentation and description of quantitative and qualitative anthropological data, probability, testing anthropological hypotheses using parametric and nonparametric statistics, the pitfalls and potential of numerical methods in anthropology. Satisfies the General Education Mathematics Requirement. Prerequisite: 300 level course in anthropology or permission. MAT 232 recommended but not required. Cr 3.

ANT 463 Systems of Kinship and Descent
The basic concepts of kinship and descent in small-scale and complex societies; examination of specific systems; critical examination of the different approaches to the study of them. Emphasis on the relationship between kinship and other aspects of social structure. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 464 Cultural Ecology
Comparative study of human populations in ecosystems. Topics include the adaptive nature of culture, implications of the ecological approach for anthropological theory, sociocultural evolution and change, and contemporary problems. Case studies from simple and complex societies. Satisfies the General Education Social Contexts and Institutions, Cultural Diversity and International Perspectives, and Population and the Environment Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 465 Political Anthropology
A study of mechanisms and institutions for mediating disputes and allocating public power in selected non-Western societies. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 466 Economic Anthropology
Comparative study of production, consumption and exchange in selected non-Western societies. Emphasis on factors influencing economic decisions in a variety of social and cultural settings. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 467 Peasant Studies
Peasants, neither primitive nor modern, are the majority of humanity. A comparative study of peasant societies in various parts of the world including a critical examination of the body of anthropological theory concerning peasantry. Prerequisite: ANT 102 or ANT 300 or permission. Cr 3.

ANT 469 Theories of Religion
Considers various anthropological approaches to religion including evolutionary, historical, psychological, functional, structural, and symbolic. Emphasis on the appropriateness of these theories for the wide range of cross-cultural material available. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or permission. Cr 3.

ANT 470 Religion and Politics
A study of religion and politics in a wide variety of human societies, past and present with particular emphasis on 1) the interrelationships among religion, culture, and political ideology as systems of belief and value, 2) the relationship between religious and national identity and 3) the role of interests and values in determining political action. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102 or ANT 120 or permission. Cr 3.

ANT 472 North American Prehistory
The history of North American native peoples from the first evidence to the arrival of the Europeans. Emphasis on major issues such as glacial and postglacial adaptation, development of agriculture, and the emergence of sedentism. Prerequisite: ANT 317 or permission. Cr 3.

ANT 473 Historical Archaeology of North America
The archaeological study of Western culture in North America during colonial and early American periods. Analysis of changing western world views as reflected in the footprints of early settlements. Integrates excavation techniques, documents and analytical methods. Emphasis on western building traditions, use of space and world view as reflected in archaeological site plans and artifacts. Recommended for students wishing to participate on excavations of historic sites. Satisfies the General Education Applications of Scientific Knowledge and Western Cultural Tradition Requirements. Prerequisite: Any 100-level course in archaeology or history. Cr 3.

ANT 474 Artifacts of Colonial America
A laboratory course covering the identification, classification, and interpretation of artifacts from historic archaeological sites. Handcrafted and mass-produced materials of domestic and foreign manufacture will be considered, especially the glass, iron and ceramic artifacts most commonly recovered on Colonial and Early American sites. Class projects will generally focus on collections from excavation in Maine. Satisfies the General Education Applications of Scientific Knowledge, Western Cultural Tradition and Writing Intensive Requirements. Lec 3, Lab 2. Prerequisite: Any 100-level course in archaeology or history. Cr 4.

ANT 475 Environmental Archaeology
Introduces historical and current theoretical literature which addresses cultural environmental relationships in prehistoric contexts. Emphasis on outlining the kinds of environmental data that survive in the historical record (geological, floral, faunal, soils, etc.), the sampling methods used to collect different kinds of data and types of inferences that can be made from surviving data regarding fossil cultural environmental relationships. Satisfies the General Education Population and the Environment Requirement. Prerequisite: ANT 317. Cr 3.

ANT 476 Mesoamerican Prehistory
The archaeological and ethnohistorical records of the civilizations of Mexico and Central America from their origins until the arrival of Europeans in the 16th Century. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspective Requirements. Prerequisite: ANT 101 or ANT 170 or ANT 317 or permission. Cr 3.

ANT 477 Field Research in Archaeology
Introduction to archaeological field techniques through excavation of an archaeological site. Intensive training in site survey, excavations techniques, recording, analysis and preliminary interpretation of archaeological materials. Generally conducted on prehistoric and historic sites in Maine. Admission by application only. Satisfies the General Education Applications of Scientific Knowledge and Cultural Diversity and International Per-spectives Requirements. (Offered Summers only.) Prerequisite: permission. Cr 2-6.

ANT 478 Zooarchaeology
A laboratory course covering techniques for analysis and interpretation of osteological remains from archaeological sites. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Rec 2, Lab 2. Prerequisite: ANT 317 or permission. Cr 4.

ANT 479 Laboratory Techniques in Prehistoric Archaeology
Hands-on experience in lab techniques using real archaeological materials. Includes analysis, classification and synthesis of the data. Rec 1, Lab 2. Prerequisite: ANT 317. Some field experience recommended. Cr 3.

ANT 480 South American Prehistory
Prehistory archaeology of South America from the first arrival of people to the Spanish Conquest. Changing lifeways as South American peoples adapted to and with new and changing environments and technologies. Origin and development of complex society in the region, culminating with the Inca Empire. Satisfies the General Education Cultural Diversity and International Perspectives and Population and the Environment Requirements. Prerequisite: ANT 101 or ANT 207 or ANT 170 or permission. Cr 3.

ANT 481 Language, Culture and Society
Introduction to basic concepts, problems and methods used by anthropologists in the investigation of the relationships among language, culture and society. Topics include the biological basis of language; origin and evolution of human language; language, conceptual systems and world view; language socialization in cross-cultural perspective; language in its social context (e.g. social roles, gender, settings, speech "styles," attitudes, discourse, bilingualism). Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ANT 102; INT 410 highly recommended. Cr 3.

ANT 490 Topics in Anthropology
Advanced treatment of specialized problems in anthropology with emphasis on analysis in frontier areas of anthropological research. Topics vary. May be repeated for credit. Prerequisite: permission. Cr 3.

ANT 491 Intercultural Understanding
A human relations workshop in which anthropology and other social and behavioral sciences are applied to cultural, ethnic, racial, religious and intergroup conflict in contemporary life. Students draw upon their own background and experiences. (Offered Summers only.) Cr 3.

ANT 492 Capstone in Anthropology
Provides seniors with an opportunity to conduct in-depth research and analysis with a faculty member in conjunction with an existing course. Program must be approved by department. Required of majors. Satisfies the General Education Capstone Experience Requirement. Prerequisite: senior standing. Cr 1.

ANT 497 Department Projects
A special project course. Specific content, scheduling and credit hours proposed by student in consultation with instructor. Maximum of 3 credit hours. Cr Arranged.

ANT 573 Advanced Methods in Historical Archaeology
A seminar devoted to researching American lifeways of historic periods using archaeological and historical data. Emphasis on interpreting current UM excavations. Prerequisite: ANT 474 or ANT 477. Cr 3.

ANT 576 Method and Theory in Archaeology
The history of and current debates in archaeological methods and theory, with a focus on Americanist archaeology. Prerequisite: ANT 317, ANT 472. Cr 3.

ANT 597 Advanced Topics in Anthropology
Advanced students study selected topics with a staff member. Credits to be arranged with instructor. Prerequisite: Graduate student standing and advanced undergraduates by permission. Departmental approval required. Cr 1-3.

Art History (ARH)

ARH 100 Art and Human Experience
An exploration of the relationships between art and human experience as they exist within historical, cross-cultural and contemporary contexts. Focus is on specific areas of human experience as they intersect with the creation, understanding and use of visual artifacts. Satisfies the General Education Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Lec 3. Prerequisite: Non-art majors only. Cr 3.

ARH 155 Art History I
Introductory survey of painting, sculpture, architecture, and other arts in their various contexts from the Upper Paleolithic and Ancient World to the end of the Middle Ages. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Lec 3. Cr 3.

ARH 156 Art History II
Introductory survey of painting, sculpture, architecture, and other arts in their various contexts from the Renaissance to the present. Satisfies the General Education Western Cultural Tradition and Artistic and Creative Expression Requirements. Lec 3. Cr 3.

ARH 162 Modern Architecture and Design
A broad survey of modern European and American architecture and design. Investigates historical building systems and decorations in terms of their relationship to 20th century achievements in building and engineering. Focus on the aesthetic and social ideas of structures, spaces and design as well as key monuments, schools, and major figures. Special emphasis on urban planning and environmental design. Satisfies the General Education Artistic and Creative Expression and the Western Cultural Tradition Requirements. Lec 3. Cr 3.

ARH 251 Classical Art and Architecture
Survey of the art and architecture of Greece and Rome in their historical context since the beginnings of Aegean civilization to the Christianization of the Roman Empire. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Lec 3. Prerequisite: ARH 155 or permission. Cr 3.

ARH 252 Mediterranean Medieval Art and Architecture
An in-depth survey of the art and architecture of the Mediterranean world, including Southern Europe, the Mid-East and northern Africa, from the first decades through the fourteenth century, examines how diverse Christian and Islamic cultures built upon the strong legacy of the Classical world. The unique artistic visions of each region spawned cross-cultural developments, facilitated by the relative ease of movement that the Mediterranean permitted. Satisfies the General Education Western Cultural Tradition, Artistic and Creative Expression and Cultural Diversity and International Perspectives Requirements. Prerequisite: ARH 155 or permission. Cr 3.

ARH 253 Northern European Medieval Art and Architecture
Surveys the art and architecture of the major civilizations of Northern Europe that developed there from the fourth century through the fifteenth, including the Carolingian, Ottonian, Romanesque and Gothic eras, focussing upon the diversity of particular cultural identities and their interrelationships among one another and the Mediterranean cultures with which they interacted. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and international Perspectives Requirements. Prerequisite: ARH 155 or permission. Cr 3.

ARH 255 Italian Renaissance Art
Survey of the major works of painting, sculpture and architecture of the Italian Renaissance in their historical context from the 13th century to the early 16th century. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Lec 3. Prerequisite: ARH 156 or permission. Cr 3.

ARH 257 Northern Renaissance Art
Survey of the art of the Netherlands, France, Spain, and Germany in its historical context from Late Gothic of the 14th century to Mannerism of the 16th century. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Lec 3. Prerequisite: ARH 155 and ARH 156 or permission. Cr 3.

ARH 258 Baroque Art and Architecture
Surveys the art and architecture of the Baroque era in Southern and Northern Europe, along with their settlements in the Americas, focus on the major shifts in the European world outlook. The course investigates how the art of the period reflects the rise of strong national identities, radically shifting political powers, growing colonialism around the globe, religious reformation and increased interests in empirical knowledge and scientific inquiry. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Prerequisite: ARH 156 or permission. Cr 3.

ARH 260 The Modern Classical Tradition
This topical survey develops the Classical tradition in western visual arts from 1700 to 1900 within the broader context of the political, social and cultural changes of the era. It considers issues from the Rococo and Neoclassical movements to Realism, Impressionism and Post-Impressionism. Lec 3. Prerequisite: ARH 156 or permission. Cr 3.

ARH 261 The Modern Romantic Tradition
This topical survey of the romantic tradition in western visual arts from 1700 to 1900 looks to the broader political, social and cultural contexts of the era. This class considers movements in art from Romanticism to Symbolism and Post-Impressionism. Prerequisite: ARH 156 or permission. Cr 3.

ARH 262 Early Modern Art: From Fauvism to Surrealism
In a thematic consideration of art and its related concepts from 1900 to 1945, this course places particular emphasis on the notions of modernity and the diversity of artistic forms that the period spawned. Lec 3. Prerequisite: ARH 156 or permission. Cr 3.

ARH 263 Late Modern Art: From Abstract Expressionism Through New Forms
This thematic course considers art forms and conceptual developments from the mid-Twentieth century through the middle of the 1970's. It places particular emphasis on the expanding nature of the work of art and the changing role, place and function of the artist during the period. Lec 3. Prerequisite: ARH 156 or permission. Cr 3.

ARH 268 Canadian Art
Survey of Canadian art and architecture from the native peoples to the 20th century. Emphasis on the major ideas and styles and their relationship to American and European prototypes and analogues. Satisfies the General Education Cultural Diversity and International Perspectives, Artistic and Creative Expression and Western Cultural Tradition Requirements. Lec 3. Cr 3.

ARH 270 Topical Survey in History of Art
Surveys the historical artifacts and monuments of culture not covered by the regular rotation of Department offerings, such as those by African, Asian or Pre-Columbian peoples. Students may repeat this course for credit to study different cultures. Satisfies the General Education Social Contexts and Institutions, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Prerequisite: permission. Cr 3.

ARH 351 Art Theory and Criticism
Examination and discussion of aesthetic theory and its relationship to the visual arts; study of a wide range of ideas in the development of aesthetic thought with primary emphasis on contemporary theory; application of theoretical systems in the critical analysis of a work of art. Lec 3. Prerequisite: ARH 155 and ARH 156 or permission. Cr 3.

ARH 352 Critical Methods in History of Art
This seminar immerses students within the historiography of History of Art, making them familiar with the philosophical underpinnings, historical context, rhetorical tones, critical vocabularies and intended goals of each investigative strategy. The exploration of the various methodological approaches that the field has supported includes: Connoisseurship, Iconography, Reception Theory, Marxism, Feminism, Deconstruction, Visual Linguistics and perhaps other emerging schemes. Satisfies the General Education Western Cultural Tradition and Writing Intensive Requirements. Lec 3. Prerequisite: permission. Cr 3.

ARH 361 Topics in Art History
Identifies and develops a particular topic within the field of History of Art not covered by traditional notions of period, geographic identity, or style. Specific topics will vary from semester to semester. May be repeated for credit. Satisfies the General Education Writing Intensive Requirement. Lec 3. Prerequisite: ARH 155 or ARH 156 or permission. Cr 3.

ARH 362 Medieval Art and Architecture Seminar
Addresses focussed topics within the field of Medieval History of Art, such as the spread of the Gothic style across Europe, the regional flavors of the Romanesque, the relationship between the Byzantine and Roman churches, etc. Students define their own research projects, work with them over the course of the semester, present them within the forum of the seminar and develop them as major papers. May be repeated for credit. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives, Artistic and Creative Expression and the Writing Intensive Requirements. Prerequisite: ARH 252, ARH 253 or permission. Cr 3.

ARH 363 Renaissance Art and Architecture Seminar
Addresses focussed topics defined by the instructor within the field of Renaissance History of Art, such as the post-Plague decades of the fourteenth century, the origins of Mannerism, the rise of artistic theory, etc. Students define their own research projects, work with them over the course of the semester, present them within the forum of the seminar and develop them as major papers. May be repeated for credit. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives, Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: ARH 255 or ARH 257 or permission. Cr 3.

ARH 364 Baroque Art and Architecture Seminar
Addresses focussed topics within the field of Baroque History of Art such as the development of genre painting, the rise of viewer engagement, visions of the New World, etc. Students define their own research projects, work with them over the course of the semester, present them within the forum of the seminar and develop them as major papers. May be repeated for credit. Satisfies the General Education Western Cultural Tradition, Artistic and Creative Expression and the Writing Intensive Requirements. Prerequisite: ARH 258 or permission. Cr 3.

ARH 366 Twentieth Century Art and Architecture Seminar
In an in-depth consideration, this seminar focuses upon the culture, period, artists or artist, or of a particular issue in the history of art and/or architecture of the twentieth century. Specific topics vary from semester to semester. May be repeated for credit. Prerequisite: ARH 262 or ARH 263 or permission. Cr 3.

ARH 368 History of Art Gender Studies Seminar
In a focussed study, this seminar will identify specific gender issues in the history of art, such as cultural vision and the male-gaze, feminist activism in the arts, gender codings of style, etc. Students will define their own research projects, work with them over the course of the semester, present them within the forum of the seminar and develop them as major papers. May be repeated for credit. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions, Cultural Diversity and International Perspectives, Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: ARH 155 or ARH 156 or permission. Cr 3.

ARH 369 Film and Video Theory Seminar
This seminar identifies specific topics in film and video theory, with careful attention to their critical language, philosophical underpinnings and social contexts and develop them in terms of select examples. Students define their own research projects, work with them over the course of the semester, present them within the forum of the seminar and develop them as major papers. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression, Social Contexts and Institutions, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: ARH 155 or ARH 156 or permission. Cr 3.

ARH 397 Independent Study in Art History
Advanced independent study or research and writing projects in the history of art and related areas. Prerequisite: Juniors and seniors only, permission. Cr Ar.

ARH 398 Directed Study in Art History
Advanced independent study or research and writing projects in the history of art and related areas. Prerequisite: Juniors and seniors only, permission. Cr Ar.

ARH 493 Medieval Research Seminar
Focus on special topics selected by the instructor in the field of Medieval History of Art. Students will define and research their own individual projects, present them within the forum of the seminar, with the aim of delivering them at a professional conference and bring them to fruition as publishable papers. May be repeated for credit. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives, Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: permission. Cr 3.

ARH 494 Renaissance Research Seminar
Focus on special topics selected by the instructor in the field of Renaissance History of Art. Students will define and research their own individual projects, present them within the forum of the seminar, with the aim of delivering them at a professional conference and bring them to fruition as publishable papers. May be repeated for credit. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives, Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: permission. Cr 3.

ARH 495 Modern/Post-Modern Seminar
An advanced examination of major theoretical tendencies in modern and contemporary visual art, this seminar stresses connections with the other arts and various conceptual frames, such as Marxism, existentialism, structuralism and post-structuralism. Entails intensive reading, research and writing on selected topics that vary semester to semester. May be repeated for credit. Prerequisite: ARH 262 or ARH 263 or permission. Cr 3.

ARH 496 Field Experience in Art History
Students engaged in professional activities related to their area of study may apply for supervision and credit for the project. Prerequisite: Juniors and seniors only, permission. Cr Ar.

ARH 497 Independent Study in Art History
Advanced independent study or research and writing projects in the history of art and related areas. Prerequisite: Juniors and seniors only, permission. Cr Ar.

ARH 498 Directed Study in Art History
Advanced directed study or research and writing projects in the history of art and related areas. Prerequisite: Juniors and seniors only, permission. Cr Ar.

ARH 499 Capstone Experience in History of Art
As a guided practicum, this course will have senior majors draw from the full breadth of their undergraduate experiences in the History of Art. Requires students to research a focused project developed from primary source materials, in an investigation that will result in a professional presentation, namely a publishable paper, a public lecture, a museum show or an equivalent. Satisfies the General Education Capstone Experience Requirement. Prerequisite: permission. Cr 3.

ARH 597 Independent Graduate Study
Entails advanced research and writing projects in the history of art. Prerequisite: Graduate Standing and instructor's permission. Cr 1-3.

Art (ART)

ART 100 Drawing I
The fundamentals of drawing through creative exercises exploring the principles of line, value, texture, space, and form. Examines various media and their relationship to expression and composition. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 6. Cr 3.

ART 110 2-D Design
Fundamentals of basic design through studio experience. Covers analysis of design, composition and basic perceptual and aesthetic aspects of color. Uses a series of problems that explore the areas listed above. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 6. Cr 3.

ART 120 3-D Design
An introduction to the fundamentals of three dimensional design including volume, mass, line, plane, space and time. Uses a series of problems that explore the areas listed above. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 6. Cr 3.

ART 180 Photography I
Fundamentals of black and white photography, including film processing, printing and print control, camera basics, exposure, photographic history, lighting, and the art of photography. Lab 6. Prerequisite: Art majors must have advisor's permission. Cr 3.

ART 182 Photography and Digital Imaging
A basic course in photography that includes use of computers as part of the process. Covers basic principles such as lighting, color and selective focus. Includes material on different photographic processes including digital processes. Cr 3.

ART 200 Drawing II
A continuation of the fundamentals of drawing in black and white media and the introduction of a variety of color media with continued emphasis on their relationship to expression and composition. Lab 6. Prerequisite: ART 100. Cr 3.

ART 220 Sculpture I
A series of projects that investigate the techniques and process approach in sculpture. Includes welding, carving, casting, forming and other forms of fabrication. General use of hand and power equipment. Lab 6. Prerequisite: ART 120. Cr 3.

ART 230 Painting I
Painting in oil or acrylic paint. Fundamentals of color mixing, paint application, composition and expressive content. Lab 6. Prerequisite: ART 200, ART 110. Cr 3.

ART 240 Printmaking I
The fundamentals of printmaking covering monoprinting and intaglio. Emphasis on technical, aesthetic, conceptual and expressive development. Lab 6. Prerequisite: ART 110, ART 200. Cr 3.

ART 250 Graphic Design I
Explores the principles of applied design as used in the production of brochures, catalogues, magazines, newspapers, etc. Exercises in type, layout and issues of technology will be covered. Lab 6. Prerequisite: ART 110 or permission. Cr 3.

ART 260 Topics in Studio Art
Selected topics surveying specific media, thematic content or contemporary issues. Topics will vary from semester to semester. May be repeated for credit. Lab 6. Prerequisite: ART 200, ART 110, ART 120 or permission. Cr 3.

ART 270 Digital Art I
An introduction to two-dimensional digital art. Includes professional 2D and related software, input/output options and image creation and editing. Emphasizes using the tools for the production of fine art. (This course is identical to NMD 270.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: ART 110 or permission. Cr 3.

ART 272 Digital Imaging
Covers the fundamentals of digital imaging, including the acquisition of images with scanners and other input devices, modification of images with image editing software such as Adobe Photoshop, and different aspects of digital printing. Cr 3.

ART 280 Photography II
A continuation of the fundamentals of black and white photography. Lab 6. Prerequisite: ART 180. Cr 3.

ART 300 Drawing III
Continued study of drawing in a wide variety

of media. Emphasis on creative thinking, problem solving, expression and technique. Lab 6. Prerequisite: ART 200. Cr 3.

ART 302 Figure Drawing
Drawing based on the human figure. Focus on understanding the basics of human structure and incorporating this understanding with technical, expressive and aesthetic development. Lab 6. Prerequisite: ART 200. Cr 3.

ART 320 Sculpture II
A thematic and process approach to exploring concepts allowing students to pursue selected individual projects. Introduction to additional materials and techniques. Prerequisite: ART 220. Cr 3.

ART 330 Painting II
Further development of painting concepts with emphasis on the characteristics of materials. Individual investigations of technical and expressive issues. Lab 6. Prerequisite: ART 230. Cr 3.

ART 340 Printmaking II
Continued explorations in printmaking with emphasis on color and multi-plate color printing. Lithography will be covered. Intaglio, monoprinting, relief and other print-making media will be studied on a rotating basis. Lab 6. Prerequisite: ART 240. Cr 3.

ART 350 Graphic Design II
Continued study of graphic design. Lab 6. Prerequisite: ART 250 or permission. Cr 3.

ART 360 Topics in Studio Art
Selected topics surveying particular media, thematic content or contemporary issues. Specific topics will vary from semester to semester. Course may satisfy level II requirements in painting, printmaking or sculpture. May be repeated for credit. Lab 6. Prerequisite: permission of instructor. Cr 3.

ART 370 Digital Art IIA: 3D Modeling and Animation
An introduction to the concepts and tools of 3D modeling and animation on the computer. Includes techniques to create narratives and provides hands-on experience with appropriate hardware and software. (This course is identical to NMD 370.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: ART 270 or NMD 270 or permission. Cr 3.

ART 371 Digital Art IIB: Digital Video
An introduction to digital, non-linear video editing. Use of professional-level equipment to create short, time-based artworks. (This course is identical to NMD 371.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: ART 270 or NMD 270 or permission. Cr 3.

ART 372 Digital Art IIC: Interactivity
An introduction to the concepts and tools of interactivity in digital art. Students will create interactive pieces and consider issues of interactivity. (This course is identical to NMD 372.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: ART 270 or permission. Cr 3.

ART 397 Independent Study in Studio Art
Advanced independent study and research in studio art or related areas. Projects must be designed by the student and approved by the designated instructor. Prerequisite: the highest level course in the subject area. Juniors and seniors only with permission of the instructor. Cr Ar.

ART 398 Directed Study in Studio Art
Advanced study and research in studio art or related areas directed by a faculty member. Prerequisite: the highest level course in the subject area. Juniors and seniors only with permission of the instructor. Cr Ar.

ART 402 Figure Drawing II
Advanced study of figure drawing. Emphasis on understanding form and structure, with technical and expressive development. Lab 6. Prerequisite: ART 302. Cr 3.

ART 420 Sculpture III
Individual and group collaborative projects working with site specific sculpture or installations. Emphasis on process including scale models and other considerations for final presentation for jurying. Prepares artists, engineers, architects in universal commission procedures. Field trips to research existing projects may be included in this course. May be repeated for credit. Lab 6. Prerequisite: ART 320 or permission. Cr 3.

ART 430 Painting III
Guided study in painting stressing individual growth through special projects. Emphasis on conceptual as well as technical development. May be repeated for credit. Lab 6. Prerequisite: ART 330. Cr 3.

ART 440 Printmaking III
Continued study of printmaking through a variety and choice of printmaking media. Emphasis on conceptual as well as technical development. May be repeated for credit. Lab 6. Prerequisite: ART 340. Cr 3.

ART 460 Topics in Studio Art
Advanced study of selected topics surveying particular media, thematic content or contemporary issues. Specific topics will vary from semester to semester. May be repeated for credit. Lab 6. Prerequisite: Senior standing or permission of the instructor. Cr 3.

ART 496 Field Experience in Art
Students engaged in professional activities related to their area of study may apply for supervision and credit for the project. Pre-requisite: Seniors and/or permission. Cr Ar.

ART 497 Independent Study in Studio Art
Advanced independent study and research in studio art or related areas. Projects must be designed by the student and approved by the designated instructor. Prerequisite: the highest level course in the subject area and ART 397. Seniors only with permission of the instructor. Cr Ar.

ART 498 Directed Study in Studio Art
Advanced study and research in studio art or related areas directed by a faculty member. Prerequisite: the highest level course in the subject area and ART 398. Seniors only with permission of the instructor. Cr Ar.

ART 499 Senior Studio Seminar
A capstone course for studio art majors which requires the synthesis of all previous course work and focuses on the development of essential professional practices in the visual arts. Satisfies the General Education Capstone Experience Requirement. Prerequisite: junior or senior standing. Cr 3.

ART 597 Independent Study in Studio Art
Graduate level independent study in studio art (painting, sculpture, printmaking, drawing), or related areas. Projects must be designed by the student and approved by the graduate instructor in studio art. Pre-requisite: permission of the instructor. Cr Ar.

ART 598 Directed Study in Studio Art
Graduate level study and research in studio art or related areas directed by a graduate faculty member in studio art. Prerequisite: permission of the instructor. Cr Ar.

Astronomy (AST)

AST 109 Introduction to Astronomy
A descriptive survey of astronomy including contemporary views of the universe. Topics include the solar system, stars, galaxies, black holes, quasars, and cosmology. May be taken without AST 110. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement when taken with AST 110. Cr 3.

AST 110 Introduction to Astronomy Laboratory
Laboratory and observational exercises to accompany AST 109. Satisfies the General Education Lab in the Basic or Applied

Sciences Requirement when taken with AST 109. Lab 2. Corequisite: AST 109. Cr 1.

AST 114 Navigation
Covers piloting, dead-reckoning, and celestial navigation. A working knowledge of trigonometry is required. Satisfies the General Education Applications of Scientific Knowledge Requirement. Rec 3. Cr 3.

AST 215 General Astronomy I
A more detailed introduction to astronomy and astrophysics than AST 109 covering solar system astronomy including celestial mechanics, astronomical coordinate systems, Kepler's laws, and the sun. Lec 3. Prerequisite: MAT 127, PHY 112 or PHY 122, or permission of instructor. Cr 3.

AST 216 General Astronomy II
An introduction to one or more of: stars, galaxies, quasars, and/or cosmology. Not given every year. This course is independent of AST 215 which is not a prerequisite. Lec 3. Prerequisite: MAT 127, PHY 112 or PHY 122 or permission of instructor. Cr 3.

AST 451 Astrophysics
Application of the principles of physics to selected topics in the study of cosmogony, stellar evolution and dynamics, interstellar processes, the formation and evolution of galaxies, and cosmology. Rec 3. Prerequisite: PHY 236, PHY 238, PHY 455, MAT 259. Cr 1-3.

AST 497 Topics in Astrophysics
Selected topics in areas not already covered by regular course offerings in the Department. Prerequisite: permission of instructor. Cr 1-3.

AST 598 Special Topics in Theoretical or Experimental Astrophysics
Prerequisite: departmental permission. Cr Ar.

Animal and Veterinary Sciences (AVS)

AVS 145 Animal Science
Fundamental principles of the animal sciences, including animal genetics, breeding systems, the physiology of reproduction, animal nutrition, and the physiology of lactation. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Satisfies the Ethics Requirement when taken in combination with AVS 249, AVS 346 and AVS 349. Lec 3, Lab 2. Prerequisite: First-year students and sophomores or by permission. Cr 4.

AVS 150 History of the Human-Animal Relationship
An examination of Humankind's association with domestic animals. Involves an examination of domestication to modern times. Topics include: origin of domestic animals, animals and early Christianity, the animal welfare movement from the 17th to the 20th century and the rise of dogs, cats and horses as privileged species. Satisfies the General Education Ethics Requirement. Lec 3. Cr 3.

AVS 151 History of Veterinary Medicine
Examines the history of veterinary medicine from the ancient world to the present. Topics include: the relationship, or lack thereof, between veterinary medicine and the animal welfare movement, veterinary medicine's contribution to bacteriology and preventive medicine, and the new direction of veterinary medicine in the twentieth century. Satisfies the General Education Ethics Requirement. Lec 3. Cr 3.

AVS 200 Topics in Animal and Veterinary Science
A survey of current issues related to animal production will be researched by students who will present the issues in a series of debates. Each student will be responsible for organizing one debate team and serving on several debate teams. (Pass/Fail Grade Only.) Cr 1.

AVS 203 Equine Management
An introductory course designed to familiarize students with the equine industry and with the principles of equine anatomy, nutrition, disease management and routine care. Lec 3. Prerequisite: BIO 100 and sophomore standing. Cr 3.

AVS 243 Centered Riding Principles of Equitation
An introduction to basic horseback riding techniques. Proper position of the rider, understanding horses movement patterns in different gaits and the proper care, use and fit of riding equipment will be covered in the lecture. In the riding arena, students will receive instruction, grooming, riding and caring for both the horse and the equipment. Cr 3.

AVS 249 Laboratory and Companion Animal Science
An introduction to laboratory and companion animal science. Species covered include rodents, rabbits, dogs and cats. Topics include characteristics of each species, welfare, husbandry, uses, diet and health maintenance. Lec 2. (Offered in spring of even numbered years.) Satisfies the General Education Ethics Requirement when taken in combination with AVS 145, AVS 346 and AVS 349. Prerequisite: AVS 145. Cr 2.

AVS 253 Principles of Western Riding
An introduction to the western style of horseback riding, including history, theory, styles, equipment and training methods associated with the western horse and rider. Student will receive both lecture and riding instruction. Cr 3.

AVS 303 Equine Management Cooperative
Work experience at the equine operation at the J. F. Witter Animal Science Center. Students work in teams to manage the University equine herd, including feeding, nutrition, health management, retraining of donated horses, maintenance and marketing. Prerequisite: AVS 203 and AVS 243 or AVS 253 or permission. Cr 4.

AVS 343 Draft Horses in Sustainable Forestry and Agriculture
An introduction to draft horses in forestry and agriculture. Use and management of draft horses are covered in lecture. In labs and field trips, students will receive experience training and driving draft horses. Cr 2.

AVS 346 Dairy Cattle Technology
The first of a two-course sequence involving a work experience at the University Dairy. Students are responsible for the management of the University dairy herd, including feeding, milking, reproduction, maintenance and marketing. Students, along with faculty and staff advisors, make and implement management decisions that affect the operation of the Dairy. Satisfies the General Education Ethics Requirement when taken in combination with AVS 145, AVS 249 and AVS 349. Lec 3, Lab 4. Prerequisite: AVS 145, AVS 455, AVS 480. Cr 5.

AVS 349 Livestock Management
The selection, breeding, feeding, care and management of beef cattle, sheep and swine. Satisfies the General Education Ethics Requirement when taken in combination with AVS 145, AVS 249 and AVS 346. Lec 3. Prerequisite: AVS 145, AVS 455, AVS 480. Cr 3.

AVS 351 Animal Science Techniques
Direct application of current techniques used in the management of dairy and beef cattle, sheep and companion animals. Included are restraint, dehorning, castration, docking, milking, shearing and health management and computer applications in the animal sciences. Lec 1, Lab 4. Prerequisite: AVS 145 and sophomore standing. Cr 3.

AVS 353 Equine Reproduction and Breeding Management
A survey of the reproductive biology of the horse and a discussion of horse breeding practices, including artificial insemination, semen evaluation and embryo transfer. Prerequisite: sophomore standing or permission. Cr 3.

AVS 365 New England Regional Dairy Travel Course
A week long course touring dairy facilities, processing plants and dairy related business in New England. Supported by the New England Regional Dairy Program. Tours different areas of New England each year. Cr 1.

AVS 368 Independent Study in the Animal Sciences
An in-depth study into a specific area to be approved by the staff advisor at time of registration. (1) breeding, (2) disease, (3) management, (4) nutrition, (5) physiology. Not more than five credit hours will be permitted toward graduation. Prerequisite: AVS 145 and permission. Cr Ar.

AVS 371 University Dairy Cooperative
Students are responsible for the management of the University dairy herd, including: feeding, milking, reproduction, maintenance and marketing. Students, along with faculty advisors and the herdsperson, make management decisions that affect the day to day operation of the University dairy. Prerequisite: AVS 346. Cr 4.

AVS 393 Training the Standardbred Horse
An introduction to the standardbred harness racing industry with detailed instruction on training and management of the standard-bred race horse. Prerequisite: sophomore standing or permission of instructor. Cr 3.

AVS 396 Field Experience in Animal and Veterinary Science
An approved program of work experience which contributes to the academic major for which academic credit is given. Students may work part time or full time for a semester in a job related to their professional career goals. (Pass/Fail Grade Only.) Prerequisite: permission. Cr 1-16.

AVS 397 Equine Internship
Field experience in the equine industry, or with an equine veterinarian. Prerequisite: AVS 303 or permission. Cr 4.

AVS 401 Senior Paper in Animal Science I
An original investigation of a problem in animal science, under the guidance of a faculty member. Students are required to submit an experimental proposal describing their research, and present an oral report to faculty and students. Satisfies the General Education Writing Intensive and Capstone Experience Requirements when combined with AVS 402. Prerequisite: AVS 200, ENG 317 or equivalent and senior standing. Cr 2.

AVS 402 Senior Paper in Animal Science II
Students will prepare a final copy of work done in AVS 401 and present an oral report to faculty and students. Lec 2. Satisfies the General Education Writing Intensive and Capstone Experience Requirements when combined with AVS 401. Prerequisite: AVS 401 and COM 103 or equivalents and senior standing. Cr 2.

AVS 420 Fish Aquaculture I
Part I of a two semester sequence. A comprehensive examination of finfish production methods. Covers aspects of fish anatomy and physiological responses to intensive culture methods. Water sources and water quality parameters and their effects on fish health will be examined. Fish culture systems from extensive pond culture to intensive land based recirculation systems and their effects on the environ-ment will be described. Aspects of fish production at all life stages, beginning with broodstock management in this course and ending with on-growing of fish to market the following semester will be studied. Students will participate in selected techniques in fish aquaculture i.e., anatomy of fish species, live food production for larval fish, diagnostic procedures, drug residue testing, fish handling and anesthesia, spawning techniques, egg incubation techniques and computer applications during five weekday afternoon laboratories and two all day field trips. This course is identical to SMS 420. Lec 2, Lab/Field 4. (Fall-even years.) Prerequisite: SMS 211. Cr 3.

AVS 421 Fish Aquaculture II
A continuation of AVS 420. A comprehensive examination of finfish production methods. Covers aspects of fish production at all life stages, beginning with broodstock management in the first semester course (AVS/SMS 420) and ending with on-growing of fish to market. Aspects of fish production to be studies will cover genetic selection, feeding, health management, fish farm structure, processing fish and environmental factors. Principles and examples of disease prevention and control, such as husbandry, treatment, vaccination, natural defenses and bio-security. Major diseases of farmed fish and control measures will be presented. Students will participate in selected techniques in aquaculture i.e., anatomy of fish species, live food production for larval fish, diagnostic procedures, drug residue testing, fish handling and anesthesia, spawning techniques, egg incubation techniques and computer applications during five weekday afternoon laboratories and two all day field trips. This course is identical to SMS 421. Lec 2, Lab/Field 4. (Spring-odd years.) Prerequisite: AVS 420/SMS 420. Cr 3.

AVS 433 Equine Exercise Physiology
Covers current concepts regarding the metabolic and physiologic factors associated with exercise and training the horse. Provides students with the scientific basis for properly designing a physical conditioning program for the equine athlete. Prerequisite: CHY 121 or BMB 207, BIO 208 or BIO 377 or permission. Cr 3.

AVS 437 Animal Diseases
Introduction to the study of disease in animals, including the causes, pathology and control of diseases of domestic animals. Lec 3. Prerequisite: BIO 377 or permission. Cr 3.

AVS 455 Animal Nutrition
Principles of nutrition; the digestion, absorption and utilization of nutrients and the consequences of their deficiency, excess or imbalance. Prerequisite: BIO 200, BMB 208 or equivalent. Cr 4.

AVS 461 Animal Breeding
Covers the inheritance of the commercially valuable characteristics and methods of estimating heritability and repeatability; mating systems and their effects; progeny testing, selection indices and other methods to increase intensity and accuracy of selection. Lec 2, Lab 2. Prerequisite: BIO 462 or equivalent, and MAT 121 or MAT 232. Cr 3.

AVS 466 Feeding Dairy Cattle
Balancing rations using a variety of feedstuffs for the lactating dairy cow. Lec 2. Prerequisite: AVS 346, AVS 455. Cr 2.

AVS 480 Physiology of Reproduction
Comparative development and functions of the reproductive process in domestic animals. Lec 3. Prerequisite: BIO 377. Cr 3.

AVS 502 Ruminant Nutrition and Physiology
Ruminant metabolism, especially rumen function, factors which modify it. The anatomical and physiological development of the rumen, as well as factors affecting digestion and microbial metabolism in the context of a dynamic system. Lec 3. Prerequisite: AVS 455, BMB 322 or permission. Cr 3.

AVS 504 Research Methods in Ruminant Nutrition
A multi-disciplinary introduction to some laboratory and animal techniques used in nutritional research. Lec 2, Lab 6. . Prerequisite: AVS 455 or FSN 410 or permission. Cr 3.

AVS 590 Special Topics in Animal Science
Anatomy, breeding, diseases, management, nutrition, physiology as related to poultry or dairy. Prerequisite: permission. Cr Ar.

Biological Sciences (BIO)

BIO 100 Basic Biology
An introduction to fundamental principles of structure and function in plants and animals. Open to students of all colleges. Intended for students planning to take additional biology courses. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 2. Cr 4.

BIO 200 Biology of Organisms
Introduces functions (physiology) and structures (anatomy, morphology) of animals and plants stressing basic physiological processes and adaptations to the environment. Equal attention is given to plants and animals. Students who have completed BIO 208 cannot take BIO 200 for degree credit. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 3. Prerequisite: BIO 100 or permission Cr 4.

BIO 205 Field Natural History of Maine
The plant and animal life and physical features of aquatic, wetland, and terrestrial ecosystems in Maine, observed during five weekday afternoon field trips and two full single-day trips on separate weekends during the first half of the semester. Each student carries out an independent field natural history project culminating in a research paper during a five-week project period (no classes) in the second half of the semester. The course concludes with a half-day field trip on winter natural history. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Field 4. Cr 4.

BIO 208 Anatomy and Physiology
An intermediate lecture and laboratory course on the structure of the human body and how it works. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 2. Prerequisite: BIO 100. Cr 4.

BIO 222 Biology: The Living Science
A laboratory course introducing the science of Biology. Emphasis is on processes and principles of science across disciplines. Focused examples are presented from topics such as ecology, evolution and cellular biology. The role of science in the resolution of ethical issues regarding the impact of the human population on the environment will be emphasized. Degree credit cannot be earned for both BIO 100 and BIO 222. Satisfies the General Education Lab in the Basic or Applied Sciences and Population and the Environment Requirements. Lec 3, Lab 2. Cr 4.

BIO 296 Biological Sciences Professional Experience
Students engage in research, clinical determinations, field studies or allied activities with medical professionals, hospitals, laboratories, state agencies, and other organizations approved by the department. May be repeated for credit up to total of 8 credit hours. Cr Ar.

BIO 306 Field Marine Ecology
An overview of the major coastal habitats and communities in Maine, including sand dunes, salt marshes, mud flats, sea grass meadows, exposed rocky shores, sheltered rocky shores, tide pools and estuaries. Emphasis will focus on distributions (including disjunct species), natural history, adaptation and ecology of important organisms occupying, influencing or regulation these communities. Note: Because of overlap, BIO/SMS 306 and BIO/SMS 475 cannot both be taken for degree credit. (This course is identical to SMS 306.) Satisfies the General Education Writing Intensive Requirement. Lec 2, Lab/field 4. Prerequisite: one year of biology or equivalent; recommended BIO 319, SMS 300 or WLE 200. Cr 4.

BIO 310 Plant Biology
Examines the structure (morphology, anatomy), function (physiology), reproduction, ecology, and systematic significance of the major groups of plants. Emphasis will be given to the flowering plants and the ecology of the various plant groups. Students who have completed BIO 222 cannot take BIO 310 for degree credit. Lec 3, Lab 3. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Prerequisite: BIO 200, PSE 100, FES 100 or equivalent. Cr 4.

BIO 319 General Ecology
Ecological principles for the science major including environmental factors, population ecology, community ecology and ecosystem analysis. Lec 3. Prerequisite: one year of college chemistry, one year of college biological science. Cr 3.

BIO 326 General Entomology
Fundamental principles of insect life and the relation of insects to plants, animals, and humans. Laboratory includes a study of structure, and systematics. An insect collection is required. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 3. Prerequisite: BIO 100. Cr 4.

BIO 327 Introductory Applied Entomology
An introduction to entomology with emphasis on regulating populations of pest insects and the fundamentals of insect biology which influence insect populations. Laboratory emphasizes identification and sight recognition of insects of importance to ornamental plants and field crops. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Rec 1, Lab 2. Prerequisite: BIO 100. Cr 4.

BIO 329 Vertebrate Biology
An introduction to the classes of vertebrates, their characteristics, evolution, reproduction and locomotion. Emphasis on adaptive aspects of structure and life histories. Lec 3. Prerequisite: BIO 200. Cr 3.

BIO 331 Vertebrate Biology Laboratory
A study of taxonomy of regional vertebrate fauna including structure and function of representatives of vertebrate classes and taxonomy of local vertebrates. Lab 2. Prerequisite: BIO 329 or concurrently. Cr 1.

BIO 336 Developmental Biology
Considers the transformation of the fertilized egg into a new adult individual including the concepts of growth and development of organisms. Lec 2, Lab 4. Prerequisite: BIO 200. Cr 4.

BIO 342 Plants in Our World
Botany and the role plants play in current and historical human society and ecology. Topics in agriculture and forestry including genetic engineering, biodiversity, and plant-based drugs. Satisfies the General Education Population and the Environment Requirement. Prerequisite: BIO 200 or permission. Cr 3.

BIO 353 Invertebrate Zoology
The morphology, ecology, life histories and phylogenetic relationships of non-vertebrate animals, excluding insects and parasites. Lec 3, Lab 3. Prerequisite: BIO 200. Cr 4.

BIO 354 Biology of Behavior
Examines mechanisms of animal behavior, stressing how behavior adapts animals to their environments. Lec 3. Prerequisite: BIO 200 or equivalent. Cr 3.

BIO 377 Animal Physiology
Physiological processes in vertebrates with emphasis on the integration of organ systems in humans. A pre-professional course for pre-medical, pre-dental, pre-graduate school, nutrition, and exercise physiology students. Lec 3. Prerequisite: BIO 200 or BIO 208 and one year of chemistry. Cr 3.

BIO 378 Animal Physiology Laboratory
Experimental analysis of physiological processes. Some animal surgery is involved. Lab 4. Prerequisite: BIO 377 previously or concurrently and 1 year of chemistry. Cr 2.

BIO 387 Undergraduate Research in Biology I
Open to juniors and seniors who have special interest and qualifications in some branch of biological research. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: departmental permission. Cr Ar.

BIO 388 Undergraduate Research in Biology II
Open to juniors and seniors who have special interest and qualifications in some branch of biological research. (May be repeated for credit.) Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: departmental permission. Cr Ar.

BIO 391 Undergraduate Independent Study in Biology I
Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: departmental permission. Cr Ar.

BIO 392 Undergraduate Independent Study in Biology II
Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: departmental permission. Cr Ar.

BIO 396 Field Experience in Biology
An approved work experience which contributes to the academic major and for which academic credit is given. Students may work part time or full time for a semester and have the opportunity to gain practical experience in a job related to their professional career goals. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission of instructor. Cr 1-16.

BIO 400 Biological Sciences Writing Intensive
Designed to supplement existing courses in Biology. Additional writing will be required in conjunction with regular course work providing students with intensive writing in their major discipline. May be repeated for credit up to a total of 4 credit hours. . Satisfies the General Education Writing Intensive Requirement. Corequisite: Must be taken concurrently with a regular Biology course. Prerequisite: permission. Cr 1-2.

BIO 401 Natural History of the Maine Coast
An ecological field study of the habitats, communities, populations and natural history of the Maine coast. Field trips are conducted at the Todd Wildlife Sanctuary (Hog Island) as well as on the mainland and coastal islands. Evening seminars are included. For information and application, write directly to: National Audubon Society, Audubon Ecology Camp, 11 Audubon Road, Bremen, Maine 04551. Do not apply directly to the University of Maine. (Summer course only.) Cr 1-2.

BIO 402 Capstone Experience in Biological Sciences
A senior-year experience for Biology, Botany and Zoology majors that emphasizes important biological concepts by synthesizing and augmenting prior learning. Utilizes class discussions, group participation, readings, formal student classroom presentations and a senior paper. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Lec 3. Prerequisite: senior standing in Biology, Botany or Zoology majors. Cr 3.

BIO 405 Clinical Lab Methods of Infectious Disease
Examines the medically important parasites causing human infection, associated epidemiology and current laboratory methods employed for diagnosis. The major groups of pathogenic fungi are also discussed, including laboratory procedures for detection and identification. Applications of immunochemical and molecular methods used to diagnose or monitor a variety of infectious disease processes is emphasized. Lec 2, Lab 2. Prerequisite: BMB 300/BMB 305, BMB 420/ BMB 421 suggested. Clinical Laboratory Science majors only or permission. Cr 3.

BIO 421 Introduction to Clinical Laboratory Methods
An introduction to basic theory and laboratory practice in clinical hematology and urinalysis, including an introduction to the theory and function of relevant laboratory instruments. Required for Clinical Laboratory Studies majors. Prerequisite: BMB 322, BMB 323; Clinical Laboratory Studies majors only or permission. Cr 4.

BIO 422 Clinical Hematology
A comprehensive study of the principles, methodology and pathological states in hematology. Lectures and laboratory practice. (EMMC, MMC.) Cr 7.

BIO 423 Clinical Microbiology
A comprehensive study of the principles and techniques of diagnostic microbiology and parasitology. Lectures and laboratory practice. (EMMC, MMC.) Cr 7.

BIO 424 Clinical Immunohematology
Fundamental techniques of blood grouping and cross-matching proceeding to advanced studies of human blood groups, theory and practice in special problems, and advanced techniques. Lectures and laboratory practice. (EMMC, MMC.) Cr 7.

BIO 425 Clinical Chemistry
Basic techniques of clinical chemistry proceeding to advanced theories and methodology. Includes theory and technique of immunochemistry. Lectures and laboratory practice. (EMMC, MMC.) Cr 9.

BIO 426 Clinical Microscopy
Lectures and laboratory practice in the microscopical examination of urine and body fluids. (EMMC, MMC.) Cr 2.

BIO 430 Ecology and Systematics of Aquatic Insects
Taxonomy, life history and ecology of aquatic insects. Emphasis on role of insects in the structure and function of aquatic ecosystems in both natural and managed settings. Field trips, research project and collection required. Lec 2, Lab 4. Prerequisite: BIO 326 or permission. Cr 4.

BIO 432 Biology of the Fungi
Ecology, physiology and classification of the major groups of fungi and their impact on human affairs. Laboratory and fieldwork will emphasize current techniques used to study fungi. (This course is identical to BIO 532.) Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Lab 4. Prerequisite: BIO 100 and BIO 200 or equivalents or permission. Cr 4.

BIO 433 Mammalogy
Considers the characteristics, functional anatomy, behavior and ecology of mammals. Lectures, laboratory study and field trips. Lec 3, Lab 3. Prerequisite: BIO 329 or BIO 333 or permission. Cr 4.

BIO 434 Avian Biology and Ecology
Advanced discussion of the characteristics, functional morphology, behavior, evolution, biogeography, and ecology of birds. Lectures, laboratory study, and an independent project. Lec 3, Lab 3. Prerequisite: BIO 329 and an ecology course or permission. Cr 4.

BIO 438 Morphogenesis and Differentiation
Analysis of interacting systems in development. Study of regulation of morphogenesis and differentiation at the organ, tissue and cellular levels, with emphasis on experimental approach towards problems in development. Satisfies the General Education Capstone Experience Requirement. Lec 3. Cr 3.

BIO 441 Electron Microscopes-Theory and Use
Principles of operation of transmission and scanning electron microscopes and their use in examining biological material. Interpretation of electron micrographs. Lec 2. Prerequisite: 1 year chemistry, 1 year physics, 1 year biology. Cr 2.

BIO 445 Plant Genetics
An introduction to the principles of genetics with emphasis on inheritance in vascular plants. Polyploidy, cytoplasmic inheritance and the principles of plant breeding receive special attention. Lec 3. Prerequisite: BIO 100 or equivalent, sophomore standing. Cr 3.

BIO 446 Aquatic Ecosystems:a Landscape Perspective
An advanced course in aquatic ecology that examines wetland, river and stream, lake and

estuarine ecosystems from a landscape perspective. Emphasis on interpreting ecosystem pattern and process by understanding the importance of spatial and temporal scales, abiotic and biotic controls, land-water biogeochemical interactions, and management considerations. Lectures, discussion, computer GIS exercises, and a research project. Note: BIO 446 and BIO 546 cannot both be taken for degree credit. Prerequisite: An advanced ecology course, e.g., BIO 468, BIO 463, PSE 423, SMS 475, SMS 352 or WLE 555 or permission. Cr 3.

BIO 448 Insect Pest Ecology and Management
Discuss principles of insect population dynamics, natural mortality and management of insects. Biological and biorationale strategies for pest suppression will be emphasized with case studies in agricultural, forest and aquatic ecosystems. (Student enrolled in BIO 548 cannot take BIO 448.) Lec 3. Prerequisite: BIO 326, BIO 327 or INT 256 or permission. Cr 3.

BIO 450 Histology
Microscopic anatomy of animal tissues. Satisfies the General Education Capstone Experience and Writing Intensive Requirements. Lec 2, Lab 4. Prerequisite: BIO 200 or BIO 208 and junior standing or permission. Cr 4.

BIO 452 Plant Physiology
Physiological processes in plants, with emphasis on water relations, mineral nutrition and physiological ecology. Lec 3. Prerequisite: BIO 100 and one year of chemistry; BIO 200 recommended. Cr 3.

BIO 453 Plant Physiology Laboratory
Laboratory study of the physiological function of plants. Lab 2. Prerequisite or corequisite: BIO 452. Cr 1.

BIO 454 Invertebrate Functional Morphology
Advanced study of the morphology and function of organ systems in invertebrate animals. Emphasis on laboratory investigation of living organisms and typically with concentration on two to four phyla chosen by participants in the course. May be repeated for credit. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Lec 1, Lab 4. Prerequisite: BIO 353 or equivalent. Cr 3.

BIO 455 Biological Invasions
Analysis of mechanisms behind species establishment in new areas, their impact on native ecology, theoretical bases of invasion-related phenomena, and economic and sociopolitical costs inflicted by exotic species. Note: BIO 455 and BIO 555 cannot both be taken for degree credit. Satisfies the General Education Population and the Environment Requirement. Prerequisite: BIO 319, WLE 200, SMS 300, SMS 352 or FES 407 or permission of instructor. Cr 3.

BIO 461 Insect Biology, Taxonomy and Systematics
Biology, morphology, and evolutionary relationships of the insect orders and major families with an introduction to the principles of modern systematics. Laboratory deals exclusively with the identification of native and exotic specimens. Lec 2, Lab 6. Prerequisite: BIO 326, BIO 327 or INT 256. Cr 4.

BIO 462 Principles of Genetics
The nature of hereditary factors and the mechanisms by which they are transmitted and expressed. Lec 3. Prerequisite: BIO 100 and sophomore standing. BMB 280 is recommended but not required. Cr 3.

BIO 463 River Ecology
An introduction to the ecology of rivers with emphasis on the role of physical and biological factors in controlling ecosystem processes and how these processes are influenced by human activities. Field trips and research projects required. Satisifies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Lab 4. Prerequisite: BIO 319 or equivalent. Cr 4.

BIO 464 Taxonomy of Vascular Plants
Identification and evolutionary biology of flowering plants. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Rec 1, Lab 2. Prerequisite: BIO 100. Cr 4.

BIO 465 Evolution
The origin and development of evolutionary theory and the mechanisms which bring about the genetic differentiation of groups of organisms. Lec 3. Prerequisite: BIO 100. Cr 3.

BIO 468 Limnology
The ecology of inland waters, with emphasis on the physical, chemical and biological characteristic of lakes. Lec 3. Prerequisite: BIO 200, CHY 121/123 and 122/124; BIO 319 recommended. Cr 3.

BIO 469 Field Limnology
An optional field and laboratory component to accompany BIO 468. Offered alternate years (odd). A weekend field trip is required. Prerequisite or Corequisite: BIO 468. Cr 1.

BIO 472 Fishery Biology
Introduction to theory and practice of contemporary fishery biology emphasizing ecology, life history, fish population sampling and manipulation, human factors and multiple use concepts. Lec 3. Prerequisite: BIO 329, BIO 319 or WLE 200. Cr 3.

BIO 474 Neurobiology
Foundations on the organization and function of the nervous systems in various animals. Specifically addresses how single nerve cells function; how groups of neurons interact; how systems of neurons provide brain function and behavior. Sensory and motor system interplay will be emphasized. Lec 3. Prerequisite: BIO 200, PHY 112, CHY 132 or permission. Cr 3.

BIO 475 Field Marine Ecology
An overview of the major coastal habitats and communities in Maine including: sand dunes, salt marshes, mud flats, sea grass meadows, exposed rocky shores, sheltered rocky shores, tide pools and estuaries. Emphasis will focus on distributions (including disjunct species), natural history, adaptation and ecology of important organisms occupying, influencing or regulating these communities. Because of overlap, BIO/SMS 306 and BIO/SMS 475 cannot both be taken for degree credit. (This course is identical to SMS 475.) Satisfies the General Education Writing Intensive Requirement and may be used to satisfy the Capstone Experience Requirement in degree programs in the Department of Biological Sciences. Lec 2, Lab/field 4. Prerequisite: one year of biology or equivalent; BIO 319 or SMS 300 or equivalent; recommended: a course in statistics. Cr 4.

BIO 479 Endocrinology
A comprehensive survey of the vertebrate hormones, their biochemistry, functions and experimental approaches to their study. Lec 3. Prerequisite: BIO 377 and BMB 280 or permission. Cr 3.

BIO 480 Cell Biology
Examines the fundamental cellular, sub-cellular and molecular characteristics of cells with emphasis on structure and function of organelle systems common to eukaryotic cells. Lec 3. Prerequisite: BIO 200 or BIO 208, Organic Chemistry or Biochemistry. Cr 3.

BIO 481 Seminar in the Biological Sciences I
Literature reviews and focused studies of topics selected from current biological research. Cr 1-3.

BIO 483 Cell Biology Laboratory
A laboratory course consisting of exercises employing techniques commonly utilized in cell biological research. Lab 2. Prerequisite: BIO 480 previously or concurrently. Cr 1.

BIO 487 Problems in Zoology I-Field Ornithology/Field Studies
Field studies in identification of land and water birds in a variety of habitats along the Maine coast. This program is based at the Todd Wildlife Sanctuary (Hog Island.) For

information and an application, write directly to: National Audubon Society, Audubon Ecology Camp, 11 Audubon Road, Bremen, Maine 04551. Do not apply directly to the University of Maine. Also, Eagle Hill Wildlife Research Station offers specialty field seminars on the Maine Coast involving intensive practical field experiences and follow-up laboratory work and discussions. For information and an application, write directly to: Eagle Hill Wildlife Research Station, Dyer Bay Road, Steuben, Maine 04680. (Offered summers only.) Cr 1-2.

BIO 496 Field Experience in Biological Sciences
Students work as field botanists pursuant to an authorized activity or research project. Cr Ar.

BIO 504 Advanced Developmental Biology
Cellular mechanisms of animal development, including fertilization, cell cleavage, cell movement, cellular interactions, extracellular matrix, developmental genetics and cancer. Prerequisite: BIO 336 or BIO 438 or permission. Cr 3.

BIO 511 Insect Ecology
Ecological effects of biotic and abiotic factors on insects and on insect population ecology. Outside reading and field trips required. Lec 2, Rec 1. Prerequisite: Beginning course in ecology and background in statistics, physiology and entomology or permission. Cr 3.

BIO 512 Advanced Seminar in Biology
Readings and presentations of recent primary literature in specific areas of zoology. Topics vary and may involve both theoretical and applied studies. Section 01-Cell Biology; Section 02-Developmental Biology; Section 03-Ecology; Section 04-Genetics; Section 05-Physiology. May be repeated for credit. Prerequisite: Permission. Cr 1-3.

BIO 525 Community Ecology
An advanced discussion of the organization of biological communities including community structure, stratification and patterns, niche division and species diversity, competition, predation, community classification and description, biogeography of communities, succession and climax. Lec 3. Prerequisite: BIO 319 or equivalent. Cr 3.

BIO 530 Biology of the Fungi
The major taxa of fungi are examined in relation to their ecology and physiology. Prerequisite: BIO 100 or equivalent and/or a basic ecology course or permission. Cr 3.

BIO 531 Fungal Biology Laboratory
An optional laboratory to accompany BIO 530. Lab 2. Corequisite: BIO 532. Cr 1.

BIO 532 Biology of the Fungi
Ecology, physiology and classification of the major groups of fungi and their impact on human affairs. Laboratory and fieldwork will emphasize current techniques used to study fungi. (This course is identical to BIO 432.) Lec 2, Lab 4. Prerequisite: BIO 100 and BIO 200 or equivalents or permission. Cr 4.

BIO 540 Seminar in Evolutionary Ecology
Covers the theoretical and applied aspects of ecological and evolutionary principles. Prerequisite: Permission. Cr Ar.

BIO 541 Electron Microscopy Laboratory
Techniques of transmission and scanning electron microscopy, especially those applicable to biological sciences. Lab 6. Prerequisite: BIO 441 (previously or concurrently), permission. Cr 3.

BIO 545 Physiological Plant Ecology
A study of interactions between plants and their physical environment. Concepts of energy and gas exchange used to examine effects of solar and terrestrial radiation, ambient temperature, wind, moisture supply, CO2 and O2 in plants. Adaptations to a variety of stresses including high and low temperature, low moisture and low N and P will be discussed. (Open to graduate students and advanced undergraduates.) Lec 3. Prerequisite: BIO 319 or equivalent plus BIO 452 or permission. Cr 3.

BIO 546 Aquatic Ecosystems: a Landscape Perspective
An advanced course in aquatic ecology that examines wetland, river and stream, lake and estuarine ecosystems from a landscape perspective. Emphasis on interpreting ecosystem pattern and process by understanding the importance of spatial and temporal scales, abiotic and biotic controls, land-water biogeochemical interactions, and management considerations. Lectures, discussion, computer GIS exercises, and a research project. (Note: BIO 446 and BIO 546 cannot both be taken for degree credit.) Prerequisite: Graduate standing and permission of the instructor. Cr 3.

BIO 548 Advanced Insect Pest Ecology and Management
Discusses principles of population dynamics, natural mortality and management of insects. Emphasizes biological and biorationale strategies for pest suppression with case studies in agricultural, forest and aquatic ecosystems. (Students enrolled in BIO 448 cannot take BIO 548.) Lec 3, Rec 1. (Fall-even years.) Prerequisite: BIO 326, BIO 327 or INT 256 or permission. Cr 4.

BIO 550 Biogeochemistry of Terrestrial Ecosystems
Biogeochemical patterns and processes in forest ecosystems. Comparative data from the ecological literature are used to examine the important processes of element cycling, including atmospheric deposition, canopy processes, plant nutrient circulation, decomposition, animal-insect interactions, soil chemical phenomena, weathering, leaching, gaseous fluxes, forest hydrology and overall watershed biogeochemical responses to disturbance. Lec 3. Prerequisite: Permission plus BIO 319 and one year of college chemistry. Cr 3.

BIO 552 Genetics of Populations
Introduces the genetic structure of populations and the factors which affect the genetic composition of populations. Prerequisite: BIO 462, MAT 126. Cr 3.

BIO 555 Biological Invasions
Analysis of mechanisms behind species establishment in new areas, their impact on native ecology, theoretical bases of invasion-related phenomena, and economic and sociopolitical costs inflicted by exotic species. (Note: BIO 455 and BIO 555 cannot both be taken for degree credit.) Prerequisite: Graduate standing and permission of the instructor. Cr 3.

BIO 568 Advanced Plant Ecology
Classical and modern perspectives on vegetation ecology, including floristic and ecosystem approaches, classification and ordination of vegetation data, dynamics of vegetation with emphasis on the role of climate change and disturbance in landscape development, paleoecological perspectives, plant population ecology. Weekly field trips. Lec 2, Lab 4. Prerequisite: BIO 319 or equivalent, one year calculus. Cr 4.

BIO 574 Neurophysiology
A biophysical approach to the detailed workings of peripheral and central nervous systems connecting structure (molecular, subcellular and specialized tissues) to function (physical and neural), through wet lab experiments on living cells, and/or computer-assisted exercises. Lec 2, Lab 1. Prerequisite: Graduate standing and permission of the instructor. Cr 3.

BIO 581 Seminar
Techniques, procedures and results in botanical literature. Cr 1.

BIO 587 Graduate Research in Biology I
Students conduct individual research problems and research seminars. Emphasis on development of scientific skills. Prerequisite: Permission. Cr 1-3.

BIO 588 Graduate Research in Biology II
Students conduct individual research problems and research seminars. Emphasis on development of scientific skills. Prerequisite: Permission. Cr 1-3.

BIO 591 Graduate Independent Study in Biology
Independent research not a part of thesis preparation. Prerequisite: permission. Cr Ar.

BIO 596 Biological Sciences Professional Experiences
Students engage in research, clinical determinations, field studies or allied activities with medical professionals, hospitals, laboratories, state agencies and other organizations approved for this purpose by the Department of Biological Sciences. May be repeated for credit up to a total of 6 credit hours. Prerequisite: graduate standing. Cr 1-3.

BIO 597 Special Topics in Biology
As available. Prerequisite: permission. Cr Ar.

Biological Engineering (BLE)

BLE 122 Introduction to Biological Engineering
Includes examining engineering applications in the discipline are. Professionalism and ethics in the engineering discipline will be discussed. (Pass/Fail Grade Only.) Lec 1. Cr 1.

BLE 282 Introduction to Biological Engineering Research
Introduces engineering experimentation involving biological material. Primarily for sophomores majoring in biological engineering. Cr Ar.

BLE 396 Field Experience in Biological Engineering
An approved program work experience which contributes to the academic major and for which academic credit is given. Students may work part time or full time for a semester in a job related to their professional career goals. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission. Cr 1-16.

BLE 434 Engineering of Biological Systems
The structure, function and energy transformations of biological systems will be used to demonstrate biological engineering applications. Students will learn to develop models to quantify the physical and chemical parameters and behavior of biological systems and their environments. Lec 2, Lab 3. Prerequisite: BIO 100, CHY 121, PHY 122. Cr 3.

BLE 452 Advanced Fluid Power
Examines the design of pneumatic and hydraulic circuits, control theory applied to fluid power actuated mechanical systems, data acquisition, transducers, computer interfacing, and programming for control. Laboratory work includes design and test of fluid power systems including programming the motion of cylinders and motors using PLC's and personal computers. Rec 2, Lab 3. Prerequisite: BLE 462 or permission. Cr 3.

BLE 462 Power Transmission and Control
Covers fluid power theory and fundamentals, circuit analysis for hydraulic and pneumatic systems, mechanical and electro-mechanical power transmission design. Selection and design of componentry for control of load. Lec 2, Lab 3. Prerequisite: MEE 251 and MEE 360 or CIE 350. Cr 3.

BLE 492 Design Project
Designed to give students in Biological Engineering a supervised design experience. Each student will be required to select and design components and systems for engineering projects identified by the BLE faculty. Requires the student to demonstrate his or her ability to understand and apply scientific principles and engineering knowledge to the solution of real life problems. Satisfies the General Education Capstone Experience and Writing Intensive Requirements. Rec 1, Lab 8. Prerequisite: Junior standing in the BLE curriculum. A minimum of 4 credits must be taken over a period of two or more semesters. Cr Ar.

BLE 497 Special Problems in Biological Engineering
Independent study. Cr Ar.

BLE 550 Computer Simulation and Analysis of Processes
Basic discrete event simulation methodology as applied to processes and systems will be explored. Random number generation, simulation designs, validation and output analysis. Applications to various areas of scientific modeling and manufacturing systems. Knowledge of a scientific computer programming language is expected. Lec 3. Prerequisite: CHB 360 or MAT 332 or permission of instructor. Cr 3.

BLE 560 Advanced Statistical Process Control
Development of methodologies associated with the modern practice of statistical quality control. Topics such as quality improvement in business, statistical methods, statistical process control and process improvement with design of experiments will be covered. Appropriate software tools will be used in analysis. Lec 3. Prerequisite: CHB 360, MAT 332 or permission of instructor. Cr 3.

BLE 597 Advanced Topics in Biological Engineering
Advanced topics not regularly covered in other BLE courses. Content varies based on instructor interest area. May be repeated for credit. Prerequisite: Senior or graduate standing; permission. Cr 1-3.

BLE 599 Independent Study in Biological Engineering
Advanced independent study for qualified students who present suitable projects for intensive investigation in the area of faculty interest. May be repeated for credit. Prerequisite: Senior or graduate standing; permission. Cr 1-3.

Black Studies (BLS)

BLS 101 Introduction to Black Studies
Introduces the student to several of the key issues and topics of Black culture including events of African American history. Includes sociological and economic perspectives as well as issues of identity, the African Diaspora, Africanisms, Pan-Africanism and contemporary African/African American relations. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

BLS 210 Contemporary African America
Examines the effects of the Civil Rights Movement from a number of disciplinary perspectives as seen in major events and issues of our time. Readings and discussions will explore such issues as external and internalized racism, poverty and economic privilege, education and popular culture, tracing the many different impacts on African American women and men and on the Black community as a whole. Prerequisite: BLS 101 or permission. Cr 3.

BLS 338 Race and Ethnicity
Explores dominant/subordinate relations nationally and internationally with emphasis on socially defined racial and ethnic groups. Origins, nature and consequences of racial/ethnic oppression and inequality; historical and social contexts of intergroup relations and conflicts; implication of changing racial/ethnic diversity. (This course is identical to SOC 338.) Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 and SOC 201 or permission. Cr 3.

Biochemistry, Microbiology and Molecular Biology (BMB)

BMB 110 Plagues Past and Present
Explores the nature of emerging and re-emerging infectious diseases from biological, historical, societal, technological and environmental perspectives. Satisfies the General Education Population and the Environment Requirement. Cr 3.

BMB 207 Fundamentals of Chemistry
Reviews the essentials of inorganic chemistry and studies the types and reactions of organic compounds. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 2. Prerequisite: one year of high school chemistry. Cr 4.

BMB 208 Elementary Physiological Chemistry
Structure and properties of biological molecules, including carbohydrates, lipids, proteins, nucleic acids, vitamins and hormones, composition and function of body fluids, study of digestion and metabolism. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 2. Prerequisite: BMB 207 or the equivalent. Cr 4.

BMB 221 Organic Chemistry
Basic theories of organic chemistry, including reactions, mechanisms and nomenclature. Emphasis on those aspects of organic chemistry which relate to biological chemistry. Prerequisite: BMB 207 or CHY 121 and CHY 123. Cr 3.

BMB 222 Laboratory in Organic Chemistry
Laboratory exercises illustrating the principles presented in BMB 221. Lab 2. Cr 1.

BMB 280 Introduction to Molecular and Cellular Biology
An in-depth introduction to macromolecules, cell structure, metabolic processes, gene expression and molecular replication common to all organisms. Lec 3. Prerequisite: BIO 100. Cr 3.

BMB 300 General Microbiology
A basic biology course dealing with general principles as illustrated by microorganisms, in bacteria and viruses. Covers cell structure, cell metabolism, genetics, geochemical activities, and host-parasite relations. Lec 3. Prerequisite: one year of chemistry and one year of biology or permission. Cr 3.

BMB 305 General Microbiology Laboratory
A laboratory study of the properties of bacteria and related microorganisms including techniques and identification. Suggested for students majoring in sciences. Lab 4. Prerequisite or corequisite: BMB 300. Cr 2.

BMB 322 Biochemistry
A study of the properties of proteins and enzymes, nucleic acids, carbohydrates, and lipids, metabolism and energy production, replication and protein synthesis. Lec 3. Prerequisite: CHY 251 or BMB 221. Cr 3.

BMB 323 Introductory Biochemistry Laboratory
Laboratory exercises illustrating the principles presented in BMB 322. Lab 2. Cr 1.

BMB 400 Molecular Genetics
The structure of DNA and of genes, and the mechanisms of gene regulation, particularly as they pertain to cell growth and differentiation. Includes a discussion of the experimental techniques used in the genetic manipulation of organisms. Lec 3. Prerequisite: BMB 280, BMB 322. Cr 3.

BMB 410 Diversity of Microorganisms
Metabolic diversity of microorganisms will be emphasized. Major metabolic groups of bacteria will be examined in detail and comparisons will be made between the different groups. Bacterial evolution and the current state of bacterial taxonomy will be discussed. Prerequisite: BMB 300, BMB 305. Cr 3.

BMB 420 Pathogenic Microbiology and Serology
Characterization of the production of disease by microorganisms in the human host. Lec 3. Prerequisite: BMB 300, BMB 305. Cr 3.

BMB 421 Pathogenic Microbiology and Serology Laboratory
Procedures used in the clinical diagnostic laboratory to identify the causative agent of human infectious diseases. Lab 2. Prerequisite or Corequisite: BMB 420. Cr 1.

BMB 430 Bacterial Physiology
The properties and behavior of bacteria with respect to their chemical and physical requirements for life and reproduction. Lec 3. Prerequisite: BMB 300, BMB 322. Cr 3.

BMB 431 Bacterial Physiology Laboratory
Laboratory experiments and exercises designed to expose students to aspects of bacterial physiology and to selected assays, techniques, and equipment used in physiology research. Lab 2. Prerequisite: BMB 300, BMB 322. Cr 1.

BMB 440 Introductory Immunology
An introduction to the organization and function of the immune system including the basic properties of humoral and cell-mediated immune responses, the reactions or antigens and antibodies and the lymphocytes involved. Lec 3. Prerequisite: CHY 251. Cr 3.

BMB 441 Immunology Laboratory
A laboratory course to introduce students to diagnostic and experimental techniques routinely used in the immunology lab. Lab 2. Prerequisite: or corerequisite: BMB 440 and BMB 471. Cr 1.

BMB 455 Virology
Introduction to the study of viruses, emphasizing their nature, methods of cultivation, mode of transmission, genetics and mechanisms of pathogenieity. Lec 3. Prerequisite: BMB 300. Cr 3.

BMB 456 Virology Laboratory
Introduction to methods of virus propagation, assay and characterization, including cell culture, in vitro infectivity assays, and cytopathic effects. Lec 3, Lab 2. Prerequisite or Corequisite: BMB 455. Cr 1.

BMB 460 Advanced Biochemistry
A continuation of BMB 322, with emphasis on elements of biochemistry and similar topics. May include discussions of cellular control mechanisms, enzyme kinetics. Lec 3. Satisfies the General Education Writing Intensive Requirement. Prerequisite: BMB 322 or permission. Cr 3.

BMB 464 Analytical and Preparative Biochemical Laboratory Methods
Laboratory techniques for the manipulation and analysis of biochemical materials including biological activity assays, concentration determinations, ligand binding analysis, enzyme kinetics and methods for macromolecular fractionation and characterization. Satisfies the General Education Writing Intensive Requirement. Prerequisite: BMB 322. Cr 4.

BMB 471 Cell Culture Laboratory
A laboratory course devoted to eukaryotic cell culture techniques and applications. Lab 2. Prerequisite: BMB 305. Cr 1.

BMB 490 Microbial Genetics
A lecture and laboratory chiefly in the genetics of Escherichia coli, its bacteriophages, and mechanisms of genetic exchange among prokaryotes. Lectures cover all materials and problems presented in the text. Laboratory sessions may include chemical mutagenesis, transposon mutagenesis, in vitro mutagenesis, transduction, conjugation, transformation, genetic mapping, physical mapping, complementation analyses, maxi cell expression of proteins, and regulatory studies using gene fusions and operon fusions. Satisfies the General Education Writing Intensive Requirement. Lec 3, Lab 4. Prerequisite: BMB 300 and BMB 305 or permission. Cr 5.

BMB 491 Biochemistry, Microbiology and Molecular Biology Research
Research in Biochemistry, Microbiology and Molecular Biology. Satisfies the General Education Capstone Experience Requirement. Prerequisite: seniors and graduate students only. Cr Ar.

BMB 497 Independent Study
A laboratory and conference for students desiring to pursue some particular line of investigation. Prerequisite: permission. Cr Ar.

BMB 505 Principles of Microbial Ecology
The distribution and activities of microorganisms in natural systems with particular emphasis on the role of bacteria in elemental cycles, animal-microbe and plant-microbe interactions, and the relationship between physiological and ecological attributes of microorganisms. Lec 3. Prerequisite: BMB 300 or BIO 319 or permission. Cr 3.

BMB 510 Laboratory in Molecular Biology
Selected exercises in recombinant DNA technology and related subjects, including nucleic acid purification, construction of recombinant DNA molecules, DNA-DNA and DNA-RNA hybridization, and DNA sequencing. Satisfies the General Education Writing Intensive Requirement. Prerequisite: BMB 400, BMB 464 or permission. Cr 5.

BMB 525 Proteins and Enzymes
Emphasis is on contemporary principles of protein structure and interactions, enzymes and catalysis, and membrane function. Rec 3. (Offered every other year.) Prerequisite: BMB 460 or permission. Cr 3.

BMB 530 Cellular Signal Transduction Mechanisms
Signal transduction mechanisms used by cells to perceive extracellular messages and to produce proper responses in regulating growth, development and metabolism. (Offered every other year.) Prerequisite: BMB 460 or permission. Cr 3.

BMB 540 Advanced Immunology
Selected topics in immunology including regulation autoimmune disease, immunogenetics, and immunodeficiences. Emphasis on topics of current significance. (Offered every other year.) Prerequisite: BMB 300, BMB 322 and BMB 440 or permission. Cr 3.

BMB 550 Special Topics in Molecular Biology
Includes lectures/seminars on the structure, regulation and evolution of genetic elements, viruses, and cell-surface glycoproteins. May be repeated for credit. Prerequisite: BMB 460 and permission. Cr Ar.

BMB 561 Marine Microbiology
A lecture and literature-based course focusing on microbiology and microbial ecology of marine environments, emphasizing prokaryote-prokaryote interactions, prokaryote-eukaryote interactions and prokaryotic diversity and distribution in marine environments. (This course is identical to SMS 561.) Prerequisite: BMB 300 or permission. Cr 3.

BMB 598 Special Topics in Microbiology
Covers selected topics or areas within the field of Microbiology. May be repeated for graduate credit. Prerequisite: permission. Cr 1-3.

Business Administration (BUA)

BUA 100 Majoring in Business
Introduces students to general resources of the University of Maine and specific resources of the College of Business, Public Policy and Health that are important to students majoring in business. Topics covered include an overview of library and computing facilities, graduation requirements and programs of study for the B.S. degree in Business Administration, internships and cooperative education opportunities, study abroad and other exchange programs and careers in business. Pass/Fail Grade Only. Cr 1.

BUA 201 Principles of Financial Accounting I
An introduction to the use and preparation of financial accounting information. Emphasis is on gaining an understanding of the income statement, balance sheet, statement of cash flows and applying that knowledge to a corporate annual report. Prerequisite: sophomore standing. Cr 3.

BUA 202 Principles of Managerial Accounting
An introduction to the use and preparation of accounting information for management decision making and analysis. Includes techniques that can be used by all businesses in evaluating, planning and controlling operations. The accounting cycle is also briefly covered. Prerequisite: BUA 201; sophomore standing. Cr 3.

BUA 220 The Legal Environment of Business
An examination of fundamental legal concepts and their application to the business community. Considers the evolution of law and its underlying conceptual framework from which legal rules and principles of business develop. Selected legal cases will be critically analyzed and discussed. Satisfies the General Education Social Contexts and Institutions and Ethics Requirements. Must be taken in series with BUA 449 to meet Ethics requirement. Neither course alone fulfills the requirement. Prerequisite: sophomore standing. Cr 3.

BUA 301 Intermediate Accounting I
An in-depth study of generally accepted accounting principles and external financial reporting. Alternative accounting methods and their impact on financial statements are discussed and analyzed. Prerequisite: BUA 202, junior standing. Cr 3.

BUA 302 Intermediate Accounting II
A study of the accounting and valuation problems of assets and a consideration of current issues and controversies in financial accounting. Prerequisite: BUA 301; junior standing. Cr 3.

BUA 305 Cost Accounting
Includes concepts of cost, cost systems (activity-based, job order and process), the theory of constraints, budgeting and cost volume profit analysis. Prerequisite: BUA 202; junior standing. Cr 3.

BUA 306 Advanced Managerial Accounting
A continuation of BUA 305. Includes such topics as standard costing, capital budgeting, quality costing, transfer pricing. Also includes case analysis. Prerequisite: BUA 305; junior standing. Cr 3.

BUA 310 Auditing
The systematic verification of financial statements including a study of the responsibilities, liabilities and ethics of the independent public accountant. Satisfies the General Education Writing Intensive Requirement. Prerequisite: BUA 301. Cr 3.

BUA 312 Federal Taxation of Individuals
A study of Federal income tax laws as they affect individuals. Includes a study of principles and concepts of taxation. Various types of income, deduction, credits and gains and losses are covered, including capital gains, income from self-employment, itemized deductions and realized and recognize gains and losses, among others. Emphasis is on tax-planning to minimize taxable income. The effect of the tax laws on individual and small business decision-making is studied. Students learn tax research techniques to help identify tax issues and find solutions to tax problems. Prepares students for further study in taxation. Prerequisite: BUA 202, junior standing. Cr 3.

BUA 325 Principles of Management and Organization
Analysis of the internal organizational structure and the process of management in business enterprises both domestic and international. Focus on concepts, methods, and techniques of planning, organizing, directing, and controlling the functions of the modern manager, and the impact of these processes upon effective interpersonal relations. Prerequisite: ECO 120 and ECO 121, junior standing. Cr 3.

BUA 326 Dynamics of Organization and Behavior
Examines the behavior of individuals, groups and organizations. Applies a managerial perspective that considers organizational effectiveness, careers and job satisfaction. Topics include diversity, motivation, organizational communication, team processes and structure, leadership, organizational design,

culture and change. Prerequisite: BUA 325 and PSY 100. Cr 3.

BUA 327 Seminar in Contemporary Management Problems
Covers developments in the behavioral and management sciences, the development of management thought, and critical issues in organizational theory, with special reference to industrial application. Students conduct in depth library research or field work in select managerial topics. Prerequisite: BUA 326. Cr 3.

BUA 328 Canadian/U.S. Business: A Comparison
A comparative review of the recent history of Canadian-U. S. business relations with primary emphasis on cross-border trade issues and the impact of that bilateral trade on Maine's business environment. Focus on energy, lumber, paper, agricultural products, industrial production, freight/transportation, and foreign investments. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: junior standing. Cr 3.

BUA 330 Personnel Management and Industrial Relations
An interdisciplinary survey of the personnel management systems of private and public organizations. An integrated behavioral, quantitative and systems approach permits an applied synthesis of the social sciences used to analyze the employment relationship. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ECO 120, ECO 121, and PSY 100, or equivalent or permission, junior standing. Cr 3.

BUA 331 Labor-Management Relations
An interdisciplinary survey of the labor-management systems of the private and public sectors. Considers the nature and characteristics of labor-management relations from structural, historical, international, legal, psychological, and economic perspectives. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: junior standing. Cr 3.

BUA 335 Principles of Management Information Systems
Introduces students to principles of management information systems. Topics include overviews of current and emerging technologies and systems, database design, distributed systems, networks and telecommunications, decision support systems, systems development and functional applications. Prerequisite: one computer science course or permission; junior standing. Cr 3.

BUA 337 Production and Operations Management
The place of production planning and control in an industrial organization and its relation to the actual production procedure. Problems in design, marketing, forecasting, capacity evaluation and quality control are interwoven with those of production and inventory management. Prerequisite: BUA 325, MAT 215, junior standing. Cr 3.

BUA 343 Introduction to International Business
Examines the role of U. S. businesses in the global economy with focus on key concepts and topics in world trade and investments, economic relationships among nations, as well as an understanding of cultural diversities. Provides analyses of problems and opportunities related to establishing, conducting, and maintaining business activities in foreign markets. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ECO 120, ECO 121, junior standing. Cr 3.

BUA 350 Business Finance
Introduces the principles of finance including time value of money, security valuation, capital budgeting and measurement of risk. Emphasis is on financial decision-making in the corporate environment. Prerequisite: ECO 120, ECO 121, and BUA 201, junior standing. Cr 3.

BUA 351 Corporate Treasury Dynamics
An advanced corporate finance course concentrating on the financing decisions of the firm and on international finance. Coverage includes venture capital financing, initial public offerings, capital structure and dividend policy, foreign exchange markets and international capital budgeting. Includes case studies. Satisfies the General Education Writing Intensive Requirement. Prerequisite: BUA 350. Cr 3.

BUA 352 Financial Institutions
Analyzes the operations and economic roles of financial institutions, including commercial, savings and investment banks. Particular attention is paid to the changing nature of this industry, regulation and deregulation and management of risk. Prerequisite: BUA 350 and junior standing. Cr 3.

BUA 353 Investment Strategy
Examines the construction and management of investment portfolios. Prerequisite: BUA 350. Cr 3.

BUA 363 Network Design and Applications
Introduces the design, management and strategic use of information systems in networked environments. Topics include telecommunications, network architecture, security, distributed processing and the Internet. Prerequisite: BUA 335. Cr 3.

BUA 364 Database Management Systems
Introduction to technical, managerial and ethical issues associated with computer-based data management. Covers issues in business database design and development, effective use of database management systems to support management decision making, database management and database management systems acquisition. Prerequisite: BUA 335; junior standing. Cr 3.

BUA 366 Decision Support Systems for Management
Covers the managerial use of computer-based modeling to aid decision making with special emphasis on modeling complex systems. Principles of decision making and knowledge management, decision support systems, business modeling methods, decision analysis and applicable artificial intelligence topics are covered. Prerequisite: BUA 335 and BUA 337; junior standing. Cr 3.

BUA 368 Electronic Commerce
Information systems and technology dramatically impact the way in which consumers and organizations conduct business transactions. Focuses on the process of buying and selling goods and services through electronic networks. Business-to-consumer and business-to-business applications will be explored. The hardware, software and networking technology necessary to implement such applications will be studied. Topics include: electronic payment systems, corporate strategy, security, legal issues, ethics and intelligent agents. Prerequisite: BUA 335; junior standing. Cr 3.

BUA 370 Marketing
Examines problems of distribution for representative industrial and consumer goods, including merchandising policies, selection of distribution channels, price policies, and advertising and sales promo-tion methods. Prerequisite: BUA 201, ECO 120 and ECO 121, junior standing. Cr 3.

BUA 372 Advertising
Considers the place of advertising in the marketing program. Business cases are analyzed to determine those situations in which advertising may be profitably employed to stimulate primary and selective demand for industrial and consumer goods and services. Prerequisite: BUA 370. Cr 3.

BUA 374 Sales Management
An analysis of the problems facing marketing management in formulating sales policy and managing the sales organization. Prerequisite: BUA 370. Cr 3.

BUA 375 Retail Management
An introduction to the strategies and tactics of retail management from a marketing management perspective. Prerequisite: BUA 370. Cr 3.

BUA 376 International Marketing
Focuses on marketing principles and strategies valuable to the successful conduct of international business operations. Differing business environments will be examined in order to sensitize students to necessary adjustments in marketing strategies. Prerequisite: BUA 343 and BUA 370; junior standing. Cr 3.

BUA 378 Marketing Research
Considers marketing research as a tool in solving problems of production and distribution with emphasis on problem formulation, exploratory research, research design, basic observational and sampling requirements, data analysis, interpretation, and sampling. Satisfies the General Education Writing Intensive Requirement. Prerequisite: BUA 370 and MAT 215. Cr 3.

BUA 382 Consumer Behavior
An exploration of consumer purchase decision processes. Analyzes existing consumer behavior models and their role in the formulation and implementation of marketing strategies. Covers the psychological, sociological and cultural dimensions of buyer behavior, and the current state-of-the-art in consumer research, including the findings from empirical tests of buyer behavior models. Prerequisite: BUA 370. Cr 3.

BUA 390 Special Topics in Business Administration
Study of various aspects of functional areas of accounting, finance, management, marketing, decision sciences, international business and other business-related topics. Topics vary depending on faculty and student interests. May be repeated for credit if the topics differ. Prerequisite: Junior standing and permission. Cr 1-3.

BUA 396 Field Experience/Internship
Students may earn from one to six credit hours for a pre-planned, supervised field experience in business relevant to the student's educational development and career goals. Credit will not be awarded for work experience acquired prior to registration for this course. (Pass/Fail Grade Only.) Prerequisite: Business majors only with junior or senior standing and permission. Cr 1-6.

BUA 400 Introduction to Accounting
An accelerated course that provides pre-MBA students with an introduction to managerial and financial accounting. Includes concepts of cost, cost systems and budgeting as well as ways of organizing, presenting and understanding financial information. Prerequisite: Pre-MBA students only, permission of the Director of the MBA Program. Cr 3.

BUA 409 Accounting for Governmental and Not-For-Profit Entities
Financial accounting for not-for-profit and governmental entities and hospitals, voluntary health and welfare organizations. Includes fund accounting. GASB statements. (This course is identical to PAA 409. Students cannot receive credit for both PAA 409 and BUA 409.) Prerequisite: BUA 201 and junior standing. Cr 3.

BUA 441 Entrepreneurship and The Small Business
Develops understanding of the economic and social environment in which the small concern functions. Provides practice in solving problems relevant to small businesses, particularly those operating in Maine. For students who anticipate operating a small business, or dealing with small businesses as customers or suppliers. Prerequisite: BUA 202, BUA 325, BUA 335, BUA 350, BUA 370 and senior standing. Cr 3.

BUA 445 International Management
Examines the management of the multinational corporation (MNC). Topics include motivations to internationalize, MNC types, strategy, structure and processes. Analysis of the competitive environment and alliances. Cross-cultural adjustment. Relies extensively on real-life business cases. Prerequisite: BUA 325 and BUA 343. Cr 3.

BUA 449 Administrative Policy and Business Environment
A study of administrative decision making and policy setting, with consideration of social and political forces, and ethical values. Satisfies the General Education Ethics and Capstone Experience Requirements. Must be taken in series with BUA 220 to meet Ethics requirement. Neither course alone fulfills the requirement. It is expected that students take this course in their last semester. Prerequisite: BUA 325, BUA 335, BUA 337, BUA 350, BUA 370 and senior standing. Not open to graduate students and may not be taken for graduate credit. Cr 3.

BUA 454 Financial Derivatives
Examines the practices of futures, options and swaps markets, particularly the economic function of these markets and their application in banking, portfolio management, international finance and individual investment programs. Prerequisite: BUA 350. Cr 3.

BUA 455 International Corporate Finance
Applies the concepts and principles of corporate finance to the multinational corporation. Focuses on gaining an understanding of the international financial environment, the measurement and management of foreign exchange risk, global financing activities and foreign direct investment. Prerequisite: BUA 343, BUA 350. Cr 3.

BUA 465 Information Systems Development
Designed to integrate the areas of technology, systems analysis, systems design, project management and organizational behavior to aid the student in developing information and decision support systems. Features the design and development of a major software system. Prerequisite: BUA 335, BUA 364 and COS 220. Students in the MS/IS program may be admitted to the course with the permission of the instructor. Cr 3.

BUA 480 Managerial Marketing
Emphasizes the integration of marketing, as an organization activity, with other activities of the business firm. Explores problems encountered by top marketing executives in modern business. Prerequisite: BUA 378 or BUA 382. Not open to graduate students. Cr 3.

BUA 507 Advanced Accounting
Theory and procedures of accounting for mergers and consolidations and preparing financial statements for consolidated entities in periods following consolidation. Related financial reporting issues, ethical issues and international aspects. Prerequisite: BUA 301, BUA 302. Cr 3.

BUA 515 Federal Taxation of Business Entities
Studies the federal taxation of corporations, partnerships and estates and trusts. Includes study of tax research and tax planning. Prerequisite: BUA 312. Cr 3.

Canadian Studies (CAN)

CAN 101 Introduction to Canadian Studies
Acquaints students with varied aspects of the Canadian experience: society, culture, history, native peoples, environment, education, technology, economy and diplomacy. Participating faculty include Canadian-American Center staff, visiting scholars from Canada and the United States, and faculty members from UM Colleges. Course includes an optional field trip to Canada. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: First-year student or sophomore standing. Cr 3.

CAN 401 Readings in Canadian Studies
An independent reading course examining issues and problems not studied in regular offerings. The course is arranged between the student and a Canadian Studies faculty member. Prerequisite: CAN 101 plus 6 hours of core courses in Canadian Studies or permission. Cr 3.

Education-Counseling (CEC)

CEC 520 Multicultural and Social Foundations of Counseling
Examines philosophical, historical, cultural and gender foundations in multicultural and contextual counseling theories and practices. Meets state licensure requirements for social and cultural foundations component. Cr 3.

CEC 523 The Use of Standardized Tests and Inventories
Considers the selection, use and interpretation of commonly-used standardized group achievement and ability tests, interest inventories and non-clinical assessment of personality and other affective attributes. Prerequisite: Basic knowledge of measurement and statistics. Cr 3.

CEC 525 DSM and the Profession of Counseling
The DSM is a clinical tool used by school counselors and other community professionals. Examines the language of the DSM by utilizing a case study approach emphasizing interviewing techniques and treatment planning. Multicultural applications will be explored. Cr 3.

CEC 549 Developmental Theories for Counselors
Life-span and life-course developmental theories. Contemporary social issues explored. Cr 3.

CEC 551 Introduction to School Guidance
Survey of the philosophy, objectives, principles, and practices of comprehensive developmental school counseling programs (K-12.) Prerequisite: Counselor Education major or permission. Cr 3.

CEC 552 Effective Group Work in the Helping Professions
Introductory course linking group theories, research, and practice through a mix of didactic, written, and experiential activities. Lab experience outside of class is required. Prerequisite: permission. Cr 3.

CEC 553 The Profession of Counseling
Examines the history, trends, values, and core beliefs underlying the counseling profession including ethical standards in the counselor-client relationship and applications to various client populations. Emphasizes self-awareness. Cr 3.

CEC 556 Established Theories of Counseling
Examines counseling theory and philosophy. Prerequisite: CEC 553. Cr 3.

CEC 557 Play Theories and Techniques
Designed for school counselors, teachers, child and adolescent development special-ists. Background in play theories, uses and techniques related to development. Cr 3.

CEC 558 Recent Developments in Counseling Theory
Focus on recent applications of contemporary theories in educational or other contexts. Emphasis on critical theory for evaluating contemporary developments. Prerequisite: CEC 553, CEC 556 and permission. Cr 3.

CEC 559 Counseling for Career Development
Theory and foundations of career development, career resources and assessment, career guidance programs and career counseling issues and techniques. Prerequisite: CEC 553 or CEC 556 or equivalent. Cr 3.

CEC 560 Counselor Education Prepracticum
Bridges cognitive courses to the counseling practicum. Uses Personal Growth and Development Center video equipment to provide feedback on skills. Prerequisite: CEC 523, CEC 552, CEC 556, CEC 559. Cr 3.

Civil Engineering Technology (CET)

CET 100 Introduction to Construction Management
An introductory study of the construction process and civil engineering technology. Topics include CMT program, project life cycle, estimating, scheduling, design, contracting and ethics and construction overview. Field trips. Lec 1 or Lab 3. (Fall.) Cr 1.

CET 101 Plane Surveying
A beginning course studying surveying instruments and their use in the measurement of angles, distances and elevations. Also includes mathematics, computational methods, adjustments and measurement analysis used in plane surveying. Lec 2, Lab 2. (Spring.) Prerequisite: CET 100. Corequisite: TME 151. Cr 3.

CET 130 Building Construction
A study of common building structural systems, materials and components, and their graphical representation. Determination of the quantity of building materials from design drawings. Lec 2, Lab 2. (Spring.) Prerequisite: MET 121. Cr 3.

CET 202 Construction Surveying
Study of surveying procedures in construction. Includes volume computations, horizontal curves, compound curves, reverse curves, vertical curves, stakeout, grade layout, profile and cross sections. Instrument experience is emphasized using total stations, laser levels and G. P. S. Lec 2, Lab 2. (Fall.) Prerequisite: CET 101, COS 103 and TME 152. Cr 3.

CET 211 Statics and Strength of Materials
The study of the equilibrium of structural systems and the stresses and strains that occur in structural members. Provides the knowledge of structural analysis required as a prerequisite to CET 212. Lec 3, Rec 2. (Fall.) Prerequisite PHY 107, COS 103 or equivalent. Prerequisite or Corequisite: TME 253. Cr 4.

CET 212 Structural Design
Design of structural members in steel, wood and reinforced concrete. Covers building code requirements for dead, live and snow loads. Lec 3, Rec 2. (Spring.) Prerequisite: CET 130 and CET 211. Cr 4.

CET 220 Selected Topics in Construction Management Technology
Topics in Engineering Technology not regularly covered in other courses. Content is varied to suit individual needs. May be repeated for credit. (Fall and Spring.) Prerequisite: permission. Cr 1-4.

CET 221 Building Construction Methods
A study in building construction operations. Topics include: earthwork equipment and operations; excavations and foundations; wood, reinforced concrete, masonry, structural steel construction; mechanical and electrical systems; construction TQM. Lec 2, Rec 2. (Spring.) Prerequisite: CET 130. Cr 3.

CET 224 Construction Safety
An introduction to safety on the construction site to include safety measures, training, responsibility for safety, accident investigation and pertinent regulations (OSHA and state). Will also look at the effect of safety on worker's compensation, liability, employee behavior and time management. Lec 1. (Fall.) Cr 1.

CET 326 Soil Mechanics and Foundations
Introduction to the physical properties of soil important to the construction industry. Includes classification systems, drainage, frost action, slope stability and shallow foundations. Lec 3. (Fall.) Prerequisite CIE 110 and CIE 111. Prerequisite or Corequisite: CET 327. Cr 3.

CET 327 Soil Mechanics and Foundations Lab
Covers standard soils tests that are important to the construction industry. Lab 2. Prerequisite CIE 110 and CIE 111. Prerequisite or Corequisite: CET 326. Cr 1.

CET 332 Civil Engineering Technology
Topics related to civil engineering site work. Covers on-site septic systems, drainage, hydrology, hydraulics, public sewer system design, water system design, erosion control, sedimentation control, pumps, culverts and conduits. Lec 3, Lab 1. (Spring.) Prerequisite: CET 202. Cr 3.

CET 351 Construction Law
Fundamental legal concepts and the development and application of law on society, business, engineering and construction. Covers legal structure, business entities, agency, mechanics liens, torts, contracts, contract formation, contract codification, liability, indemnification, warranties, remedies, damages, the uniform commercial code, alternate dispute resolution, international law, legal research and land use restrictions. Satisfies the General Education Social Contexts and Institutions and Writing Intensive Requirements. Lec 4. (Fall.) Prerequisite: CET 124. Corequisite: ENG 317. Cr 4.

CET 360 Construction Estimating and Bidding
A study in the estimating an bidding processes for construction projects. Topics include: budgetary, parametric and detailed cost estimating for residential, commercial, heavy highway and industrial construction projects. Manual, computer assisted and estimating software is utilized to prepare construction cost estimates; bid preparation and submittal: project budget preparation. Lec 2, Lab 2. (Spring.) Prerequisite: CET 221. Cr 3.

CET 394 Construction Management Technology Practice
Cooperative work experience at full-time employment for at least a continuous 10 week period. (Pass/Fail Grade Only.) (Summer.) Prerequisite: Junior or senior standing in CMT program. Cr 3.

CET 421 Construction Equipment Operations
A study in heavy highway and construction equipment operations. Topics include: earthwork and excavations; equipment production and scheduling; equipment rental, lease and purchase, rock excavation; compaction and finishing; aggregate, asphalt and concrete plant operations; construction equipment safety. Lec 2, Lab 1. (Spring.) Prerequisite: CET 130; junior standing. Cr 2.

CET 456 Construction Documents and Administration
A study of documents and administrative procedures relevant to construction and contract administration. Topics include bidding, bonds, letters of credit, insurance, addenda, claims, inspections, reporting, operations, disputes, payments and defaults. Satisfies the General Education Writing Intensive Requirement. Lec 3. (Fall.) Prerequisite CET 351. Prerequisite or Corequisite: CET 457 and ENG 317. Cr 2.

CET 457 Construction Documents and Administration Lab
A study of administrative procedures relevant to construction administration. Practical exercises include change orders, claims, inspections, reporting, operations, disputes, payments and defaults. Lab 2. Prerequisite CET 351. Prerequisite or Corequisite: CET 456 and ENG 317. Cr 1.

CET 458 Management of Construction
The capstone course for Construction Management Technology (CMT) program. Principles and applications taught throughout the CMT program are used by students during a construction project simulation that covers many facets of construction management, engineering and business that are encountered in practice. Format varies. In addition, cost to cost, percentage complete accounting is covered. . Satisfies the General Education Capstone Experience Requirement. Lec 3. (Spring.) Prerequisite: BUA 201, CET 326, CET 351, CET 462. Cr 3.

CET 462 Construction Planning and Scheduling
A study of design and analysis of construction planning and scheduling for construction projects. Manual and computer assisted procedures are used, as well as, industry software to solve contruction scheduling problems, such as resource constraints and limitations. Project control systems are also studied. Lec 2, Lab 2. (Fall.) Prerequisite: CET 360. Cr 3.

CET 479 Student Construction Competition Experience
Requires students to bring together estimating, scheduling, management and organizational skills, focused on a construction project. The competition is against other regional construction programs. Prerequisite: Permission of instructor. Cr 0-3.

CET 498 Selected Topics in Construction Management Technology
Topics in Engineering Technology not regularly covered in other courses. Content varies to suit individual needs. May be repeated for credit. (Fall and Spring.) Prerequisite: junior or senior standing; permission of instructor. Cr Ar.

Chemical and Biological Engineering (CHB)

CHB 111 Introduction to Chemical and Biological Engineering I
An introduction to the profession of chemical and biological engineering and the process industries through a series of speakers, tours, presentations and projects. The development of teaming skills as well as oral presentation and report writing skills is emphasized. Together with CHE 477, CHE 479 and CHB 493 Satisfies the General Education Ethics Requirement. Lec 2. (Fall.) Prerequisite: first-year students only. Cr 2.

CHB 112 Introduction to Chemical and Biological Engineering II
Introduction to the application of computers to solving chemical engineering problems. Commercial software for computers and graphics will be introduced. The application of these programs to engineering problem solving will be introduced through a series of analysis and design projects. Lec 1, Rec 2. (Spring.) Cr 2.

CHB 200 Fundamentals of Process Engineering
Formulation of the zeroth and first laws of thermodynamics and applications to material and energy balances for closed and open systems; PVT behavior of matter; heat capacity and heat of reactions; applications to systems with chemical reactions; integration of basic mathematical, chemical and physical concepts into chemical engineering practice; discussions of the chemical processing industry and the history of thermodynamics. Lec 4. (Fall.) Prerequisite: CHY 132 or permission. Cr 4.

CHB 350 Statistical Process Control and Analysis
The basics of statistics and statistical process control and systems optimization will be investigated. Prerequisite: MAT 127 or permission of instructor. Cr 3.

CHB 460 Biochemical Engineering
Application of chemical engineering principles to systems utilizing micro organisms, tissue culture and enzymes for processing. Applications to food, pharmaceutical and fermentation industries will be discussed. No previous background in biological sciences required. Lec 3. (Fall.) Prerequisite: Background in kinetics and mass transfer. Cr 3.

CHB 493 Chemical and Biological Engineering Seminar
Discussion of recent developments in chemical engineering and related fields. Together with CHB 111, CHE 477 and CHE 479 satisfies the General Education Ethics

Requirement. (Fall and Spring.) Prerequisite: senior standing in Chemical and Biological Engineering. Cr 0-1.

Chemical Engineering (CHE)

CHE 352 Process Control
Process dynamics described by ordinary differential equations and by linearized approximations. Covers solution of system equations by the use of LaPlace transforms, concepts of feedback control, process dynamics and closed loop system analysis. Lec 3. (Fall and Summer.) Prerequisite: MAT 258 or MAT 451 or permission. Cr 3.

CHE 360 Elements of Chemical Engineering I
Introduction to rate operations, stage operations, and the principles of molecular and turbulent transport of mass, momentum, and energy including application of these principles to chemical engineering unit operations. Lec 4. (Fall and Summer.) Prerequisite: CHB 200. Cr 4.

CHE 361 Chemical Engineering Laboratory I
Applies the principles of unit operations and process control in the laboratory, using pilot scale equipment with emphasis on formal reports. Satisfies the General Education Writing Intensive Requirement. Lab 4, Rec 1. (Spring and Summer.) Prerequisite: CHE 352, CHE 360. Cr 3.

CHE 362 Elements of Chemical Engineering II
A continuation of CHE 360. Unit operations with emphasis on equilibrium stage operations involving interphase mass transfer - absorption, distillation, extraction leaching plus selected other topics such as drying, absorption and filtration. Lec 4. (Spring and Summer.) Cr 4.

CHE 363 Chemical Engineering Laboratory II
Application of the principles of unit operations and process control in the laboratory, using pilot scale equipment. Emphasis is placed upon formal written and oral reports. Satisfies the General Education Writing Intensive Requirement. Lec 1, Rec 1, Lab 2. (Fall.) Prerequisite: CHE 352, CHE 362. Cr 3.

CHE 368 Kinetics and Reactor Design
The analysis and design of chemical reactors. The fundamental principles of chemical kinetics and of heat and mass transfer are applied to various types of chemical reactors. Lec 3. (Spring and Summer.) Cr 3.

CHE 385 Chemical Engineering Thermodynamics I
Applications of the first and second laws of thermodynamics to the analysis of systems of interest to chemical engineers. Topics include state equations for both ideal and real gases, heat and energy relationships in chemical reactions, elementary phase equilibria, and simple heat and power cycles. Lec 3. (Spring.) Prerequisite: CHB 200. Cr 3.

CHE 386 Chemical Engineering Thermodynamics II
A continuation of CHE 385. Emphasis on homogeneous mixtures, multi-component vapor-liquid equilibria, chemical reaction equilibria and the thermodynamic analysis of chemical processes. Lec 3. (Fall and Summer.) Prerequisite: CHE 385. Cr 3.

CHE 410 Advanced Materials
Covers the basic structure, processing and properties of metals, polymers and ceramics and stresses the application of chemical engineering principles to the problems of materials fabrication with emphasis on emerging technologies such as chemical vapor deposition (CVD). Lec 3. (Fall.) Prerequisite: permission Cr 3.

CHE 420 Colloid Technology
Designed to familiarize students with the fundamentals of colloid and surface chemistry from various types of colloids and colloidal phenomena, commonly encountered in chemical process industry and classical and modern measurement techniques to applications of colloids and surface chemistry. Lec 3. (Offered every other year, spring only.) Cr 3.

CHE 430 Introduction to Polymer Science and Technology
Concept of macromolecules and synthesis of polymers from monomers. Step-growth and addition polymerization. Polymer structure, molecular size and shape and characterization techniques. Polymer solutions and phase equilibria. Solid state properties. Polymer morphology and transitional phenomena. Crystalline and amorphous states. Glassy, rubbery and viscous behavior. Rheological aspects. Viscoelasticity. Survey of commodity thermoplastics, engineering polymers and uses. Polymer additives and blends. Basic processing techniques. Lec 3. (Spring.) Cr 3.

CHE 454 Introduction to Digital Computer Process Control
Real-time process programming concepts, the z transformation and design of digital controllers. Advanced control schemes. Dynamic considerations and control of unit operations. Includes laboratory project. Lec 3. (Spring.) Prerequisite: CHE 352. Cr 3.

CHE 477 Elements of Chemical Process Design
Introduction to chemical process design and engineering economics. Considers principles of design, complex process flow diagrams, heat and material balances, rate equations, and cost estimating techniques as well as principles of engineering economics involving time value of money, taxes, depreciation, profitability indicators, alternative investment and optimization. The nature of failure of process equipment will be discussed including explosion, corrosion, stress corrosion and cracking. Selection of materials for chemical process and equipment will be discussed. Together with CHB 111, CHE 479 and CHE 493 satisfies the General Education Ethics Requirement. Lec 3. (Fall.) Prerequisite: CHE 360, CHE 362 and CHE 386 or permission. Cr 3.

CHE 478 Analysis, Simulation and Synthesis of Chemical Processes
Covers three areas: process analysis, steady state process simulation and process synthesis. Analysis of process flowsheets to understand material flows, unit operation function and interactions between units. Simulation and design of unit operations and complete chemical processes using process simulation software. Synthesis of chemical processes including chemical reactor and separation system configuration based on heuristic methods. Lec 3. (Fall.) Prerequisites: CHE 360, CHE 362, CHE 368 and CHE 386. Corequisite: CHE 477. Cr 3.

CHE 479 Process Design Projects
Application of chemical engineering principles to the solution of complex, open-ended, design problems involving feasibility, analysis, design and optimization of chemical processes. Review of methods for estimating thermodynamic and transport properties required in process design. Emphasis on oral and written communications and working in small design groups. Satisfies the General Education Capstone Experience Requirement and together with CHB 111, CHE 477 and CHB 493 Satisfies the General Education Ethics Requirement. Rec 1, Lab 3. (Spring.) Prerequisite: CHE 477. Cr 4.

CHE 480 Pollution Prevention in Industrial Ecology
Provides a basic background in pollution science while exploring the engineer's role in solving pollution problems with an emphasis on pollution prevention and industrial ecology, which works toward integrating industrial operations into natural systems and examining the whole life cycle of a product. Satisfies the General Education Population and the Environment Requirement. (Spring.) Prerequisite: senior status in Chemical Engineering or instructor permission. Cr 3.

CHE 494 Chemical Engineering Practice
A cooperative work experience in a

commercial operation of the chemical process industry. May be repeated for credit to a maximum of 8 credit hours. (Pass/Fail Grade Only.) (Offered by arrangement.) Prerequisite: permission. Cr Ar.

CHE 497 Independent Study
Individual, independent study of a specialized topic under supervision of an advisor and at least one other faculty member. A formal report is required upon completion of the study. Maximum of 3 accumulated credit hours. (Fall, Spring and Summer.) Prerequisite: permission. Cr Ar.

CHE 498 Special Topics in Chemical Engineering
Class work in selected subjects in the field of chemical engineering, or related areas of science and technology, not covered in other courses. May be repeated for credit. (Offered by arrangement.) Prerequisite: permission. Cr 1-3.

CHE 499 Undergraduate Thesis
Original investigation of a chemical engineering problems. The topic must be chosen prior to the senior year. A committee of at least three faculty members will supervise the thesis and its defense. Maximum of 3-6 accumulated credit hours. (Offered by arrangement.) Prerequisite: permission. Cr Ar.

CHE 510 Introduction to Transport Phenomena
A study of principles of momentum, energy and mass transport including mathematical modeling of transport processes by exact and approximate techniques. (Fall.) Cr 3.

CHE 511 Fluid Dynamics
The use of fundamental fluid flow equations will be covered. Newtonian and non-Newtonian fluids are examined. The concepts of modeling of industrial processes in terms of fluid dynamic concepts are included. (Offered by arrangement.) Prerequisite: CHE 510 or permission. Cr 3.

CHE 512 Mass Transfer
The fundamentals principles of diffusion are reviewed and extended to multicomponent and heterogeneous systems using the Stefan-Maxwell approach. Appropriate models for mass transfer processes are developed and applied to the analysis and design of selected separation processes including adsorption and membrane systems. (Offered by arrangement.) Cr 3.

CHE 533 Introduction to Polymer Processing
The application of engineering principles to polymer processing with particular emphasis on applied rheology, extruder design, die design, spinning, molding, and sheet fabrication. Emphasis on mathematical modeling of processes and the effects of processing on the products formed. Lec 3. (Offered by arrangement.) Prerequisite: CHE 362, CHE 372, CHY 386 or permission. Cr 3.

CHE 540 Advanced Chemical Engineering Thermodynamics
Studies of phase and reaction equilibria in multi-component, non-ideal, and complex systems. Flow and non-flow systems. Application of general thermodynamic methods to problems in chemical engineering. Lec 3. (Fall.) Cr 3.

CHE 561 Advanced Chemical Engineering Kinetics
Examines theory of homophase and heterophase catalysis and chemical transformation as a base for process design. Includes chain reactions, acid-base catalysis, enzymes, and commercial case studies such as hydrocarbon synthesis, organic oxidations, cracking, and platforming. Lec 3. (Offered by arrangement.) Cr 3.

CHE 575 Paper Surface Science
Deals with the fundamentals of paper surface treatment such as sizing, printing and glueing, with emphasis on paper coating. Issues such as adhesion, light scattering, rheology, fluid dynamics and film formation will be covered. (Offered by arrangement.) Cr 3.

CHE 580 Chemical Engineering Analysis
Modeling and simulation of chemical engineering processes. Emphasis on the formation of a model using ordinary and partial differential equations, and on the solution of the model using numerical methods. (Offered by arrangement.) Cr 3.

CHE 585 Mathematical Methods in Chemical Engineering
Solutions of ordinary and partial differential equations encountered in transport phenomena, chemical kinetics and process control. Series solutions involving Bessel functions, Legendre functions and Gamma functions. Use of Laplace transforms and approximate methods. Solution of difference equations for discrete systems. Application of vectors and tensors. (Offered by arrangement.) Cr 3.

CHE 598 Special Topics in Chemical Engineering
Special topics presented as need and interest require. Topics will include studies relevant to fields of application, such as pulp and paper, polymers, process control, materials conversion, and surface properties. (Offered by arrangement.) Prerequisite: permission. Cr Ar.

Child Development and Family Relations (CHF)

CHF 200 Family Interaction
Interpersonal dynamics of dating, courtship, mate selection, and the development of family life. Changing patterns of personal interactions within the family life cycle and a pluralistic society. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

CHF 201 Introduction to Child Development
Influences on human development from conception through middle childhood. Theoretical perspectives, empirical evaluation and practical implications. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

CHF 203 Practicum in Early Childhood Programs
Introductory practicum combining child development and education theory with supervised weekly participation in the Child Development Learning Center. Focuses on the child under six years of age. Lab 2. Prerequisite: CHF 201. Cr 3.

CHF 321 Curriculum for Young Children I
Exploration of topics such as selection of developmentally appropriate activities, time management, arrangements of the physical environment, staff management and program administration of early childhood settings. Satisfies the General Education Writing Intensive Requirement. Prerequisite: CHF 201, CHF 203 or permission. Cr 3.

CHF 322 Curriculum for Young Children II
Students will develop curriculum resource units for an early childhood environment (e.g., preschool-3, daycare centers, play center for the hospitalized child), evolving from the contents structured in CHF 321. Prerequisite: CHF 201, CHF 203, CHF 321 or permission. Cr 3.

CHF 331 Cognitive Development
Introduction to the developmental processes involved in the acquisition, organization and proessing of information, with an emphasis on the period between infancy and adolescence. Discussion of current theories and research on cognitive, memory and language development and their applications and implications for teaching and parenting. Prerequisite: CHF 201, PSY 100. Cr 3.

CHF 351 Human Sexuality
Discusses sexuality and its social implications against a background of constantly changing sexual mores, sex role development, alternative conceptualizations of sexuality, and implications for future trends in human interaction. Satisfies the General Education

Ethics and Social Contexts and Institutions Requirements. Cr 3.

CHF 381 Family Resource Management
Analysis of the managerial process and its relationship to decision making. Emphasis on the use of resources including time, energy, and money to attain family goals. Cr 3.

CHF 385 Personal and Family Finance
Influence of outside economic conditions and personal circumstances on family financial problems. The management process applied to family problems involving finances, economic position, meeting living costs, protection against financial contingencies, credit, developing a savings and investment program. Cr 3.

CHF 391 Family Housing
Covers physical and social aspects of the housing environment, including floor plan principles in relation to family life cycle, local government controls, natural problems in housing. Cr 3.

CHF 401 Peer Education
Students are trained in the realities and consequences of critical social issues college students face and provide workshops on responsible behavior to campus and community groups. Prerequisite: CHF 351 and permission. Cr 3.

CHF 404 Selected Topics in Child Development and Family Life
Review of specific subject areas in the field. Subject areas vary by semester. May be repeated for credit. Prerequisite: permission. Cr 1-3.

CHF 406 Introduction to Research Methods in Child Development and Family Relations
An overview of research methods applicable to the study of children and families. An in-class research project is completed. Prerequisite: CHF 200, CHF 201 or permission. Cr 3.

CHF 409 Special Problems in Child Development and Family Life
As available. Prerequisite: permission. Cr Ar.

CHF 421 Student Teaching in Early Childhood
Supervised student teaching in one of the following settings: nursery school, day care, or kindergarten through grade three. Prerequisite: senior standing; CHF major. Cr 6.

CHF 422 Field Placement in Early Childhood Environments
Individual study in selected early childhood settings such as family day care homes, counseling and mental health centers, child development programs, child and family oriented hospital settings. Includes developmental assessments, planning and implementations of educational programs, family education courses and assisting in special classes and group sessions. (Pass/Fail Grade Only.) Prerequisite: senior or graduate student standing and permission of the instructor. Cr 6.

CHF 423 Professional Seminar in Individual and Family Studies
An integrated examination of career-related roles, ethics, and responsibilities in research and service to individuals and families. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: CHF major; senior standing. Cr 3.

CHF 424 Professional Seminar for Early Childhood Specialists
Examination of professional issues such as staff-client roles, professional ethics, employer-employee relationships, decision making in early child service agencies. (Pass/Fail Grade Only.) Prerequisite Corequisite: CHF 421 and CHF 422 or permission of instructor. Cr 1.

CHF 430 Applied Self-Control
Students will learn and practice several approaches to self-directed behavior change. The goal is to enhance their understanding of individual development by systematically observing their own behavior. Satisfies the General Education Writing Intensive Requirement. Prerequisite: CHF 201 or permission. Cr 3.

CHF 431 Parenting
Parent behavior and the dynamics of parenthood are studied. Emphasis on interpersonal, familial, and societal roles of parents, and factors influencing role behaviors and expectations. Prerequisite: CHF 200, CHF 201. Cr 3.

CHF 432 Socialization of the Child
A study of normal development and behavior with emphais on the impact of peers, school and familty on the developing child. Theory in child development is also examined. Prerequisite: CHF 201. Cr 3.

CHF 433 Adolescence
Growth and development during the adolescent years. Conceptual models and recent research are discussed. Prerequisite: CHF 201 or PSY 100 and sophomore standing. Cr 3.

CHF 434 Adult Development and Aging
Developmental processes and transitions from the early to later years of adulthood. Social, physical, cognitive, and familial aspects of adult growth and aging are examined. Prerequisite: CHF 201 or permission. Cr 3.

CHF 441 Family Life Education Methods
Provides students with an overview of the knowledge, skills, methods, current materials and resources to plan, implement and evaluate family life education programs for diverse learners including K-12 students, parents, community members, educators and other professionals. Students will practice developing and presenting educational programs. Cr 3.

CHF 442 Helping Skills
Examines the nature of helping relationships including descriptions, characteristics, stages and ethics of effective helpers and helping relationships. Considerable attention will be focused on learning the nonverbal and verbal responses used in helping interactions. To assist in the development of these helping skills, students can expect to be engaged in extensive practice sessions with classmates. Cr 3.

CHF 451 Family Relationships
The study of traditional and non-traditional family units as a system of interactions between individuals. Prerequisite: CHF 200. Cr 3.

CHF 452 Violence in the Family
Major forms of family violence, including child abuse and neglect, sexual abuse, and spouse abuse, are examined to provide students with an understanding of the development of dysfunctional forms of family interaction, descriptive knowledge on the prevalence of violent relationships at the national and local level, the necessary skills for identifying victims of abuse and the services available to them, and a preliminary understanding of the challenge of designing intervention strategies. Satisfies the General Education Ethics Requirement. Prerequisite: Junior or senior standing, CHF 200 or SOC 318 or permission. Cr 3.

CHF 488 Family Legal Issues
Issues of legal interest to consumers. Social and economic effects on families will be emphasized. Prerequisite: junior standing. Cr 3.

CHF 496 Field Experience in Human Development and Family Studies
An approved program of work experience for department majors that involves the application of theory and research in applied settings. Requires a written proposal outlining the proposed experience, its relation to the student's program of study, plan for faculty supervision and a final written report. No more than 6 credits may be used toward the departmental major and not more than 12 credits may be used toward the

graduation requirements. Prerequisite: permission of instructor. Cr 1-6.

Chemistry (CHY)

CHY 101 Chemistry for Everyday Living
A non-mathematical introduction to the basic principles of chemistry with an emphasis on chemistry relevant to everyday life. Topics will include nuclear, food, agricultural, drug, cosmetic and polymer chemistry. May be taken without CHY 102. Together with CHY 102, satisfies the General Education Applied Sciences Requirement. Lec 3 with dem. Cr 3.

CHY 102 Chemistry for Everyday Living Laboratory
Accompanies CHY 101. Experiments will emphasize chemical topics relevant to everyday living. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lab 3. Cr 1.

CHY 105 Majoring in Chemistry
Introduces students to the faculty, students, facilities and resources central to their major in chemistry. Topics covered include requirements and advising for the major, library resources, research laboratories and projects, and the special expertise of the faculty. (Pass/Fail Grade Only.) Prerequisite: First-year students only. Cr 1.

CHY 121 Introduction to Chemistry
Topics include: units and definitions, atomic structure, bonding, chemical change, concentration of solutions, reaction rates and equilibria, acid-base chemistry and summary topics related to applications in materials science, biological chemistry and the environment. Together with CHY 123, satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3. Prerequisite Corequisite: CHY 123, MAT 122 or higher. Cr 3.

CHY 122 The Molecular Basis of Chemical Change
Topics include: atomic and molecular bonding; classes of chemical reactions, reactivity of non-metals and metals; materials chemistry; kinetics; thermodynamics; electrochemistry; nuclear chemistry. Together with CHY 124, satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3. Prerequisite: CHY 121. Corequisite: CHY 124. Cr 3.

CHY 123 Introduction to Chemistry Laboratory
Introduction to experimental techniques and concepts in chemistry. satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lab 3. Corequisite: CHY 121 Cr 1.

CHY 124 The Molecular Basis of Chemical Change Laboratory
A continuation of CHY 123. Experimental techniques and concepts in chemistry. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lab 3. Prerequisite: CHY 121 and CHY 123. Corequisite: CHY 122. Cr 1.

CHY 242 Principles of Quantitative Analysis and Solution Equilibria
Topics covered include gravimetric and titrimetric methods of analysis and acid-base, complex formation, precipitation and oxidation-reduction equilibria. Spectrophotometric, potentiometric and chromatographic methods of analysis will be introduced. Laboratory determinations will provide examples of the above. Lec 3, Lab 6. Prerequisite: CHY 122. Cr 5.

CHY 251 Organic Chemistry I
An introduction to the chemistry of carbon compounds. Lec 3, Rec 1. Prerequisite: CHY 122. Cr 3.

CHY 252 Organic Chemistry II
A continuation of CHY 251 including the study of carbonyl compounds and amines. Lec 3, Rec 1. Prerequisite: CHY 251. Cr 3.

CHY 253 Organic Chemistry Laboratory I
An introduction to the separation, synthesis and analysis of organic compounds in the laboratory. Lab 4. Prerequisite or Corequisite: CHY 251. Cr 2.

CHY 254 Organic Chemistry Laboratory II
A continuation of CHY 253. Lab 4. Prerequisite: CHY 253 and CHY 252 (previously or concurrently.) Cr 2.

CHY 371 Physical Chemistry I
Applications of classical thermodynamics to the study of chemical systems. Lec 3. Prerequisite: CHY 122, PHY 112 or PHY 122, MAT 228 or equivalent. Cr 3.

CHY 372 Physical Chemistry II
Covers electrochemistry, kinetic theory of gases, transport processes and reaction kinetics and an introduction to statistical thermodynamics. Lec 3. Prerequisite: CHY 122, PHY 112 or PHY 122, MAT 228. Cr 3.

CHY 393 Undergraduate Seminar in Chemistry
Discussion of developments in chemistry and the chemical profession. Introduction to chemical literature and research methods. Oral presentations and written papers required. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Chemistry major; CHY 122. Cr 3.

CHY 394 Field Experience/Cooperative Education
Supervised employment with relevance to the study of chemistry in the public or private sector. A proposed program of study, mutually agreed upon by the student, faculty adviser, and "Co-Op" sponsor may be carried out in the summertime or during the academic year. A written report is required. (Pass/Fail Grade Only.) Prerequisite: junior or senior standing with a good academic record, permission. Cr 1-9.

CHY 398 Undergraduate Research
Students will conduct a research project under the supervision of faculty member. A written research report is required. For chemistry majors only. Students must apply through the Undergraduate Research Coordinator. No more than 2 credit hours can apply to graduation requirements. Together with CHY 399, this course satisfies the General Education Capstone Experience Requirement. Prerequisite: Junior standing. Cr 1.

CHY 399 Undergraduate Thesis
Written report of an original investigation carried out in the library and laboratory. Together with CHY 398, this course satisfies the General Education Capstone Experience Requirement. Prerequisite: senior standing, departmental permission. Cr 1-3.

CHY 431 Structure and Mechanism in Biological Chemistry
Examination of biosynthetic pathways, structure and function of enzymes (including metalloenzymes) and other important biomolecules, methods of structure determination and synthetic pathway elucidation and mechanisms of enzyme-catalyzed reactions. Prerequisite: CHY 252, CHY 254. Cr 3.

CHY 443 Instrumental Analysis
Modern tools for acquiring qualitative and quantitative data about the composition and structure of matter. A blend of theoretical and experimental/hands on approaches to investigate modern spectroscopic and separation techniques for solving "real world" bioanalytical and environmental problems. Lec 3. Prerequisite: CHY 242 and CHY 371. Cr 3.

CHY 453 Intermediate Organic Chemistry Laboratory
Qualitative organic analysis by chemical and instrumental methods. Lec 2, Rec 1, Lab 3. Prerequisite: CHY 252; CHY 254. Cr 4.

CHY 461 Advanced Inorganic Chemistry I
Advanced theoretical and descriptive inorganic chemistry emphasizing periodic relationships. Lec 3. Prerequisite Corequisite CHY 371 or permission. Cr 3.

CHY 462 Organometallic Chemistry
Principles and applications of organotransition metal chemistry. Topics include coordination chemistry, group theory, organometallic reaction mechanisms, electrochemistry, photochemistry, bioinorganic chemistry, catalysis and applications to organic synthesis. Lec 3. Prerequisite: CHY 252. Corequisite: CHY 371. Cr 3.

CHY 475 Physical Chemistry III
An introduction to quantum mechanics, spectroscopy and chemical bonding. Lec 3. Prerequisite: PHY 122, MAT 228 and MAT 258 or equivalent. Cr 3.

CHY 483 Introductory Wood Chemistry
Emphasis on the chemical and physical properties of cellulose, hemicelluloses, lignin and extractives. Lec 3. Prerequisite: CHY 252 or permission. Cr 3.

CHY 491 Advanced Integrated Laboratory I
An advanced laboratory environment integrating inorganic, instrumental and physical chemistry concepts. Synthetic techniques, instrumental methods, reaction kinetics, thermodynamics and spectroscopy will be included. Lab 8. Prerequisite: CHY 242, CHY 254, CHY 371 (or concurrently). Cr 3.

CHY 492 Advanced Integrated Laboratory II
A continuation of the methods and concepts outlined in CHY 491. Advanced experiments and projects in physical, inorganic and analytical chemistry. Lab 8. Prerequisite: CHY 491. Cr 3.

CHY 541 Topics in Advanced Analytical Chemistry
Topics may include advanced techniques in bioanalytical separation, Fourier transform, spectroscopy, mass spectrometry and other vacuum technologies. Influence of hard- and software components such as analyzers, detectors, sources and digital/electronic filters for noise removal and improved detection limits. Lec 3. Prerequisite: permission. Cr 3.

CHY 550 Introduction to Molecular Modeling
An introduction to the computational investigation of molecular structure and properties. Operation of UNIX workstations and nature and applications of molecular mechanics, semi-empirical molecular orbital calculations and ab initio molecular orbital calculations. Completion of a significant research project is required. Lec 2, Lab 3. Prerequisite: CHY 556 and CHY 575. Cr 3.

CHY 551 Topics in Advanced Organic Chemistry
Recent advances in stereo chemistry, heterocyclic compounds, natural products and other graduate level topics. Prerequisite: CHY 555. Cr Ar.

CHY 553 Organic Qualitative Analysis
The isolation and identification of organic compounds. Lab 8. Prerequisite: CHY 252. Cr 4.

CHY 555 Intermediate Organic Chemistry
Detailed study of preparation of complex organic compounds and newer synthetic methods. Prerequisite: CHY 252. Cr 3.

CHY 556 Theoretical Organic Chemistry
Includes topics in electronic theory and reaction mechanisms. Prerequisite: CHY 252. Cr 3.

CHY 558 Problem Solving in Organic Chemistry
Discussion and solution of problems in mechanism, synthesis, and structure determination from current chemical literature. Required of all graduate students in organic chemistry once each year for a maximum of four credits. (Pass/Fail Grade Only.) Prerequisite: CHY 252 or equivalent. Cr 1.

CHY 560 Physical Methods of Inorganic Chemistry
Applications of the principles of group theory and modern spectroscopic techniques, including x-ray diffraction and photoelectron, infrared and Raman vibrational, electronic and magnetic resonance spectroscopies in inorganic chemistry. Prerequisite: CHY 461 or CHY 575 or permission. Cr 3.

CHY 561 Topics in Advanced Inorganic Chemistry
Advanced level topics such as chemistry of the representative elements, transition metals, organometallic compounds, group theory and chemical bonding in inorganic compounds. Prerequisite: CHY 461, CHY 575 or permission. Cr Ar.

CHY 562 Advanced Organometallic Chemistry
An introductory course for graduate students covering the principles and applications of organotransition metal chemistry. Topics include coordination chemistry, group theory, organometallic reaction mechanisms, electrochemistry, photochemistry, bioinorganic chemistry, catalysis, and applications to organic synthesis. Lec 3, Lab 3. Prerequisite: CHY 252 and CHY 372 or equivalents. Cr 3-4.

CHY 563 Inorganic Chemical Kinetics and Mechanisms
Fundamentals of inorganic chemical kinetics and reaction mechanisms. Lec 3. Prerequisite: permission. Cr 3.

CHY 571 Topics in Advanced Physical Chemistry
Advanced level subjects such as quantum chemistry, molecular spectroscopy, theory of solutions, statistical mechanics of mixtures, applied group theory, structure and bonding. Cr Ar.

CHY 572 Molecular Spectroscopy and Dynamics
Theoretical foundations of spectroscopy including time-dependent perturbation theory, interaction of light with matter. Topics may include NMR, Fourier transform methods, laser spectroscopy, Ramand and other scattering techniques. The use of spectroscopy to study molecular dynamics emphasized. Prerequisite: CHY 575 or permission. Cr 3.

CHY 573 Computer Simulation Methods
Computer simulation using Monte Carlo and molecular dynamics techniques with applications in chemistry, physics, materials science and molecular biology. Prerequisite: CHY 371 or PHY 236 and knowledge of FORTRAN. Cr 3.

CHY 575 Intermediate Physical Chemistry I
Introduction to the foundations of quantum theory and molecular quantum mechanics. Cr 3.

CHY 583 Advanced Wood Chemistry
Fundamental chemistry of carbohydrates, lignin, and extractives. Prerequisite: CHY 252 or permission. Cr 3.

Civil and Environmental Engineering (CIE)

CIE 100 Introduction to Civil and Environmental Engineering
Introduces first-year and transfer students in Civil Engineering to the multifaceted field of Civil and Environmental Engineering. Each week a different faculty member will conduct the class. Challenging problems will be introduced and team work will be practiced. (Pass/Fail Grade Only.) Lec 1. (Fall.) Cr 1.

CIE 101 Civil Engineering Graphics
Graphic principles, concepts and techniques involving civil engineering applications. Exercises will be done in 2D/3D using CADD software. 1.0 ED/2.0 ES. Lec 2, Lab 2. (Spring.) Cr 3.

CIE 110 Materials
The structure, properties, and testing of engineering materials and their use in constructed facilities. Includes metals, woods, concrete, bituminous mixtures, plastics, insulation, adhesives and corrosion of materials. Engineering design is introduced

by readings and discussions on creativity, the design process and the concepts of marginal economic analysis, probability of failure and safety factors. Design problems include design of concrete mixtures and insulating systems to satisfy specific realistic situations taking into account uncertainty, safety, economic factors and intangibles, as well as technical considerations. (0.0 ED/3.0 ES.) Lec 3. Prerequisite: MAT 122 or concurrent. Cr 3.

CIE 111 Materials Laboratory
Evaluation of material performance under applied loads for engineering applications. Physical properties of concrete, metals, plastics and wood. Exercises include study of the variability of materials, construction of probability density functions from test data and computation of the probability of failure. (1.0 ED/0.0 ES.) Lab 2 (Fall.) Corequisite:CIE 110. Cr 1.

CIE 115 Computers in Civil Engineering
Introduces the student to computers and computations by solving examples relevant to civil engineering. The algorithmic aspects of programming as well as the development of simple graphical user interfaces are taught. Approximately one half of the course time is allocated to programming with the remainder involving problems and applications. Specific examples typically include problems from structures, geotechnical, transportation and environmental engineering. Emphasis is placed on examples introducing statistical methods. Also introduces the use of spreadsheets, word processing and a mathematics program. (0.0 ED/3.0 ES.) Lec 2, Lab 3 (Spring.) Prerequisite: MAT 126, Civil Engineering majors only. Cr 3.

CIE 225 Transportation Engineering
An introduction to the broad field of transportation with emphasis on the motor vehicle mode. Principles of roadway and urban transportation planning, economic analysis methods, and route design elements are discussed and related to the planning and design of highway transportation routes. Students design a section of roadway and prepare a technical paper on a current transportation engineering problem. (3.0 ED/ 0.0 ES.) Lec 3. (Spring.) Prerequisite: Civil Engineering majors or permission. Cr 3.

CIE 231 Fundamentals of Environmental Engineering
Introduction to environmental engineering including water quality, water and wastewater treatment plant design, solid and hazardous wastes, landfill design, radioactive waste control and air pollution abatement (1.0 ED/2.0 ES.) Lec 3. (Fall.) Satisfies the General Education Writing Intensive Requirement. Prerequisite: CHY 132, ENG 101, MAT 127. Cr 3.

CIE 340 Introduction to Structural Analysis
The cyclic process of analysis and design. Structure idealization and modeling. Design methodologies and loads considerations. The analysis of determinate trusses, beams and frames. Introduction to indeterminate structures. (1.0 ED/2.0 ES.) Lec 3, Lab 3 (Fall.) Prerequisite: MEE 251. Cr 4.

CIE 350 Hydraulics
An elementary course presenting fundamental principles of fluid flow and their applications to engineering problems. Includes study of hydrostatics, liquid measur-ing devices and channel and pipe flow. (0.0 ED/3.0 ES.) Lec 3. (Fall.) MEE 150. Prerequisite/Corequisite: MAT 258. Cr 3.

CIE 351 Hydraulics Laboratory
Application of hydraulic principles in laboratory experiments. Includes experiments on buoyancy and flotation, forces on submerged planes, venturi meter calibration, pipe friction, losses, weirs and others. (0.0 ED/1.0 ES.) Lab 2 (Fall.) Prerequisite: CIE 350 or concurrent. Cr 1.

CIE 365 Soil Mechanics
An introduction to fundamental physical properties, engineering behavior and performance of soils and rocks. (0.0 ED/3.0 ES.) Lec 3. (Spring.) Prerequisite or Corequisite: MEE 251. Cr 3.

CIE 366 Soil Mechanics Laboratory
Covers geotechnical laboratory testing including classification, density, permeability, shear strength, and consolidation tests. Design project reports are also submitted to ENG 317. (0.0 ED/1.0 ES.) Lab 2. (Spring.). Satisfies the General Education Writing Intensive Requirement. Corequisites: CIE 365, ENG 317. Cr 1.

CIE 394 Civil Engineering Practice
Cooperative work experience in civil and environmental engineering. Up to three credits may count toward the degree. (Pass/ Fail Grade Only.) (Usually summer.) Prerequisite: sophomore standing. Cr 1-3.

CIE 411 Engineering Project Design
Student design teams develop the conceptual design of an active civil engineering project. Topics include: consulting firm practice, the design process, evaluation of alternatives, regulatory constraints and the permit process, legal, ethical and social aspects of professional engineering practice, cost and scheduling estimations. Oral presentations and written technical reports are required. Open only to civil engineering students during their last spring semester. (3.0 ED/0.0 ES.) Lec 2, Lab 3. (Spring.) Satisfies the General Education Capstone Experience Requirement. Cr 3.

CIE 412 Engineering Decisions
Application of various analysis methods to engineering design decisions. Evaluation of economic, financial, legal, and ethical factors affecting engineering design. Topics include: engineering economy, consideration of risk and uncertainty, and evaluation of ambiguous and intangible factors in engineering design. (0.0 ED/2.0 ES.) Lec 2. (Fall.) Prerequisite: Senior standing or permission of instructor. Cr 2.

CIE 413 Project Management
Role of civil engineer in the implementation process of engineering projects from project conceptualization through design, construction, commissioning, start-up, and operations. Topics include: project life-cycle, project manager's tools, quality and risk management, required deliverables of design, cost and time estimates, and dispute resolution. (1.0 EE/1.0 ES.) Lec 2. (Fall.) Prerequisite: Senior standing or permission of instructor. Cr 2.

CIE 424 Urban Transportation Planning
Basic concepts and practices in the field of transportation planning, including the process and policy surrounding urban transportation planning, characteristics of urban travel, air quality - noise, energy - land use, the elements of decision making, data management and diagnosis, demand and supply analysis, project evaluation and implementation. A transportation demand management study constitutes a major part of the course. (2.0 ED/1.0 ES) Lec 3. (Spring.) Prerequisite: CIE 225. Cr 3.

CIE 425 Transportation Safety
Fundamental theory on transportation safety processes and evaluation methodology. Topics: vehicle/road/driver interaction, countermeasure effectiveness, enforcement, education and engineering measures. (1.0 ED/ 2.0 ES). Lec 3. (Fall.) Prerequisite: CIE 225. Cr 3.

CIE 426 Advanced Roadway Design
Principles of highway location, design of vertical and horizontal alignment, design and construction of surface treatments, pavement structures and roadway drainage systems. Student project preparing necessary plan-profile and cross section drawings required to construct a 3,000 foot section of roadway, which is evaluated with respect to road-user travel time, comfort and safety; impact on surrounding environment including aesthetical aspects; and con-struction cost. (3.0 ED/0.0 ES.) Lec 3. (Fall.) Prerequisite: CIE 225 and SIE 211. Cr 3.

CIE 427 Highway Curves
Covers horizontal curves, compound curves, reverse curves, and spiral curves, along with

curve design parameters. Vertical curves, including unequal tangent curves are also covered. Lec 1. Cr 1.

CIE 431 Pollutant Fate and Transport
Introduction to environmental transformation processes which controls the fate and transport of contaminants in the environment and in engineered systems. Topics include reaction energetics and kinetics, reactor engineering concepts, interphase mass transfer and phase partitioning. (3.0 ED/1.0 ES). Lec 3, Lab 3 (Spring.) Prerequisite: CIE 231 and MAT 258 or permission. Cr 4.

CIE 432 Water and Wastewater Process Design
Theory and design of water supply and wastewater treatment facilities. Design projects cover processes such as sedimentation, coagulation and filtration, biological treatment and disinfection. (4.0 ED/0.0 ES). Lec 3, Lab 3. (Spring.) Prerequisite: CIE 231 and CIE 350. Cr 4.

CIE 437 Environmental Chemistry
Introduction to environmental chemistry including chemical processes in water, soil and atmosphere. (0.0 ED/3.0 ES.) Lec 3, Lab 3. (Fall.) Prerequisite: CIE 231 or consent of instructor. Cr 4.

CIE 440 Structural Analysis I
Classical and matrix methods in the analysis of linear redundant systems. The basic concepts of equilibrium, stress-strain relations, and compatibility are emphasized. Manual and introductory computer aided solution techniques are utilized. (0.0 ED/4.0 ES.) Lec 3, Lab 3. (Spring.) Prerequisite: CIE 340. Cr 4.

CIE 442 Reinforced Concrete Design
The behavior design and detailing of reinforced concrete structures: beams, columns, beam-columns, slabs, footings, retaining walls. Microcomputer aided design project. (4.0 ED/0.0 ES.) Lec 3, Lab 3. (Fall.) Prerequisite: CIE 340. Cr 4.

CIE 443 Structural Steel Design
The design and detailing of steel structures: tension members, beams, columns, beam columns, and connections. Covers composite construction. Introduces the Load and Resistance Factor Design concept. Microcomputer aided design project. (4.0 ED/0.0 ES.) Lec 3, Lab 3. (Spring.) Prerequisite: CIE 340. Cr 4.

CIE 450 Open Channel Hydraulics
Covers uniform and nonuniform flow in open channels, gradually and rapidly varying flow, computational methods for flow profiles, open channel flow structures. (1.0 ED/2.0 ES.) Lec 3. (Spring.) Prerequisite: CIE 350 or equivalent. Cr 3.

CIE 455 Hydrology
Application of statistical analysis of rainfall and runoff processes for the development of design parameters of water resources projects, including uncertainty of these parameters. Includes collection and presentation of rainfall and runoff data, methods for developing hydrographs and flood control, development of design hydrographs for urbanizing watersheds. (1.0 ED/2.0 ES.) Lec 3. (Fall.) Prerequisite: CIE 350. Cr 3.

CIE 456 Groundwater Hydrology and Hydraulics
Fundamentals of the hydrodynamics of flow through porous media, and the development of methodology for solving the many open-ended problems of groundwater flow, supply and pollution. Concepts of groundwater modeling design. Aspects of field variability and uncertainty. (1.0 ED/2.0 ES.) Lec 3. (Spring.) Prerequisite: CIE 350 and MAT 258 or MAT 451 or permission. Cr 3.

CIE 460 Geotechnical Engineering
The application of geotechnical engineering to practical engineering design and construction problems including consideration of economic and safety constraints. (3.0 ED/0.0 ES.) Lec 3. (Fall.) Prerequisite: CIE 365. Cr 3.

CIE 470 Construction Management and Estimating
Management of construction activity with emphasis on cost estimating and bid preparation. Topics include: construction business management, advertising and contracting process, construction plans and specifications, quantity take-off, unit costs, and bid proposals. (1.5 ED/1.5 ES.) Lec 2, Lab 3 (Fall.) Prerequisite: CIE 110, CIE 225. Cr 3.

CIE 498 Selected Studies in Civil Engineering
Topics in civil engineering not regularly covered in other courses. Specific topics vary. May, with permission of the depart-ment, be repeated for credit. (Fall and Spring.) Prerequisite: permission. Cr 1-3.

CIE 533 Environmental Aquatic Chemistry
Fundamental aspects of aquatic chemistry emphasizing environmental engineering applications. (0.0 ED/3.0 ES.) Lec 2, Lab 3. (Spring.) Prerequisite: CIE 231. Cr 3.

CIE 534 Environmental Microbiology
Fundamentals of microbiology and biochemistry as related to natural and engineered treatment processes; microbial ecology, physiology, metabolism and genetics; energetics and kinetics of microbial growth; public health microbiology; introduction to pollution microbiology. (0.0 ED/3.0 ES.) Lec 3. (Fall.) Prerequisite: CIE 231. Cr 3.

CIE 540 Experimental Analysis of Structures
Stress and strain measurement techniques. Applications to small and full scale structures, dynamic measurements, modal analysis, fracture toughness, nondestructive evaluation. (0.0 ED/3.0 ES.) Lec 3. Prerequisite: CIE 440. Cr 3.

CIE 543 Introduction to Composite Materials in Civil Engineering
An introduction to the mechanics of fiber-reinforced polymer (FRP) composite materials in civil engineering with a view to structural design. Understanding of material properties, fabrication processes, fundamental mechanics, experimental procedures and methods of analysis and design. (2.0 ED/1.0 ES.) Lec 2, Lab 1. Prerequisite: Senior or graduate standing in Engineering or Wood Science and Technology; MEE 251 or equivalent and CIE 340 or equivalent. The student should have at least one course each in mechanics, calculus/linear algebra and computer programming. Cr 3.

CIE 544 Design of Wood Structures
Study of unique mechanical and design characteristics of structural wood and wood composite members and design of systems containing these members. (4.0 ED/0.0 ES.) Lec 3, Lab 3. Prerequisite: CIE 340 or WSC 425. Cr 4.

CIE 545 Structural Dynamics
Examines free vibration and response to harmonic and general dynamic loading of the single degree of freedom system, Fourier analysis and response in the frequency domain, response spectra, framed structures modeled as discrete multi-degree-of-freedom systems, dynamic analysis of nonlinear systems. Response of structural systems to earthquake excitation. (0.0 ED/3.0 ES.) Lec 3. Prerequisite: CIE 440. Cr 3.

CIE 547 Prestressed Concrete Structures
Design and behavior of prestressed concrete components and structures; pretensioning and post-tensioning technology. (3.0 ED/0.0 ES.) Lec 3. (Spring.) Prerequisite: CIE 442. Cr 3.

CIE 548 Bridge Engineering
History and aesthetics of bridges, construction materials, bridge shapes and types, bridge components, design philosophies, loads on bridges, slab-on-steel beam bridges, plate girder bridges, composite design, box girder bridges, overview of arch, truss, cable-stayes and suspension bridges,

bridge evaluation and maintenance. (3.0 ED/ 0.0 ES) Lec 3. (Fall.) Prerequisite: CIE 443 or equivalent. Cr 3.

CIE 549 Numerical Methods in Engineering
Modern numerical methods for engineering analysis, including numerical linear algebra, numerical methods for solving nonlinear systems of equations, the solution of initial-value problems, finite-difference methods for boundary-value problems, iterative methods for large sparse systems of equations, and an introduction to optimization techniques. (0.0 ED/3.0 ES.) Lec 3. (Fall.) Prerequisite: MAT 258 or MAT 259 and an introductory programming course, or permission of the instructor. Cr 3.

CIE 555 Environmental Hydrology
A comprehensive qualitative and quantitative treatment of hydrologic processes above and below the land surface, including an understanding of approaches to hydrologic measurements and the uncertainties involved in those measurements and hydrologic perspectives of surface and subsurface pollution. Lec 3. (Fall.) Prerequisite: at least one semester of calculus (not open to engineering majors). Cr 3.

CIE 556 Advanced Groundwater Hydrology and Modeling
Advanced topics in the groundwater system and flow through porous media pertaining to the modeling of fluid flow and mass transport in the groundwater environment. (1.0 ED/2.0 ES.) Lec 3 (Spring.) Prerequisite: CIE 456 or equivalent. Cr 3.

CIE 562 Earthwork Design
Design and construction of earth structures including earth dams, landfill liners and roadway embankments. Economic, safety, reliability, ethics, social impact and legal constraints are considered in design decisions. (3.0 ED/0.0 ES.) Lec 3. (Spring.) Prerequisite: CIE 365. Cr 3.

CIE 563 Thermal Soil Mechanics
A study of the thermal properties of soils, heat transfer, and methods for predicting soil temperature under freezing conditions. Design of pavements, foundations, and excavations to resist the effects of freezing. (1.0 ED/1.0 ES.) Lec 2. (Spring.) Prerequisite: CIE 365. Cr 2.

CIE 564 Deep Foundations
The theories, design concepts, and construction of pile and caisson foundations for buildings and bridges. Economic, safety, and reliability constraints are considered in design decisions. (3.0 ED/0.0 ES.) Lec 3. (Fall.) Prerequisite or Corequisite: CIE 460. Cr 3.

CIE 565 Foundations and Underground Structures
Covers design of shallow foundations for buildings and bridges including effect of economics and reliability on choice of foundation system. Design of dewatering systems, buried pipes, and tunnels. Legal and ethical aspects of geotechnical practice. Intended for structural and soils students. (3.0 ED/0.0 ES.) Lec 3. Prerequisite or Corequisite: CIE 460. Cr 3.

CIE 566 Retaining Earth Structures
Geotechnical analysis and design for structures which retain earth. Economic, safety and reliability constraints are considered in design decisions. (3.0 ED/0.0 ES.) Lec 3. Prerequisite: CIE 460. Cr 3.

CIE 567 Ground Improvement Techniques
Practical techniques to overcome unfavorable ground conditions applied to foundation, roadway, and embankment design. Covers compaction in-situ densification, stone columns, chemical stabilization, reinforced embankments, preloading, sand drains, and wick drains. (3.0 ED/0.0 ES.) Lec 3. (Fall.) Prerequisite: CIE 460. Cr 3.

CIE 592 Civil Engineering Seminar I
Individual oral presentation and discussion of current research and topics of civil engineering interest. Required of all civil engineering graduate students. (Fall and Spring.) Cr 1.

CIE 593 Civil Engineering Seminar II
Individual oral presentation and discussion of current research and topics of civil engineering interest. Required of all civil engineering graduate students. (Fall and Spring.) Cr 1.

CIE 598 Selected Studies in Civil Engineering
Advanced topics in Civil Engineering not regularly covered in other courses. Content varies to suit individual needs. May be repeated for credit with permission of department. (Fall and Spring.) Prerequisite: permission. Cr 1-3.

Classics (CLA)

CLA 101 Greek Literature in English Translation
A survey of Greek literature. No knowledge of Greek is necessary. Satisfies the General Education Cultural Diversity and International Perspectives, Western Cultural Traditions and Writing Intensive Requirements. Cr 3.

CLA 102 Latin Literature in English Translation
A survey of Latin literature. No knowledge of Latin is necessary. Satisfies the General Education Cultural Diversity and International Perspectives, Western Cultural Traditions and Writing Intensive Requirements. Cr 3.

CLA 201 Women in the Ancient World
Investigates the social and literary context of the lives of women in several ancient Mediterranean cultures; Near East, Hebrew, North Africa, Greece and Rome. Cr 3.

CLA 202 Mythology of the Ancient Near East, North African and Greece
Surveys the mythologies of the ancient Mediterranean Basin, including Hebrew Mythology. Through lectures, reading and video the major deities and heroes of each culture will be presented within their cultural context, including the stories associated with them. Cr 3.

Communication, Mass Communication and Journalism (CMJ)

CMJ 100 Introduction to Mass Communication
Introduces the structure and operation of mass media and the social, political and economic implications of their activities. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

CMJ 102 Fundamentals of Interpersonal Communication
The basic elements of interpersonal communication, with special emphasis on developing knowledge and skills applicable to face-to-face interactions between individuals and in small groups. Participation in research to a maximum of 3 hours is expected. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

CMJ 103 Fundamentals of Public Communication
The nature and problems of public speech communication, with practical experience in representative speaking situations. Participation in research to a maximum of 3 hours is expected. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

CMJ 106 Oral Communication of Literature
An introduction to the oral communication of literature (storytelling, prose, and poetry) to an audience. Emphasis on gaining greater sensitivity and expressiveness as a communicator. Participation in research to a maximum of 3 hours is expected. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

CMJ 201 Communication Studies I
Introduction to historical and philosophical approaches to the study of communication. The course examines communication from the classical, modern and contemporary perspectives, with specific attention to the rhetorical theorists and theories that have been dominant in the history of communication. Satisfies the General Education Western Cultural Tradition Requirement. Cr 3.

CMJ 202 Communication Studies II
Introduction to social and human science approaches in communication studies. The course examines communication theories and models, the function of language and symbolic behavior in society and culture, and the nature of interaction and interpretation. Not open to first-year students. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

CMJ 211 History of Mass Communication
Social history of mass communication roles, technologies and processes with emphasis on interactions with political, economic and cultural institutions. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

CMJ 236 Writing for the Mass Media
Practical introduction to non-fiction writing styles in journalism, broadcasting, advertising and public relations. Intensive stress on grammar, spelling, punctuation. Work is typed in desktop publishing lab. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 101 with 'C' or better. Cr 3.

CMJ 237 Newswriting and Reporting
Provides intensive practice in newswriting with emphasis on accuracy, style, judgment and responsibility. Satisfies the General Education Writing Intensive Requirement. Prerequisite: CMJ 236 with a 'C-' or better. Cr 3.

CMJ 250 Introduction to Advertising
Examines social and economic roles of advertising including rate structure, agency practices, effective use of media. Advertis-ing principles analyzed and discussed from the media point of view. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

CMJ 257 Business and Professional Communication
Advanced study and practice in specialized audience analysis, strategies and tactics, conference procedures, interviewing techniques, and delivery of professional presentations. Prerequisite: Junior or senior standing. CMJ 103 or permission. Cr 3.

CMJ 314 International Mass Communication
Survey of media systems around the world and the role of mass media in political, social, economic and cultural development. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

CMJ 324 Interpersonal Communication in Everyday Life
The advanced study of interpersonal communication as it functions across a range of human relationship, such as family, friends, professions and organizations. Examines perspectives, theories, and research on communication in everyday life. Prerequisite: CMJ 102 or permission. Cr 3.

CMJ 330 Copy Editing
A lab course in electronic copy editing designed to develop editorial judgment and skills for preparing news for publication. Covers headline writing, photoediting and basic page make up. Prerequisite: CMJ 237 with 'C-' or better and declared JOU or MAC majors or permission. Cr 3.

CMJ 332 Public Affairs Reporting
Students cover public issues and institutions in surrounding communities and write for publication. Emphasis on local and state government. Satisfies the General Education Writing Intensive Requirement. Prerequisite: CMJ 237 with 'C-' or better and declared JOU or MAC majors or permission. Cr 3.

CMJ 340 Broadcast Newswriting and Reporting
Provides instruction in newswriting and reporting for radio and television. Students make the transition from print to broadcast writing, with emphasis on the preparation of newscasts for CMJ 343. Topics include: story types, leads and narrative flow, interviewing, voice work, and digital sudio editing. Satisfies the General Education Writing Intensive Requirement. Prerequisite: CMJ 236. Corequisite: CMJ 343. Cr 3.

CMJ 343 Radio News Practicum
Provides hands on experience in radio newscasting, the foundation for further work in radio and TV news. Topics include audio recording, digital editing, newscast production, and the conception and execution of feature stories and mini-documentaries. Serves as the companion course to CMJ 343. Prerequisite: CMJ 236. Corequisite: CMJ 340. Cr 3.

CMJ 345 Small Group Communication
An introduction to the principles of the small group processes as involved in decision making, problem solving and negotiation. Practical application of these principles through classroom experiences. Prerequisite: 3 hours of CMJ courses or permission. Cr 3.

CMJ 347 Argument and Critical Thinking
An introduction to the principles of decision-making through critical thinking applied to reasoned advocacy. Practical application of these principles through classroom experience. Satisfies the General Education Writing Intensive Requirement. Prerequisite: 3 hours of CMJ courses or permission. Cr 3.

CMJ 351 Techniques of Video Production
Concentrates on the conception, design and development of non-linear video production for broadcast, non-broadcast and online uses. Explores the fundamental principles of digital video production as well as the creative use of cameras, lighting, sound, digital non-linear editing, graphics and visual effects in news features and mini-documentaries. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: CMJ 100 and CMJ 236. Cr 3.

CMJ 355 Advertising Copy and Graphics
Provides theory and practice in creating advertising for print, direct mail and electronic media, with emphasis on the limitations of each and the responsibilities of the advertising practitioner. Satisfies the General Education Writing Intensive Requirement. Prerequisite: CMJ 236 and CMJ 250 with 'C-' or better; declared JOU or MAC majors or permission. Cr 3.

CMJ 356 Advertising Media
Covers problems and procedures for creating an advertising media plan with emphasis on basic media math skills. The knowledge covered addresses media selection, as well as other areas of advertising, including creative, research, management and marketing. Prerequisite: CMJ 250 or BUA 370 with 'C-' or better; declared JOU or MAC majors or permission. Cr 3.

CMJ 360 Nonverbal Communication
Examines important non-linguistic variables related to human interactions. Specific emphasis on the effects of kinesics, proxemics, paralanguage and other code systems as they affect meaning in communication efforts. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: Not open to first-year students. Cr 3.

CMJ 362 Photographic Reporting and Storytelling
An overview of photojournalism history, theory and ethics. Exercises teach skills and strategies used by newspaper, magazine and on-line photographers and editors and challenge students to deal responsibly with issues of invasion of privacy, subject representation, copyright and fair use and image manipulation. (This course is identical

to NMD 362.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: CMJ 236 or ART 270 or ART 280 or NMD 111; familiarity with Photoshop; or permission. Cr 3.

CMJ 366 Speech Play and Performance
Study of creative and aesthetic dimensions of communication and language. Examines how people use speech play and performance (e.g., word play, joking, storytelling, performing literature) and what happens when they do. Focus on performance as a cultural event in everyday life as well as in society and the media. Satisfies the General Education Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of CMJ courses or permission. Cr 3.

CMJ 367 Public Relations
The study of those activities which help to create public understanding and acceptance of an organization's policies and programs. Prerequisite: Junior or Senior standing. 3 hours of CMJ courses or permission. Cr 3.

CMJ 375 Mass Media Law and Regulation
Topics include libel, privacy, contempt, copyright, obscenity, censorship, prejudicial pre-trial publicity. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Prerequisite: CMJ 100 with 'C-' or better; declared JOU or MAC majors or permission. Cr 3.

CMJ 376 Programming and Criticism of Electronic Media
Programming practices, strategies and conventions considered in relation to broadcast history, economics and socio-cultural factors. Critical analysis of contemporary program trends in television and radio. Prerequisite: declared JOU or MAC majors or permission. Cr 3.

CMJ 380 Advertising, Media and Society
Examines advertising's impact on U. S. society; especially on women, children, minorities, families and popular culture. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: CMJ 250 or permission. Cr 3.

CMJ 398 Topics in Mass Communication
Topics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: permission. Cr 1-3.

CMJ 401 Speech, Space, Event: Critical Applications
Introduction to the subject of criticism from a rhetorical perspective. Examines methods of critical reading, criticism of several kinds of texts, including speeches, social spaces, and events, and how texts are made meaningful and why. Involves application of evaluative criteria such as aesthetics, truth, effects and especially ethics. Satisfies the General Education Cultural Diversity and International Perspectives, Writing Intensive and Capstone Experience Requirements. Prerequisite: CMJ 201 and junior standing or permission. Cr 3.

CMJ 402 Communication Research
An introduction to social science inquiry into the nature, forms and functions of human communication. Focuses on conceptualizing communication research problems and selecting appropriate methodologies and analyses for examining communication data. Satisfies the General Education Mathematics, Writing Intensive and Capstone Experience Requirements. Prerequisite: CMJ 202 or permission. Cr 3.

CMJ 403 Persuasion and Social Influence
Study of the theory and principles involved in the process of influencing the beliefs, attitudes and values of others. Focus on social science and humanistic explanations of what makes messages persuasive in interpersonal and public contexts. Prerequisite: 3 hours in CMJ courses or permission. Cr 3.

CMJ 405 Women and Communication
A systematic study of research by and about women with regard to language, speech, and communication pragmatics, discussed within a variety of communication contexts. Not open to first-year students. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: CMJ 102 or WST 101. Cr 3.

CMJ 410 Social Influence of Mass Communication
A study of the communicative impact of mass media (e.g., television, radio, newspapers), and uses of the media in other communicative contexts (e.g., small group and interpersonal situations.) Current mass communication theories and research studies are explored. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: 3 hours of CMJ courses or permission. Cr 3.

CMJ 412 Electronic Media Management
Overview of the tasks and challenges of managing electronic media outlets, with special emphasis on radio and TV. Begins with a general treatment of management theory and practice and covers specific topics including finance, human relations, sales, programming and promotion. Other topics include the management of cable systems and public broadcasting stations, and telecommunications law and policy. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: CMJ 236 and sophomore standing. Cr 3.

CMJ 420 Health Communication
Study of the theories and issues in health communication research, including provider-client communication, support groups, organizational and intercultural communication issues in health care. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: Juniors or Seniors. Cr 3.

CMJ 434 Editorial and Opinion Writing
Develops skills of persuasive and argumentative writing, with emphasis on disciplined logic, knowledge of subject and alternate points of view. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: CMJ 237 with a 'C-' or better and declared JOU or MAC majors or permission. Cr 3.

CMJ 435 Feature Writing
Develops style and proficiency in writing non-fiction newspaper and magazine articles. Prerequisite: CMJ 237 with a 'C-' or better and declared JOU or MAC majors or permission. Cr 3.

CMJ 444 Political Rhetoric
Examines the nature and impact of diverse communication strategies in political campaigns. Emphasis on Congressional and Presidential campaigns. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: 3 hrs of CMJ courses or permission. Cr 3.

CMJ 450 Communication and Technology
Examines and analyzes the characteristics of and influences on human communication mediated by technology such as computer networks, video teleconferencing. Prerequisite: Juniors or Seniors. Cr 3.

CMJ 451 Advanced Electronic Reporting and Production
Students will conduct intensive broadcast reporting and production projects on some issue of demonstrated social relevance. Structured opportunities are provided for reflection on the impact of student reporting on the wider community. Topics may vary and the course alternates between radio and TV reporting. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: CMJ 341 or CMJ 351. Cr 3.

CMJ 459 Advertising Campaigns
Requires students to synthesize and apply knowledge and skills from all other

advertising courses to create an advertising campaign. Prerequisite: CMJ 355 and CMJ 356 with 'C-' or better; declared JOU or MAC majors. Cr 3.

CMJ 466 Narrative and Communication
A study of narrative, or storytelling, as a way of communicating in conversation, oral performance and literature: what stories are told to whom, how stories are told, and the forms and functions of narrative. Considers narrative in a variety of communication settings. Satisfies the General Education Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: 3 hours of CMJ courses or permission. Cr 3.

CMJ 470 Communication in Organizations
Examines research and theory of communication behavior in organizations with focus on recurring communication problems in complex organizations (including business, industrial, educational and service agencies.) Attention is given to communication training and assessment in organizations. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Juniors or seniors. Cr 3.

CMJ 489 Seminar in Media Ethics and Issues
An advanced level course requiring extensive reading, discussion and research on the mass media and ethics, politics, economics and society. Satisfies the General Education Ethics and Capstone Experience Requirements. Prerequisite: Senior JOU or MAC majors or permission. Cr 3.

CMJ 492 Directed Independent Study
For the advanced student desiring to study a particular problem under the guidance of a member of the staff. May be repeated up to 6 credits. Prerequisite: permission of Department Chairperson. Cr 1-3.

CMJ 493 Topics in Communication
In-depth analysis of selected subjects, designed to explore new areas of research and/or current issues. Specific topics vary. Prerequisite: Sophomore standing and permission of Department Chairperson. Cr 1-3.

CMJ 495 Internship
Approved work experience for departmental majors in the application of communication to practical, theoretical or research problems in any public service agency, business, or other setting approved by the department. Requirements include an initial written application showing the projected experience and its relevance to communication, conferences with faculty supervisor, periodic logs or summaries, plus a final written report. May be repeated up to 6 hours. (Pass/Fail Grade Only.) Prerequisite: permission of Department Chairperson. Cr 1-3.

CMJ 497 Problems in Communication
For the advanced student desiring to study a particular problem under the guidance of a member of the staff. May be repeated up to 6 credits. Prerequisite: permission of Department Chairperson. Cr 1-3.

CMJ 498 Advanced Topics in Mass Communication
Topics not regularly covered in other courses, content varies to suit current needs. Prerequisite: permission. Cr 1-3.

CMJ 510 Critical Studies in Mass Communication
Advanced study of critical and interpretive approaches to mass communication theory with emphasis on the relationship of human communication and mass media in structuring behavior and experience. Prerequisite: CMJ 410 or permission. Cr 3.

CMJ 515 Mass Communication Theory
Familiarizes students with dominant theories, research and historical literature. Prerequisite: permission. Cr 3.

CMJ 520 Media History
Examines media cultures in the context of technologies, social movements and free expression from oral to digital communication eras applying contrasting approaches to historical inquiry. Prerequisite: permission. Cr 3.

CMJ 524 Seminar in Interpersonal Communication
An advanced consideration with emphasis on the implications of various theories and research traditions for understanding interpersonal traditions. Prerequisite: permission Cr 3.

CMJ 530 Mass Communication Law and Policy
Advanced study of the legal privileges and responsibilities of the traditional mass media and the Internet under the First Amendment. Emphasis on how domestic and international principles regarding speech, press and information shape professional activity and creative endeavors. Prerequisite: permission. Cr 3.

CMJ 540 Political Economy of Media
Advanced study of the political and economic relationships among media corporations, other corporate actors, politicians, and government bodies. Topics include the deregulation, consolidation, and globalization of media corporations, media content as an economic good, and economic influences on the new media industries. Prerequisite: permission. Cr 3.

CMJ 550 Advertising and Consumer Culture
Examines the relationships between advertising and consumer culture from critical perspectives. Prerequisite: permission. Cr 3.

CMJ 560 Ethics in the Media
Analysis of the ethical principles and methods of moral reasoning that affect journalists' pursuit and presentation of the truth in the context of changing societal and professional value systems. Prerequisite: permission. Cr 3.

CMJ 566 Seminar in Aesthetic Communication
Advanced study of theory and research in aesthetic communication, for example, topics on gender and aesthetic communication, narrative as human communication, reading and cultural performance, the politics of literature and performance. Prerequisite: permission. Cr 3.

CMJ 593 Topics in Communication
Advanced study of selected topics. Prerequisite: permission. Cr 3.

CMJ 596 Topics in the History of Public Discourse
Investigations and analyses of the history and historiography of public discourse such as: the rhetoric of pre-Civil War protest, second-wave feminism, immigration, reproductive control and other social movements. Prerequisite: permission. Cr 3.

Computer Science (COS)

COS 100 Introduction to the Personal Computer and the Internet
Topics include: introduction to the IBM-compatible microcomputer hardware and operating systems, introduction to communications and the Internet, introduction to spreadsheets and presentation software. Does not meet Bachelor of Arts Core Distribution Area III requirement. Credit does not count towards the computer science major. Cr 3.

COS 101 Introduction to PC Hardware and Windows
Topics include an overview of PC hardware, the Windows operating system, the Internet, and use of Web browsers. Does not meet Bachelor of Arts Core Distribution Area III requirement. Credit does not count towards the COS major. Cr 1.

COS 102 Introduction to the World Wide Web
Topics include the sturcture and design of Web pages. (This course is equivalent to the second 5 weeks of COS 100.) Does not meet Bachelor of Arts Core Distribution Area III requirement. Credit does not count towards the COS major. This course assumes

knowledge of the Windows operating system, basic word processing, and file and folder management. Cr 1.

COS 103 Introduction to Spreadsheets
Topics include design and use of spreadsheets to solve problems using formulas, charts and data functions. (This course is equivalent to the third 5 weeks of COS 100.) Does not meet Bachelor of Arts Core Distribution Area III requirement. Credit does not count towards the COS major. This course assumes knowledge of the Windows operating system, basic word processing, and file and folder management. Cr 1.

COS 104 Introduction of Presentation Software
Topics include use of presentation software containing text, graphics and multimedia components to enhance presentations. (This course is equivalent to the first 5 weeks of COS 100.) Does not meet Bachelor of Arts Core Distribution Area III Requirements. Credit does not count towards the COS major. This course assumes knowledge of the Windows operating system, basic word processing, and file and folder management. Cr 1.

COS 110 Introduction to Personal Computers Using the Macintosh
Investigates the friendly interface of the Apple Macintosh personal computer. A number of software systems will be explored including spreadsheets in Excel, word-processing in MSWord, Superpaint and MacDraw for graphical operations and authoring in hypercard. Considerable overlap in content with COS 100 or COS 101, COS 102 and COS 103. Cr 3.

COS 120 Introduction to Programming I
Topics include the development of programming skills in the novice with instruction in a sample programming language. A laboratory/recitation session is included. Credit does not count towards the computer science major. This course assumes knowledge of the Windows operating system, basic word processing, and file and folder management. br>Satisfies the General Education Mathematics Requirement. Cr 3.

COS 198 Topics in Computer Science
Introductory topics in computer science not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: permission. Cr 1-3.

COS 201 Introduction to Programming II
A continuation of COS 120 with development of programming skills in arrays, classes, algorithms and user interfaces. Other topics include integration with databases, spreadsheets and the Internet. Prerequisite: COS 120. Cr 3.

COS 203 Programming in COBOL
An introduction to the COBOL language for those with programming experience in another language. Does not count for credit in the major. Prerequisite: COS 220 or equivalent. Cr 1.

COS 204 Programming in FORTRAN
An introduction to the FORTRAN language for those with programming experience in another language. Does not count for credit in the major. Prerequisite: COS 220 or equivalent. Cr 1.

COS 211 Principles of Data Processing
Presents basic concepts in database management systems using a microcomputer database system and basic theory of database design. Students will construct systems in various application area. Credit does not count toward the computer science major. Cr 3.

COS 215 Introduction to Computing Using FORTRAN
Programming logic and techniques using FORTRAN including introductory hardware concepts. Students are assigned programs from various areas of application. Credit does not count towards the computer science major. Degree credit will not be given for both COS 215 and COS 220. Satisfies the General Education Mathematics Requirement. Cr 3.

COS 220 Introduction to Computer Science I
Topics include programming techniques with a brief introduction to hardware concepts as they apply to software development. Students are assigned programs emphasizing numerical algorithms for implementation in a higher level language. This course assumes knowledge of the Windows operating system, basic word processing, and file and folder management. Some prior experience in programming logic, macros, or scripting is recommended. Satisfies the General Education Mathematics Requirement. Cr 3.

COS 221 Introduction to Computer Science II
Continuation of COS 220 with emphasis on the development of non-numeric algorithms. Topics include program efficiency, text processing, sorting and data structures. Prerequisite: COS 220. Cr 3.

COS 230 Computer Architecture and Assembly Language
Introduction to concepts of modern computers, instruction formats, addressing techniques. Covers input-output processes and interrupt handling. Programming aspects include assembler program segmentation and linkage. A specific assembler used to illustrate various topics. Prerequisite: COS 220 or equivalent. Cr 3.

COS 231 Introduction to UNIX
An introduction to the UNIX operating system from the user's point of view. Covers the basic structure of UNIX, basic commands, file system, editing, utilities, shell programming, programming environment and customization. Prerequisite: COS 220 or equivalent proficiency in PASCAL or C. Cr 3.

COS 250 Discrete Structures
Introduction to discrete structures used in various areas of computer science. Topics include logic, sets, relations, functions, cardinality, enumeration, and computability. Prerequisite: COS 221, MAT 127 or MAT 115 or permission. Cr 3.

COS 298 Topics in Computer Science
Introductory topics in computer science not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: Permission. Cr 1-3.

COS 301 Programming Languages
Formal description of programming languages including specification of syntax and semantics. Discussion of infix, prefix, and postfix notation with translation techniques. Topics include branching, grouping of statements, storage allocation, list and string processing, relation of language design to efficiency. Satisfies the General Education Writing Intensive Requirement. Prerequisite: COS 250. Cr 3.

COS 335 Computer Organization and Architecture
The internal organization of both microcomputers and mainframes. Topics include addressing modes, computer arithmetic, introduction to digital logic. Prerequisite: COS 431. Cr 3.

COS 350 Data Structures and Algorithms
Introduction to abstract data types as a unifying concept in the study of data structures. Topics include lists, queues, multi-linked lists, priority queues, trees, and graphs. The impact of these structures on algorithm design is explored. External memory manage-ment is discussed. Prerequisite: COS 250. Cr 3.

COS 398 Topics in Computer Science
Topics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: permission. Cr 1-3.

COS 400 Introduction to Compiler Construction
Basic concepts of programming language translation, compiler design and construction. Topics include the compilation process, language definition, lexical analysis, syntax analysis, error detection and recovery, grammars, ompiler design issues, symbol-

tables, storage allocation, code generation and machine-independent code improvement. Programming projects illustrate various concepts. Prerequisite: COS 350. Cr 3.

COS 415 Computer Simulation and Modeling, from Development to Display
The process of designing and using a computer model is examined in detail. The development of the model equations, numerical techniques for solving them, and basic graphical techniques for displaying the results of the calculations will be presented. Prerequisite: Familiarity with a programming language and/or permission Cr 3.

COS 416 Parallel Programming
Introduces the students to a realistic programming environment where they can experience the differences and difficulties of programming in a multi-processor or multi-computer architecture. Prerequisite: permission. Cr 3.

COS 420 Introduction to Software Engineering
A broad view of software engineering which introduces a variety of software engineering techniques which can be applied to practical software projects. Topics include process models, human factors, software specification; software design, programming techniques and tools, and validation. Prerequisite: COS 431. Cr 3.

COS 431 Operating Systems
Study of the structure of current computer operating systems. Topics include I/O management, memory management, multiprogramming, linking loaders, real and virtual systems, batch and time sharing. Prerequisite: COS 221, COS 230 or permission. Cr 3.

COS 440 Computer Networks I
Covers data and computer communications using ISO model. Discussion of physical media, communication protocols, and network architectures including wide area and local area networks. Includes examples of networks currently in use. Prerequisite: COS 431. Cr 3.

COS 441 Computer Networks II
A continuation of COS 440. An in-depth study of computer network protocols and certain network applications. Concentration is on network to application layers of the OSI model. Presently specific emphasis is on the Internet Protocol TCP/IP with examples from Appletalk and Novell protocols. Prerequisite: COS 440. Cr 3.

COS 460 Interactive Computer Graphics
Topics include graphic I/0 devices: plotter, CRT, and light pen; vector generation; transformation of two/and three-dimensional objects; clipping and windowing; hidden line removal; interrupt handling; interactive techniques; data structures for graphics; and various display algorithms. Prerequisite: COS 221 or equivalent, MAT 126 and junior standing. Cr 3.

COS 470 Introduction to Artificial Intelligence
Surveys fundamental areas of research in Artificial Intelligence including knowledge representation, vision, planning, logic, learning, expert systems, and natural language comprehension as well as techniques including predicate calculus, backtracking, tree searching, and semantic networks. Also covers LISP, a principal Artificial Intelligence programming language. Prerequisite: COS 350 or permission. Cr 3.

COS 480 Database Management Systems
Provides the knowledge necessary to understand and use existing DBMS technology following the data model approach with emphasis on the relational model. Topics include DBMS architecture and underlying file organization, integrity, relational algebra and calculus, query optimization, and normalization. Students design and manipulate a system using an existing DBMS. Prerequisite: COS 350. Cr 3.

COS 490 Computers, Ethics and Society
Consideration of human and social consequences of technological development and application of computers, ethical questions of computer use, professional ethics. Satisfies the General Education Ethics and Writing Intensive Requirements. Prerequisite: COS 431, ENG 317. Cr 3.

COS 495 Field Experience
A pre-planned work experience of no less than ten and preferably more weeks in a commercial environment, with faculty supervision. Normally a paid work experience. A presentation open to interested faculty, staff and students might be required at the completion of the project. (Pass/Fail Grade Only.) May be repeated for a maximum of 3 credit hours. Satisfies the General Education Capstone Experience Requirement. Prerequisite: A student normally must complete COS 301, COS 420, COS 431 and preferably COS 350, with a least a grade of "C" in each of these courses and permission. Cr 1-3.

COS 498 Topics in Computer Science
Topics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prereq-uisite: Semester of programming. Cr 1-3.

COS 499 Senior Project
An undergraduate research project in computer science under the direction of an approved advisor. An individual or small group will work on the conception, design and implementation of a significant computer science project. A presentation, open to interested faculty, staff and students may be required at the completion of the project. Satisfies the General Education Capstone Experience Requirement. Prerequisite: permission. Cr 3.

COS 515 Topics in Scientific Computation: Simulation and Modeling
The purpose of designing and using a computer model is examined in detail. The development of the model equations, numerical techniques for solving them, and basic graphical techniques for displaying the results of the calculations will be presented. Prerequisite: Familiarity with a programming language and/or permission. Cr 3.

COS 516 Topics in Scientific Computation: Parallel Programming
Introduces the students to a realistic programming environment where they can experience the differences and difficulties of programming in a multi-processor or multi-computer architecture. Prerequisite: permission. Cr 3.

COS 520 Software Engineering I
Specification, design, implementation, and maintenance of reliable software. Various methodologies will be explored with Ada as the implementation tool. Prerequisite: COS 350 and COS 431. Cr 3.

COS 521 Topics in Software Engineering
May be repeated. Prerequisite: permission. Cr 3.

COS 545 Data Communications and Networking
Coverage of the major areas of Data Communications and Computer Networks based on the OSI model for data communications. Provides a high level coverage of major topics such as WANs, LANs, protocols, including Internet protocols and applications. Cr 3.

COS 550 Theoretical Computer Science I
A survey of automata theory, formal languages, undecidability and computational complexity. Prerequisite: COS 301 and COS 250. Cr 3.

COS 554 Algorithms
Important algorithms and their application to solving problems. Prerequisite: COS 350. Cr 3.

COS 570 Topics in Artificial Intelligence
May be repeated. Prerequisite: permission. Cr 3.

COS 580 Topics in Database Management Systems
May be repeated. Cr 3.

COS 598 Advanced Topics in Computer Science
Topics in computer science not regularly covered in other courses. May be repeated for credit. Prerequisite: permission. Cr 1-3.

COS 599 Graduate Project
Cr Ar.

Communication Sciences and Disorders (CSD)

CSD 108 Directed Speech Improvement
Individualized evaluation and self-improvement programs focused on the spoken communication needs of students presenting problems in language, speech, fluency, voice, or hearing. May be repeated for credit. (Pass/Fail Grade Only.) Prerequisite: permission of coordinator, Conley Speech and Hearing Center. Cr 1.

CSD 130 Introduction to Communication Sciences and Disorders
A survey of the major disorders of language, speech and hearing with attention to their recognition and the principles of their treatment. Recommended for all teachers. Prerequisite: Not open to first semester first-year students. Cr 3.

CSD 201 American Sign Language I
Introduction to American Sign Language syntax, morphology, phonology, history and culture. Focus on dialogue. Prerequisite: Sophomore standing. Cr 3.

CSD 202 American Sign Language II
Continuation of skill building in American Sign Language syntax, morphology, phonology, cultural awareness. Focus on monologue. Prerequisite: CSD 201 or permission. Cr 3.

CSD 222 International and National Issues of Language Usage
Exploration of linguistic variation including dialects and minority languages; interplay of language, society and personhood; language as a carrier of cultural values; and issues of bilingualism and multilingualism. Includes focus on language and personal identity within immigrant and ethnic experiences. Focus is global as well as North American. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ENG 101 and sophomore standing. Cr 3.

CSD 291 Introduction to Scholarship and Inquiry in Communication Sciences and Disorders
Develops knowledge pertaining to professional journals, peer-reviewed research, use of library and electronic databases and preparation of professional papers including the use of APA style. Required of all majors. Prerequisite: Sophomore and junior majors only. Cr 1.

CSD 301 Introduction to Clinical Audiology
An introduction to principles of acoustics as a basis for understanding hearing assessment. Development of ability to read and interpret audiograms as well as the results from a hearing evaluation. Includes pure tone and speech audiometry, acoustic immittance and reflex testing. Prerequisite: CSD 130. Cr 3.

CSD 302 Issues in Hearing Loss
Reviews the basic principles of hearing and hearing loss. Explores the principles of basic audiologic rehabilitation, amplification technology and cochlear implants. Includes psychosocial aspects of hearing loss, counseling, communication modalities and deaf culture. Prerequisite: CSD 301 or permission. Cr 3.

CSD 380 Language Development
Study of the sequential aspects of language development from birth to adolescence. Emphasis on prerequisite foundations and skills for collecting and analyzing language samples. Prerequisite: CSD 130 or INT 410 or permission. Cr 3.

CSD 383 Anatomy and Physiology of the Speech Mechanism
Study of the structures, muscular system, nervous system and underlying mechanisms required for breathing, phonation, articulation and language. Emphasis on normal neurophysiological function with attention to organic pathologies affecting speech and language. Prerequisite: CSD 130; junior or senior standing. Cr 3.

CSD 481 Phonological Development and Phonetics
Exploration of phonological theory using examples from a variety of languages and study of normal phonological development. Emphasis on acquisition, understanding and use of phonetic transcription skills. Prerequisite: INT 410 or CSD 380; limited to junior or senior majors. Cr 4.

CSD 484 Introduction to Speech Science
Introduces research findings on the importance of acoustical, physiological, and preceptual factors in speech production and reception. Methodology and instrumentation employed in such research are surveyed. Prerequisite: CSD 383 or permission; junior and senior majors only. Cr 3.

CSD 487 Disorders of Speech and Language
A study of the description, evaluation and therapeutic intervention of speech and language disorders in pediatric and adult populations. Prerequisite: CSD 130; junior or senior majors only Cr 3.

CSD 490 Senior Capstone: The Clinical Process I
First of a two-semester course on the clinical process in communication disorders emphasizing observation as a clinical tool, principles of clinical research, scientific and professional writing, and the foundations for professionalism and ethical decision making. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: Limited to senior majors with at least 9 credit hours of 300 and/or 400 level coursework in CSD courses completed as well as CSD 291. Cr 4.

CSD 491 Senior Capstone: The Clinical Process II
Second of a two-semester course on the clinical process in communication disorders with primary emphasis on clinical problem solving, decision making, and developing clinical expertise. Satisfies the General Education Capstone Experience Requirement. Prerequisite: CSD 490. Limited to Senior majors only. Cr 4.

CSD 493 Topics in Communication Sciences and Disorders
In-depth analysis of selected subjects, designed to explore new areas of research and/or current issues. Specific topics vary. May be repeated for credit. Prerequisite: Sophomore standing and permission of instructor. Cr 1-3.

CSD 497 Problems in Communication Sciences and Disorders I
For the advanced student desiring to study a particular problem under the guidance of a member of the staff. May be repeated for credit. Prerequisite: permission. Cr 1-3.

CSD 498 Problems in Communication Sciences and Disorders II
A continuation of CSD 497. May be repeated for credit. Prerequisite: permission. Cr 1-3.

CSD 581 Articulation and Phonology Disorders
Theoretical perspectives on disordered phonology and articulation in children with emphasis on applications related to clinical management. Evaluation, assessment

techniques and strategies for remediation of articulation and phonological disorders. Prerequisite: one course in anatomy and physiology of the speech mechanism and permission. Cr 3.

CSD 582 Voice Disorders
Study of anatomy, physiology and pathology of the voice mechanism. Diagnostic methods, issues related to faulty voice production and current treatment techniques. Evaluation techniques will be employed in the clinical setting. Prerequisite: one course in anatomy and physiology of the speech mechanism and permission. Cr 3.

CSD 583 Fluency Disorders
Fluency disorders from theoretical, etiological and developmental perspectives. Principles of assessment and intervention, including integration of fluency shaping and stuttering modification techniques. Prerequisite: permission. Cr 3.

CSD 584 Language Disorders in Children: Preschool
Theoretical perspectives, contributing factors, special populations and basic assessment and intervention principles. Emphasis on disorders of emerging language in infants, toddlers and preschoolers. Prerequisite: one course in normal language development and permission. Cr 3.

CSD 585 Language Disorders in Children: School-Age
Theoretical perspectives, contributing factors, special populations and basic assessment and intervention principles. Emphasis on disorders of language, literacy and learning in the school-age population. Prerequisite: one course in normal language development and permission. Cr 3.

CSD 586 Current Issues in Clinical Practice
Advanced study of topics related to current professional and clinical issues in speech-language pathology. Topics to be arranged. May be repeated for credit. Prerequisite: permission. Cr 3.

CSD 588 Aural Rehabilitation
Effects of hearing loss upon the educational, social and personal development of children and adults Principles of habilitative and rehabilitative procedures, auditory training and speech reading as approaches to speech and language development in the person who is hard of hearing. Prerequisite: one course in audiology and permission. Cr 3.

Dance (DAN)

DAN 101 Beginner Modern Dance I
Fundamental concepts and practice of modern dance technique: body alignment, stretch/strengthening, movement vocabulary, body coordination, musicality and spatial awareness. For the general student at the beginning dance level. Previous dance training. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 2.

DAN 102 Beginner Ballet I
An introduction to classical ballet dance training. Traditional exercises at the barre and on center floor emphasize body placement, flow of energy, and the creation of expressive movement in space. For the performing artist or general student. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 2.

DAN 103 Beginner Jazz I
Fundamentals of jazz dance technique with emphasis on body alignment, coordination and movement vocabulary. Preparation for expressive movement in relation to modern jazz music. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 2.

DAN 105 Beginner Tap
Teaches the fundamentals of Rhythm tap and Broadway Styles technique with emphasis on body alignment, flexibility, strength, rhythm, coordination and movement vocabulary. Expressive movement is encouraged. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 2.

DAN 112 Production/Rehearsal
Dance production and performance with emphasis on repertory, costuming, lighting in relation to choreography, staging, publicity and rehearsal. May be repeated with permission. (Pass/Fail Grade Only.) Prerequisite: audition or permission. Cr 1.

DAN 121 Beginner Modern Dance II
Builds upon the fundamental concepts and practice of modern dance technique focusing on body alignment, stretch, strengthening, movement vocabulary, coordination, musicality and spatial awareness. Further emphasis on longer dance phrases and musicality. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: DAN 101 or permission. Cr 2.

DAN 122 Beginner Ballet II
Builds upon the fundamentals of classical ballet technique with emphasis on alignment, flexibility, strength, coordination and movement vocabulary. Expressive movement, the execution of ballet 'line', and performance of longer dance phrases will be encouraged. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: DAN 102 or permission. Cr 2.

DAN 123 Beginner Jazz II
Builds upon the fundamentals of lyrical jazz technique and contemporary jazz styles with emphasis on alignment, coordination, and movement vocabulary. Expressive movement in relation to modern jazz music and performance of longer dance phrases will be encouraged. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: DAN 103 or permission. Cr 2.

DAN 130 Ballroom and World Dance Forms
From swing to salsa and waltz to tango, basic social and Latin dance, with emphasis on alignment, coordination, and movement vocabulary. Additional exposure to Afro-Caribbean roots of today's dance forms. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 2.

DAN 201 Intermediate Modern Dance
Continuation of DAN 121. Emphasis on solving more complex movement problems. Provides an enhanced movement vocabulary and further principles of body alignment, stretch/strengthening and musicality and expressiveness. May be repeated for credit. Prerequisite: DAN 121 or permission. Cr 2-3.

DAN 202 Intermediate Ballet
A detailed study of ballet form for the student with some previous training. Students master the execution of exercises and steps with speed, clarity and grace in order to achieve a fuller kinesthetic awareness. Can be used as a base for professional training or general artistic enrichment. May be repeated for credit. Prerequisite: DAN 122 or permission. Cr 2-3.

DAN 203 Intermediate Jazz
A continuation of DAN 123. Further development of principles of movement within the jazz idiom: body alignment, musicality, phrasing, stylistic form and performance awareness. May be repeated for credit. Prerequisite: DAN 123 or permission. Cr 2.

DAN 205 Intermediate Tap
Expands upon the fundamentals of Rhythm Tap and Broadway Styles technique. Complex rhythmic patterns, breaks, and longer combinations are encouraged. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: DAN 105 or permission. Cr 2.

DAN 250 Dance Composition I
Study of the principles and elements of choreography. Provides guided practice in the

construction of movement phrases, and studies for solo and group dances. Includes an informal studio presentation of student pieces. Prerequisite: Prior dance experience or permission. Cr 3.

DAN 266 Dance History
Religious, social and cultural aspects of dance from lineage-based ritual to the present century. Cr 3.

DAN 270 Pilates Conditioning and Functional Anatomy
Teaches mat work to enhance strength, flexibility, and breath. Further work into the function of the skeletal-muscular-neurological systems as they apply to movement efficiency and somatics. Cr 3.

DAN 297 Introductory Topics in Dance
Provides an opportunity for introductory level exploration within a particular dance form, tradition or innovation not covered within the existing course offerings. Specific topics will vary semester to semester. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: Permission. Cr 2.

DAN 301 Advanced Modern Dance
A continuation of DAN 201. Emphasis on performance quality, phrasing and musicality. The advanced dance may develop and expand his/her style and vocabulary. May be repeated for credit. Prerequisite: DAN 201 or permission. Cr 2-3.

DAN 302 Advanced Ballet
A continuation of DAN 202. Emphasis on performance quality, an expansion of balletic and choreographic vocabulary. May be repeated for credit. Prerequisite: DAN 202 or permission. Cr 2-3.

DAN 303 Advanced Jazz
A continuation of DAN 203. Further emphasis on musicality, movement vocabulary and phrasing of advanced floor combinations. May be repeated for credit. Prerequisite: DAN 203 or permission. Cr 2.

DAN 397 Intermediate Topics in Dance
Provides an opportunity for intermediate level exploration within a particular dance form, tradition or innovation not covered within the existing course offerings. Specific topics will vary semester to semester. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: Permission. Cr 2.

DAN 497 Advanced Topics in Dance
Provides an opportunity for advanced level exploration within a particular dance form, tradition or innovation not covered within the existing course offerings. Specific topics will vary semester to semester. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: Permission. Cr 2.

DAN 498 Dance Project/Thesis
A supervised practicum in choreographic process and/or performance accompanied by a written analysis of this practicum. An advanced level research topic, designed jointly by the student and the instructor. Prerequisite: Advanced level technique or permission. Cr 3.

Disability Studies (DIS)

DIS 400 Introduction to Interdisciplinary Disability Studies
Explores the experiences of individuals with disabilities across the lifespan and the philosophies, values and practices that shape current services and supports. Specific issues to be addressed include: diverse definitions of disability services for infants and preschool children, inclusive schools, assistive technology, universal access, the role of various disciplines, recent developments in employment and community living services and advances in medical interventions. Satisfies the General Education Social Contexts and Institutions Requirement and together with DIS 450 satisfies the Ethics Requirement. Prerequisite: 6 credits of coursework in human development and permission. Cr 3.

DIS 450 Seminar in Interdisciplinary Disability Studies
Examines the current trends in disability theory, services and supports for people with disabilities across the lifespan. Students are required to take an active role in class participation. Satisfies the General Education Social Contexts and Institutions Requirement and together with DIS 400 satisfies the Ethics Requirement. Prerequisite: DIS 400 or permission of instructor. Cr 3.

DIS 470 Practicum in Disability Studies
Field experience in university, school and community agencies provides students with opportunities to observe and participate in services and supports for people with disabilities. For students enrolled in the Interdisciplinary Concentration in Disability Studies. Prerequisite: permission. Cr 1-6.

DIS 480 Independent Project in Disability Studies
Individual work on a topic or problem selected by the student. Primarily for students in the Interdisciplinary Concentration in Disability Studies. Prerequisite: permission. Cr 1-6.

DIS 490 Selected Topics in Interdisciplinary Disability Studies
Faculty and students identify and work on selected topics and/or problems related to the area of disability. Focuses on related literature, research, services/supports and materials. Prerequisite: permission. Cr 1-6.

Education-Administration (EAD)

EAD 500 Fundamentals of Educational Leadership
A required introductory examination of the fundamental practices and responsibilities of leadership in educational organizations, including establishment of mission, program articulation, personnel functions and decision-making processes necessary to productive student outcomes. Cr 3.

EAD 510 Educational Supervision
Includes creative supervision, techniques of working with professional staff, improvement of curriculum, observational and evaluation techniques. Prerequisite: EDB 202, EDB 204 or equivalents. Cr 3.

EAD 530 School-Community Relations
Process, policy development and communications related to the formulation and implementation of a comprehensive school-community relations program. Practical approaches to interacting with citizens, media and others will be explored. Prerequisite: EAD 550 or equivalent. Cr 3.

EAD 531 School Law for Administrators
The Constitutional framework, legal issues and state statutes affecting the practice of school administration. Special emphasis on the impact of recent court decisions. Cr 3.

EAD 532 Staff Development for School Leaders
Provides school board members, administrators, teachers and staff the opportunity to further skills and knowledge of staff development. Participants examine the theory and practice of staff development, explore underlying beliefs and assumptions and apply evolving insights in a staff development project that is situated within their own schools and practice. Cr 3.

EAD 550 Theories of Administration I
Introduces concepts and research findings in social and behavioral sciences basic to the educational administrator. Interdisciplinary analysis of administrative problems and organizational behavior. Prerequisite: EDB 202, EDB 204 or equivalents. Cr 3.

EAD 560 Functions and Theories of Educational Leadership
The philosophical foundations for schools

and leadership; organizational theories underlying school management and leadership; and the inter- and intrapersonal dimensions of leadership. Prerequisite: permission. Cr 3-6.

EAD 561 Leadership of Planning and Evaluation
Examination and application of the evaluation and planning cycle in schools through preparation and execution of a program evaluation with colleagues; includes collection of data on programs, personnel and student outcomes. Prerequisite: EAD 560 and EDS 520 or permission. Cr 3.

EAD 562 Group Leadership and Decision-Making in Schools
Introduction to and the application of group dynamics, group leadership and group decision-making in the many contexts encountered by school leaders. Prerequisite: EAD 560 and EAD 561 or permission. Cr 3.

EAD 563 Individual Leadership: Problems, Paradoxes and Possibilities
Provides students a forum to examine inter-personal aspects of school leadership. Students research and prepare strategies in response to leadership dilemmas, then carry them out in simulated situations. Prerequisite: EAD 560, EAD 561 and EAD 562 and permission. Cr 3.

EAD 564 Educational Organizations from a Personal, Social and PoliticalPerspective
Organizational analysis; investigation of the social, political, economic context of organizations; strategies surrounding strategic planning, goal setting and visioning; and change theory and its application. Prerequisite: EAD 560, EAD 561, EAD 562 and EAD 563 or permission. Cr 3.

Education-Adult Education (EAE)

EAE 523 Introduction to Adult/Continuing Education
Overview of purposes, clientele, origins, forms, content, sponsors and organizations of adult/continuing education. Cr 3.

EAE 524 Adult Development and Learning
Examination of learning theory, life span development and aging. Focus on the psychological, sociological, physiological and environmental factors that distinguish adult learners. The concepts and theories studies will be related to adult education and counseling. Prerequisite: permission. Cr 3.

EAE 525 The Teaching/Learning Process with Adults
A critical examination including characteristics of adult learners, needs assessment, methods, group process and resource identification and development. Focus on individual and group instruction. Cr 3.

EAE 526 Community Processes and Leadership in Adult/Continuing Education
An applied examination of the process and strategies of community development in relation to Adult/Continuing Education. Prerequisite: EAE 523 Cr 3.

EAE 527 Program Development and Evaluation in the Education of Adults
The application of theory principles and concepts in program development and evaluation to the social, economic and environmental problems of people and communities, studies through simulation, case study, role playing. Prerequisite: EAE 523 or permission. Cr 3.

EAE 528 Management of Adult Continuing Education Organizations
An introduction to the concept, functions and tasks of management in relation to adult/continuing education organizations. Also examines managerial behavior and style. Prerequisite: EAE 523. Cr 3.

Electrical and Computer Engineering (ECE)

ECE 101 Introduction to Electrical and Computer Engineering
Introduction to the engineering profession as well as information and concepts of general use in Electrical and Computer Engineering. Topics include: exploration of career paths and professional responsibilities, basic use of personal computers, mathematical concepts, development of problem solving skills with professional communication. Students work in teams on projects involving digital and motor control. Rec 3, Lab 1. (Fall.) Prerequisite CEN and ELE majors only or permission. Corequisite: PHY 121. Cr 4.

ECE 105 Explorations in Electrical and Computer Engineering
Teaches non-engineering students the relationships between computers, sensors and mechanical systems. Provides an understanding of how microprocessors interact with mechanical systems to achieve desired results. Students will design, build and program robots to perform simple tasks using a high level language such as C. The class will be primarily hands-on. Cr 3.

ECE 171 Microcomputer Architecture and Applications
The microcomputer and its component parts including microprocessors, registers, memory and I/O. Programming and applying the microcomputer in engineering systems. Lec 3, Lab 3. (Spring.) Prerequisite: at least a C- in each of the following: ECE 101 and MAT 126 and PHY 121 or permission. Cr 4.

ECE 198 Selected Topics in Electrical and Computer Engineering
Topics in electrical engineering not regularly covered in other courses. May include ECE topics suitable for advanced first-year students. Content can be varied to suit current needs. (Fall and Spring.) Prerequisite: permission. Cr 1-3.

ECE 210 Electrical Networks I
Covers basic circuit laws and theorems, op-amp circuits, natural and forced responses of first order systems, phasor concepts, solution of steady-state AC networks, AC power calculations. Lec 3. (Fall/Spring.) Prerequisite: at least a C- in MAT 127, PHY 122. Cr 3.

ECE 211 Electrical Networks II
Natural and forced responses of second order systems, polyphase circuits, magnetically coupled circuits, frequency domain analysis, Bode plots, two-port parameters, Fourier series applications. Lec 3 (Fall/Spring.) Prerequisite: at least a C- in each of the following: ECE 210, MAT 228. Cr 3.

ECE 214 Electrical Networks Laboratory
Provides support for ECE 211. Lab exercise and circuit simulations demonstrate concepts presented in ECE 211. Participants become familiar with circuit simulation, safety and grounding considerations, instrumentation, e.g., oscilloscopes, signal sources, multimeters, and signal analyzers. Also of particular significance will be the development of technical writing skills. Lec 2, Lab 3. (Spring.) Prerequisite at least a C-in ECE 211 or Corequisite: ECE 211. Cr 3.

ECE 275 Sequential Logic Systems
Methods of design and testing for logic systems with memory. Includes procedures and the design of system tests, combinational design, multi-level circuits, logic minimization, sequential design, analysis and optimization and the use of computer tools for logic design. Lec 3. (Spring.) Prerequisite: at least a C- in ECE 171. Cr 3.

ECE 300 Seminar
Exploration of career opportunities, organizational structure of industry and professional responsibilities. (Pass/Fail Grade Only.) Lec 1. (Fall.) Prerequisite: Junior standing. Cr 1.

ECE 314 Linear Circuits and Systems
Analysis of continuous linear time-invariant systems including Fourier series, Fourier transforms, Laplace transform techniques and their applications; transformation and properties of continuous signals and systems,

convolution, transfer functions and state variable system representations. Rec 3. (Fall.) Prerequisite: at least a C- in each of the following: MAT 258, ECE 211. Cr 3.

ECE 323 Electric Power Conversion
AC/DC power conversion, magnetic circuits and transformers, theory, operation and control of electric machines. Prerequisite: at least a C- in ECE 211 or permission. Cr 4.

ECE 331 Introduction to Unix Systems Administration
Topics include hardware and devices, file systems, user management, backup and recovery, application management and network services such as NFS, NIS, DNS, DHCP, electronic mail and Web servers. Problem solving and diagnostic methods, performance tuning, legal and professional issues, ethics and policies and security aspects of hosts on the Internet are discussed. Students gain hands-on experience and complete a project. Lec 3. (Spring.) Prerequisite: at least a C- in COS 231 or equivalent proficiency. Cr 3.

ECE 342 Electronics I
Investigates semiconductor fundamentals of the p-n junction, BJT and MOSFET. Static and low frequency dynamic models are developed and utilized in design and analysis. Explores basic electronic circuit building blocks based on diodes, BJT's MOSFET's and fully-compensated op-amps. Lec 3, Lab 3. (Fall.) Prerequisite: at least a C- in ECE 211, ECE 214. Cr 4.

ECE 343 Electronics II
Introduces design and analysis of semiconductor circuits. Analog networks include amplifiers, power supplies and oscillators. Digital efforts are concentrated in the CMOS and pseudo-NMOS areas with a brief look at the BJT logic. Explores basic concepts of frequency response, feedback and data conversion. Lec 3, Lab 3. (Spring.) Prerequisite: at least a C- in ECE 342. Cr 3.

ECE 351 Fields and Waves
Topics include: static electric and magnetic fields, properties of dielectric and ferromagnetic materials, time varying fields, Faraday's law, Maxwell's equations, plane waves in dielectric and conducting media, calculation of the fields and other properties of common transmission lines. Lec 3. (Fall.) Prerequisite: at least a C- in each of the following: ECE 211, MAT 228, MAT 258. Cr 3.

ECE 383 Communications Engineering
A study of basic principles of modern communication engineering including methods of analysis, modulation techniques, effects of noise, information transmittal. Lec 3. (Fall.) Prerequisite: at least a C- in ECE 314 and CHB 360. Cr 3.

ECE 394 Electrical and Computer Engineering Practice
Work experience in electrical engineering and/or computer engineering. May be repeated for credit. (Pass/Fail Grade Only.) (Fall, Spring and Summer.) Prerequisite: sophomore standing and permission. Cr 1-3.

ECE 401 Electrical and Computer Engineering Design Project
First of a three semester sequence of courses involving the design, implementation and reporting of an engineering device, system or software package by an individual student or small group. Part one: project selection, feasibility studies and proposal writing. (Spring.) Prerequisite: at least a C- in ECE 314, ECE 342, or instructor permission. Cr 1.

ECE 402 Electrical and Computer Engineering Design Project
Second of a three semester sequence of courses involving the design, implementation and reporting of an engineering device, system or software package by an individual student or small groups. Part two: resource location, module debugging, prototype testing. (Fall.) Prerequisite: ECE 401. Cr 4.

ECE 403 Electrical and Computer Engineering Design Project
Third of a three semester sequence of courses involving the design, implementation and reporting of an engineering device, system or software package by an individual student or small group. Part three: written and oral presentation of the completed project. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. (Spring.) Prerequisite: ECE 402. Cr 2.

ECE 414 Feedback Control Systems
Analysis and design of continuous control systems using transfer function and state variable system representations. Covers signal flow graphs and Mason's gain formula, decomposition of transfer functions, controllability and observability, root locus techniques, Routh-Hurwitz criterion, Nyquist criterion, controller design in time and frequency domains, State feedback, phase lead and lag controllers, PID type controllers. Lec 3. (Spring.) Prerequisite: at least a C- in ECE 314, basic knowledge of matrix algebra. Cr 3.

ECE 417 Introduction to Robotics
Introduces robotics and operation of microcomputer-controlled manipulators with their applications in automation. Includes a general review of robot structure, current application of robots in automation, spatial descriptions and coordinate transformations, manipulator kinematics and solutions, robot control and path planning, dynamics and vision in robot application. Lec 2, Lab 3. (Fall.) Prerequisite: at least a C- in COS 215 or COS 220 and MAT 228; knowledge of matrix algebra and some familiarity with basic control and rigid body mechanics suggested. Cr 3.

ECE 427 Electric Power Systems II
Power system models, power flow solutions, fault analysis, protective relaying. Lec 2, Lab 3. (Fall.) Prerequisite: at least a C- in ECE 323. Cr 3.

ECE 431 Introduction to Unix Systems Administration
Topics include hardware and devices, file systems, user management, backup and recovery, application management, and network services such as NFS, NIS, DNS, DHCP, electronic mail and web servers. Problem solving and diagnostic methods, performance tuning, legal and professional issues, ethics and policies and security aspects of hosts on the Internet are discussed. Students gain hands-on experience and complete a project. Prerequisite: COS 220, COS 231 and COS 431 or equivalent and permission. Cr 3.

ECE 434 Biomedical Engineering
A survey of devices and practices in Bioengineering. Describes physiological principles and biomedical devices for the circulatory, respiratory and nervous systems, with engineering emphasis on methods of transduction, signal processing and imaging. Makes frequent use of biomedical research journals in order to balance the theoretical and the applied aspects of the field. Prerequisite: at least a C- in BIO 100 and ECE 342 or permission of instructor. Cr 3.

ECE 435 Network Engineering
Focuses on the engineering aspects of data networks including physical media and interconnections, signals and noise, modulation, multiplexing, frame and packet transmission, routing, network design and network management. Problem solving and diagnostic methods, legal and professional issues, ethics and policies, and security aspects of interconnected networks are discussed. Students gain hands-on experience and complete networking projects. Prerequisite: at least a C- in COS 231 or equivalent proficiency. Cr 3.

ECE 444 Analog Integrated Circuits
Considers topics in the internal circuit design and system applications of analog integrated circuits. Concerns addressed include temperature and power supply sensitivity, gain, bandwidth, stability and I/O

characteristics. Specific topics include current sources, differential amplifiers, level shifters, op-amps, regulators and phase-locked loops. Lec 3. (Spring.) Prerequisite: at least a C- in ECE 314 and ECE 343. Cr 3.

ECE 445 Analysis and Design of Digital Integrated Circuits
Reviews device characteristics with emphasis on switching behavior. Considers ramifications of need for designs to be compatible with IC processing technology. Emphasis on CMOS and ECL based systems. Explores interface and optimization problems as related to timing and loading. Brief look at significant parameters needed for accurate computer modeling. Lec 3. (Fall.) Prerequisite: at least a C- in ECE 342. Cr 3.

ECE 453 Microwave Engineering
Topics include: rectangular and cylindrical waveguides, transmission line models, impedance matching, Smith chart methods, microwave circuits and components, s-parameter measurement techniques and antennas. (Spring.) Prerequisite: at least a C- in ECE 351. Cr 3.

ECE 462 Introduction to Basic Semiconductor Devices and Associated Circuit Models
Introduces the fundamental device material that is basic to electronics-engineering. Initial concepts include diamond (zinc-blende) crystal structure, holes, free electrons, drift, diffusion, and the energy band model. These are then used to explore p-n junction and MOS structures including the extraction of SPICE model parameters. A more detailed look at reasons behind the characteristics of p-n and Schottky diodes, MOSFETs and BJTs follows. The goal is an understanding of the behavior of the basic semiconductor devices, their limitations and their models. If time permits additional topics from the following list will be discussed: Power Semiconductors, Photonic Devices, Semiconductor Reliability. Lec 3. Prerequisite: At least a C- or better in MAT 228, ECE 342. Cr 3.

ECE 464 Microelectronics Science and Engineering
The science and engineering of CMOS and deep sub-micron semiconductor device fabrication. Semiconductor process steps including: diffusion, oxidation, reactive ion etching, chemical etching, surface cleaning, lithography, ion implantation, thin film deposition and chemical-mechanical polishing. A CMOS process flow is outlined. Computer simulation is utilized to provide insight into ion implantation, diffusion and lithography. Lec 3 (Spring.) Prerequisite: at least a C- in CHY 121 and PHY 122. Corequisite: MAT 258. Cr 3.

ECE 465 Introduction to Sensors
Various types of conductometric, acoustic, magnetic, thermal and optical sensors are presented. Techniques for interfacing the sensors using microprocessor control systems and signal processing are discussed. Applications of sensor systems in medicine, environmental monitoring, the automotive industry, the chemical industry, manufacturing and construction are given. (Spring.) Prerequisite: junior level standing in engineering. Cr 3.

ECE 466 Sensor Technology and Instrumentation
Design and fabrication techniques for piezoelectric, thin film, fiber optic and silicon based sensors. Topics include: cutting, polishing and cleaning crystals, the deposition of electrodes and sensing elements and sensor characterization. Students will design, fabricate and test a sensor. Lec 3, Lab 3. (Fall.) Prerequisite: at least a C- in ECE 465 or permission. Cr 4.

ECE 471 Microprocessor Applications Engineering
Application of micro-processors to the solution of design problems, including hardware characteristics, peripheral control techniques and system development. Lec 2, Lab 3. (Fall.) Prerequisite: at least a C- in ECE 171. Cr 3.

ECE 473 Computer Architecture and Organization
Historical computers and topics of importance in the design of modern computer systems including memory technology, memory system design, and parallel processing. Lec 3. (Fall.) Prerequisite: at least a C- in ECE 471. Cr 3.

ECE 477 Hardware Applications Using C
Emphasizes the use of the C programming language to control hardware devices. Review of the necessary features of the C programming language will be included. Lec 3. (Spring.) Prerequisite: at least a C- in ECE 171, COS 220 or instructor's permission. Cr 3.

ECE 478 Industrial Computer Control
Design of computerized systems for industrial applications. These include programmable logic controllers, personal computers and embedded controllers. Interface electronics, communication strategies, design for hostile environments, fault tolerance and fail safe design will also be covered. Lec 3. (Spring.) Prerequisite: at least a C- in COS 220 or instructor's permission. Cr 3.

ECE 484 Communications Engineering II
Topics include: digital communication systems, multiplexing, signal space, information theory and coding. Lec 3. Prerequisite: at least a C- in ECE 383. Cr 3.

ECE 486 Digital Signal Processing
A study of discrete-time signals and systems, Z-transforms, discrete Fourier series and transforms. Efficient implementations of discrete-time system and design of IIR, FIR and multirate digital filter structures. Lec 3, Lab 3. (Spring.) Prerequisite: at least a C- in ECE 314 and COS 220. Cr 3.

ECE 498 Selected Topics in Electrical and Computer Engineering
Topics in electrical engineering not regularly covered in other courses. May include advanced microprocessor applications, robot applications, instrumentation semiconductor technology, introduction to VLSI design and microwave acoustics. Content can be varied to suit current needs. May be repeated for credit, with departmental permission. (Fall and Spring.) Prerequisite: permission. Cr 1-3.

ECE 512 Linear Systems Analysis
Analysis of linear dynamic systems using matrices and linear vector spaces, internal and external models, state variable analysis, controllability and observability, stability. (Spring.) Prerequisite: ECE 314, MAT 262. Cr 3.

ECE 515 Random Variables and Stochastic Processes
Engineering applications of probability theory. Analysis of random variables, random processes and stochastic models. Introduction to the analysis and optimization of linear systems with random inputs. Lec 3. (Fall.) Prerequisite: graduate standing, MAT 332 or equivalent. Cr 3.

ECE 523 Mathematical Methods in Electrical Engineering
Application of advanced mathematical methods to problems in electrical engineering. Topics include conformal mapping, calculus of variations, and difference equations. Lec 3. (Spring.) Prerequisite: ECE 512 or permission. Cr 3.

ECE 533 Advanced Robotics
Introduces intelligent robot control system and programming. Robot dynamical equations, path planning and trajectory generation, control system, off-line simulations, robot languages and vision integration in robot applications will be discussed. Lec 2, Lab 3. (Spring.) Prerequisite: ECE 417. Cr 3.

ECE 535 Computer Vision
Topics include: image generation, the physics of images and sensors, binary images, image processing and understanding, computational methods for recovery and representation of visual information, review of available vision

ystems and their applications in automation. Lec 2, Lab 3. (Spring.) Prerequisite: COS 215 or COS 220 and ECE 314 or equivalent. Cr 3.

ECE 543 Microelectronic Devices I
Physics, engineering and design of deep-submicron Si devices used in microelectronic circuits; non-Si devices used for Photonics; and novel quantum-mechanical single-electron devices. (Fall.) Prerequisite: ECE 343. Cr 3.

ECE 547 VLSI Design/Layout
Integrated circuit design methodologies. Semi-custom ASICs, logic synthesis and simulation, design automation techniques and designing for testability. Chips designed in this course will be fabricated and tested in ECE 548. (Fall.) Prerequisite ECE 343. Corequisite: ECE 445 or ECE 444. Cr 3.

ECE 548 VLSI Test/Characterization
Laboratory course covering the testing and characterization of integrated circuits designed in ECE 547 and fabricated externally. (Pass/Fail Grade Only.) (Spring.) Prerequisite: ECE 547. Cr 1.

ECE 550 Electromagnetic Theory
Reviews of Maxwell's Equations and waves in dielectric and lossy unbounded and layered media. Covers plane cylindrical and spherical wave functions; reflection and transmission properties of layered media, electromagnetic radiation and antenna theory. Lec 3. (Spring.) Prerequisite: ECE 351 or equivalent. Cr 3.

ECE 552 Wave Propagation
Theory of the propagation of electromagnetic and sound waves in unbounded and layered isotropic and anisotropic solids and liquids. Specific applications to wave propagation in the ocean and crystals are also presented. Lec 3. (Summer.) Prerequisite: ECE 453 or permission. Cr 3.

ECE 565 Solid State Device Theory I
A study of physical principles underlying solid state devices. Topics include: crystalline structure, x-ray diffraction, reciprocal space, lattice vibrations, phonons, specific heat and introduction to quantum mechanics. Lec 3. (Fall.) Prerequisite: permission. Cr 3.

ECE 571 Advanced Microprocessor-Based Design
Includes techniques for developing software and hardware for microprocessor-based systems, computer aided design using a multistation logic development system, use of components commonly found in microprocessor-based systems. Lec 2, Lab 3. (Spring.) Prerequisite: ECE 471 or permission. Cr 3.

ECE 573 Microprogramming
Fundamentals of microcoding and the design of microcoded systems including bit slice design. Lec 2, Lab 3. (Fall.) Prerequisite: ECE 471, ECE 475. Cr 3.

ECE 577 Fuzzy Logic
Covers the fundamentals of fuzzy logic and its application in control, model identification, information systems and pattern recognition, as well as in conjunction with artificial neural networks and genetic algorithms. Prerequisite: ECE 477 or permission. Cr 3.

ECE 580 Communications Engineering
Topics include: probability theory, random processes, optimum receivers, vector channels, matched filters, block orthogonal signaling, time-bandwidth product, channel capacity, and implementation of coded systems. Lec 3. (Spring.) Prerequisite: ECE 515 or equivalent. Cr 3.

ECE 581 Estimation and Detection Theory
Mathematical fundamentals of optimal signal-processing strategies. Neyman-Pearson and Bayes Detectors applied to radar and sonar systems. Maximum Likelihood and Bayes Estimators and applications. (Spring.) Prerequisite: ECE 515. Cr 3.

ECE 590 Neural Networks
Introduces artificial neural networks. Provides supervised and unsupervised learning in single and multi-layer networks, software implementation, hardware overview. Applications in pattern recognition and image analysis. (Fall.) Prerequisite: permission. Cr 3.

ECE 598 Selected Advanced Topics in Electrical and Computer Engineering
Advanced topics not regularly covered in other courses. Content varies. May be repeated for credit. (Fall and Spring.) Prerequisite: permission. Cr 1-3.

ECE 599 Selected Study in Electrical and Computer Engineering
Advanced independent study for qualified students who present suitable projects for intensive investigation in the area of faculty interest. (Fall/Spring.) Prerequisite: permission. Cr 1-3.

Economics (ECO)

ECO 107 The World Economy: Changes and Challenges
Introduces the world economy as a transnational economic system and describes its basic structure for allocating and distributing economic resources. Covers such issues as: international trade and capital flows; international financial institutions; comparative economic growth and development; economic effects of world population growth and demographic change. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

ECO 120 Principles of Microeconomics
Principles of microeconomics and their application to economic issues and problems. Analysis of the economic decision-making of individuals and firms; markets and pricing; monopoly power; income distribution; the role of government intervention in markets. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

ECO 121 Principles of Macroeconomics
Principles of macroeconomics and their application to modern economic issues and problems. Analysis of national income and employment; fluctuations in national income; monetary and fiscal policy; control of inflation, unemployment, and growth; and international aspects of macroeconomic performance. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

ECO 310 Introduction to Economics/ Accelerated
An accelerated introduction to the principles of micro- and macro-economics for those preparing for graduate school who have not taken an introductory economics course. Theories of business and consumer behavior. Competitive and non-competitive markets. The determination of national income. Monetary theory and policy. Government regulatory, budgetary and fiscal policy. Principles of international trade and finance. Prerequisite: baccalaureate degree or senior standing and permission of the instructor. Cr 3.

ECO 329 Global Political Economy
Description, analysis and evaluation of the newly emerging global economy. Systematic and holistic assessment of the origins, characteristics and institutions of the global economy in light of economic and other social science theories. Topics include political, economic and technological changes at the global level, transnational corporations, international monetary institutions (World Bank, International Monetary Fund) and the implications of globalization for the relevance of traditional economic theory and policy. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 333 Labor Markets and Human Resource Development
Topics include: labor market dynamics, the structure of labor markets, preparation for employment, labor market problems of special groups, remedial manpower programs, labor markets and public policy. Satisfies the General Education Ethics Requirement. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 335 History of Economic Thought
Survey of basic economic principles and theories from preindustrial times to present. Emphasis on the Classical School (Smith, Ricardo, and Malthus) and its critics, the development of the Austrian School, the synthesis of Neo-Classicism and emergence of macroeconomics. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission. Cr 3.

ECO 336 Marxian Economics
A dynamic macro-analytical critique of the functioning of a capitalist society. Covers theoretical comparisons with orthodox economic theory and an introduction to American radicals (neo-Marxian) and their thought. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission. Cr 3.

ECO 338 Economic Development
Theories and practices of interregional and international economic development. Emphasis on development problems of emerging nations. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 339 International Finance
Analysis of the fundamental characteristics of an open macroeconomy including exchange rate determination, balance of payments adjustment, income determination, financial flows, effect of monetary and fiscal policies on exchange rates, economic integration and global monetary issues. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ECO 120 and ECO 121. Cr 3.

ECO 340 Canadian Economics: Issues and Policies
Survey of the structure and functioning of the Canadian economic system, its problems and the policies used to solve them. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 343 North American Economic Integration
Covers the emergence of trading blocs in North America and the conflict involved in the passage of North America Free Trade Agreement (NAFTA). Also covers the economic costs and benefits for Canada, the United States and Mexico (including the relocation of production and job loss). The future of North American economic integration will be addressed. Satisfies the General Education Western Cultural Tradition Requirement. Cr 3.

ECO 353 Money and Banking
Examines the American banking and financial system including monetary theory and policy. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 368 Economics of Regulation
Examination of the institutions and economic issues related to public utility regulation in the United States. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 370 Topics in Economics
Includes readings, research and discussions. Topics vary depending on faculty and student interests. Prerequisite: ECO 120 and ECO 121 or permission. Cr 1-3.

ECO 371 Public Finance and Fiscal Policy
Covers public expenditure theory, principles of taxation, the federal budget and alternative budget policies, federal tax policy, fiscal policy for stabilization, federal debt. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: ECO 120. Cr 3.

ECO 372 State and Local Government Finance
Topics include: development of the federal system, fiscal performance, intergovernmental fiscal relations, state and local revenue systems, budgetary practices, state and local debt. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 399 Readings in Economics
Supervised readings or research in topics not covered by regular course offerings. Prerequisite: ECO 120 and ECO 121 and permission. Junior or senior standing. Cr 3.

ECO 420 Intermediate Microeconomics
A study of theories of consumer behavior, markets ,the firm, and distribution. Prerequisite: ECO 120 and ECO 121, or equivalent with permission. Cr 3.

ECO 421 Intermediate Macroeconomics
Analysis of the basic forces that cause fluctuations in economic activity and their effects on employment, investment, and business firms. Stabilization proposals examined and evaluated. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

ECO 443 Introduction to Modern Economic Growth
An introduction to the empirical aspects of economic growth and an exploration of the major determinants of growth and decline, including the roles of technological progress and research and development, human capital accumulation, technology transfer, intellectual property rights and other socio-political institutions. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: ECO 420. Cr 3.

ECO 445 Urban-Regional Economics
Economics of business and household location decisions and the formation and spatial distribution of urban places. Economics of land rent, intraurban land use allocation, and the suburbanization of households and businesses. Economics of urban and regional growth and decline and the effects of public policies involving taxation, industry subsidies, public service and infrastructure supply and environmental regulations and quality. Prerequisite: ECO 420 or the equivalent with permission. Cr 3.

ECO 449 International Trade
An examination of the microeconomics foundations of international trade, including the historical evolution of theories that explain the international exchange of goods and services. Focus will be on the "real trade theory" and on major emerging policy issues in international trade, including growth in the volume of international trade and the benefits and costs of the removal of trade barriers through international trade agreements. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: ECO 420. Cr 3.

ECO 470 Topics in Economics
Includes readings, research, and discussions. Topics vary depending on faculty and student interests. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: ECO 420 and ECO 421 or permission. Cr 1-3.

ECO 475 Industrial Organization
Explores the relationship between market structure, conduct and performance. Development of a general analytical framework to assess performance in existing markets and evaluation of current public

policy on this basis. Satisfies the General Education Social Contexts and Institutions, Writing Intensive and Capstone Experience Requirements. Prerequisite: ECO 420. Cr 3.

ECO 480 Introduction to Mathematical Economics
Mathematics used as a language in presenting concepts of economic theory. Satisfies the General Education Mathematics Requirement. Prerequisite: ECO 420, ECO 421, MAT 114 or MAT 126. Cr 3.

ECO 485 Introduction to Economic Statistics and Econometrics
Surveys the application of probability and statistics to economic problems. Emphasis on construction and testing of economic hypotheses. Practical application of regression techniques, including use of computer, occupies second half of course. Strong algebra skills required. Satisfies the General Education Mathematics, Writing Intensive and Capstone Experience Requirements. Prerequisite: ECO 420 or ECO 421, MAT 215. Cr 3-4.

ECO 496 Field Experience in Economics
Supervised employment in either the public or private sector. Requirements include initial proposal showing relevance of job and final report or paper. Prerequisite: 400-level eco-nomics course in relevant area of work. Cr 3.

ECO 499 Readings in Economics
Supervised readings or research in topics not covered by regular course offerings. Offered at student request. (May be repeated for credit.) Prerequisite: ECO 420 and ECO 421 and permission. Junior or senior standing required. Cr 3.

ECO 511 Macroeconomic Theory
An examination of the development of modern economic analysis with regard to employment, income distribution, and stabilization policies. Prerequisite: permission. Cr 3.

ECO 524 Advanced International Finance
Analysis of the fundamental characteristics of an open macroeconomy including exchange rate determination, balance of payments adjustment, income determination, financial flows, effect of monetary and fiscal policies, economic integration, and global monetary issues. (May not be offered every year.) Prerequisite: ECO 421 and permission. Cr 3.

ECO 525 Advanced Topics in Economic Development
Presents concepts, tools and models in contemporary economic theory relevant to development problems. Also explores applications to public policy. (May not be offered every year.) Prerequisite: ECO 420, ECO 421 and permission. Cr 3.

ECO 529 Readings in Economics
Specialized topics in economics pursued by the student on an independent basis. Prerequisite: permission. Cr 3.

ECO 533 Economics of Human Capital
Considers the role of human capital theory in understanding labor market outcomes and in policy decisions involving the allocation of funds to education and training programs. (May not be offered every year.) Prerequisite: ECO 420 and permission. Cr 3.

ECO 545 Advanced Regional Economics
Theories of the development of subnational economic regions, principally in the United States. Factors that influence firm and household interregional location and migration decisions. The impact of public policy on growth and adjustment. Attention to econometric evidence is emphasized. (May not be offered every year.) Prerequisite: INT 514. Cr 3.

ECO 565 Graduate Economics Practicum
Presents material on conducting and presenting economic research, with an emphasis on application to economic policy. Requires completion and presentation of a substantial research project. Prerequisite: permission. Cr 3.

ECO 590 Advanced Topics in Economics
Theoretical and empirical analysis of one or more major economic policy issues. (May not be offered every year.) Prerequisite: ECO 420 and ECO 421 and permission. Cr 3.

ECO 595 Graduate Internship in Economics
Limited to graduate students who choose the internship option. Internships in public or private institutions in situations requiring application of economic theories and methodologies. Written reports are required. Prerequisite: Prior approval of student's graduate committee. Cr 3-6.

Education-Measurement and Testing (EDA)

EDA 521 Evaluation of Instruction
A basic course for elementary and secondary school teachers. Emphasis on utilizing various strategies of evaluation in classroom and school. Prerequisite: EDB 202 or permission. Cr 3.

EDA 570 Models of Educational Evaluation
A study of the different models of educational evaluation including procedures for designing and implementing both formative and summative evaluation studies. Prerequisite: EDA 520 or equivalent. Cr 3.

Education-Basic Professional (EDB)

EDB 202 Schools, Students, and Society
An interdisciplinary examination of the school-society relationship in the United States. Examines and evaluates the political, economic, social, and academic purposes and ethical issues that shape teaching and schooling practices and policies. Satisfies the General Education Social Context and Institutions and the Writing Intensive Requirements. Prerequisite: ENG 101 or equivalent. Cr 3.

EDB 204 The Teaching Process
Examines procedures of instructional planning, including improved use of small groups, classroom space, and appropriate teaching materials; measurement, evaluation, and reporting of pupil learning. Prerequisite to student teaching in all regular under-graduate programs. Prerequisite: teacher candidacy approved minor or permission. Cr 3.

EDB 221 Educational Psychology
A scientific study of human development, learning, cognition and teaching. Emphasis on theory and research and their application to educational problems. Prerequisite: PSY 100 and sophomore standing. Cr 3.

EDB 504 Inquiry Into Teaching and Learning
Explores the substance of classroom instruction and student learning. Current research and practice in teaching, learning, school culture and context will serve as the foundation. Prerequisite: Admission to the Master of Arts in Teaching Program. Cr 3.

Education-Curriculum (EDC)

EDC 333 Curriculum Development and Evaluation
Provides the prospective teacher with an overview of theory and research in the field of curriculum, plus "hands-on" experience in curriculum development. Historical, philosophical and sociological perspectives on both the explicit and the hidden curriculum. Exploration and guided practice in the processes of writing and evaluating curricula for local school districts. Prerequisite: EDB 202, EDB 204, EDB 221. Cr 1. 5 - 3.

EDC 524 Curriculum and Organization of Middle Schools and Junior High Schools
A thorough exploration of the educational program for pre and early-adolescents, including growth and development issues, curriculum planning processes, curriculum development in various subject areas and across subjects, and organizational issues. Cr 3.

EDC 533 Dynamics of the Curriculum
Examines problems and issues of curriculum development common to all areas of instruction and all educational levels. Provides an opportunity to acquire concepts and skills which may be applied to the curriculum development process in local school districts. Prerequisite: EDB 202, EDB 204, EDB 221 or equivalents. Cr 3.

EDC 595 Leadership in Curriculum Design for Administrators/Supervisors
Role function and practices for the curriculum leader. Prerequisite: EDC 533 or permission. Cr 3.

Education-General (EDG)

EDG 298 Teacher Candidacy Field Experience
Students will observe in educational settings social agencies or working with K-12 schools, complete field experience guidelines report and assist teachers and professionals. May be repeated for a total of three credits. Prerequisite: permission. Cr 1-3.

EDG 400 Field Observation (Activity)
Study of education programs through visits, consultation and appraisal of practices in selected schools, instructional centers, clinics, laboratories and community agencies. Observations are considered in relation to research theory and practice. Corequisite: To be taken in conjunction with methods course(s). Cr 1-6.

EDG 498 Problems in Education
Individual work on a problem selected by the student. Primarily for Education majors. Cr Ar.

EDG 499 Alternative Practicum and Seminar in Education
A combined practicum and seminar course drawing upon academic and professional course work. Students examine and reflect on their understandings about teaching and learning, apply integrated educational skills and knowledge in contexts other than K-12 classrooms and fitness settings, and develop projects that synthesize academic and professional experiences. Satisfies the General Education Capstone Experience Requirement. Prerequisite: At least senior standing required and completion of all other program requirements or permission. Cr 3-6.

EDG 595 Educational Research
Evaluates selected research in education in relation to the appropriateness of the design to the stated purpose of the study. Students select and present research problem with special attention to design and studies related to it. Prerequisite: EDS 521. Cr 3.

Education-History and Philosophy (EDH/EDM)

EDH 500 Seminar in Social Context of Education
Considers competing interpretations of the relationship between schools and society, the impact of race, class, and gender on education, and issues of continuity and change in policy and practice. Cr 3.

EDH 501 Social Context of Education
Provides a theoretical framework for analyzing the influences of schools, families, communities, government policies, society and culture on student learning and classroom interactions, along with exploration of specific illustrative examples of importance to beginning teachers. Prerequisite: Admission to the Master of Arts in Teaching Program. Cr 3.

EDH 540 Students at Risk and Their Families
Examines the roles of educational personnel in addressing the needs of students at risk in the context of contemporary schooling and family life. Identifies various "at risk" categories. Considers implications for school improvement programs, individual intervention, referrals to community services and community action coalitions. Cr 3.

EDM 520 Teaching in Middle School/Junior High School
Reviews the unique demands that children in grades five through eight place on teachers as a direct result of normal developmental patterns. Focus on specific teaching behaviors that deal effectively with each of these demands, with special attention to problems of peer influences, periodicity of brain growth, and effects of uneven growth patterns. Prerequisite: teaching experience or permission. Cr 3.

Education-Research (EDS)

EDS 500 Directed Readings (area)
Opportunity to read in a particular area of education under faculty direction. Prerequisite: Masters and CAS level and permission. Cr Ar.

EDS 510 Introduction to Educational Research
For graduate students in education and related fields. Topics include: locating educational research reports, abstracting and evaluating sources, understanding statistical symbols, examining inquiry methodology and communicating about research. Designed for consumers of research. Lec 3. Prerequisite: permission. Cr 3.

EDS 520 Educational Assessment
An introduction to the concepts, principles and practices associated with design and conduct of assessments in education. Teacher-made assessments, standardized achievement tests and large-scale assessments will be considered. Cr 3.

EDS 521 Statistical Methods in Education I
Introduction to descriptive and inferential statistics as applied to education and human behavior. Emphasis on parametric statistics. Cr 3.

EDS 522 Statistical Methods in Education II
Builds on the statistical foundation provided in EDS 521. Topics include: power analysis, factorial and repeated-measures analysis of variance, multiple regression and factor analysis. Students use statistical software for data analysis. Prerequisite: EDS 521 or equivalent. Cr 3.

EDS 569 Seminar in Educational Leadership
Discussion and reports structured around a series of topics on organizational theory, educational leadership practice and a list of readings. Cr 3.

EDS 571 Qualitative Research: Theory, Design and Practice
Examination and use of phenomenological approaches to social science research, emphasizing ethnographic methods in education and human service settings. Field work required. Typically offered over two semesters. Prerequisite: EDS 521 or equivalent and permission. Cr 3.

Education-Telecommunications (EDT)

EDT 400 Computers in Education
An introduction for students majoring in education. Nature and use of the computer and its impact on the curriculum and other areas of education are studied. Laboratory experience in developing practical programs using the computer included. Prerequisite: permission. Cr 3.

EDT 500 Summer Technology Institute
A one week summer technology immersion designed to help classroom teachers plan how to integrate new technologies into their existing classrooms. Cr 3.

EDT 520 Technology Tools for K-12 Schools
Provides practical and understandable information about integrating technology in K-12 classrooms. Examines tool applications (WD, DB, SS and Telecommunications), multimedia and categories of software. Explores ways these support learning. Prerequisite: EDT 400 or permission. Cr 3.

EDT 525 Telecommunication in K-12 Classrooms
Telecommunications used to support teaching and learning in K-12 environments. Prerequisite: EDT 400 or EDT 520 or permission. Cr 3.

EDT 527 Networking and Troubleshooting Basics for Educators
The basics of networking and troubleshooting for designing, building and managing a Local Area Network (LAN) in a classroom environment. Prerequisite: EDT 520. Cr 3.

EDT 530 Introduction to Hypermedia in Education
Presents hypermedia tools for Macintosh and/or PC platforms. Emphasizes writing code for Hypermedia applications. Prerequisite: EDT 400 or EDT 520. Cr 3.

EDT 535 Multimedia Design for Teaching and Learning
Develops skill in educational multimedia design and development using educational software found in most schools. Prerequisite: EDT 530. Cr 3.

EDT 540 Instructional Design
Principles of strategic and systematic design, implementation and evaluation of instruction with emphasis on integration of technology. Prerequisite: EDT 520. Cr 3.

EDT 550 Production and Application of Educational Video
Examines roles of video in education and the technology behind video as an information medium. Prerequisite: EDT 520. Cr 3.

EDT 555 Computers and Cooperative Learning
Strategies for using computer technology in cooperative learning environments. Topics include theoretical explanations of cooperative groups, online cooperative learning projects, criteria for evaluating resources and lesson plans. Cr 3.

EDT 560 Applying Technology to Assessment in Education
Evaluation and integration of technology-based assessment tools for K-12 schools, including electronic portfolios, digital grading programs and relational databases. Prerequisite: EDT 540 and EDS 520. Cr 3.

Education-General (EDU)

EDU 580 Educational Institute (Activity)
Provides understanding and insight into areas of special concern including education of teachers of the disadvantaged and retarded, guidance counselors, reading specialists, social studies teachers and school administrators. Attention given to literature, research, practices and materials. Cr 1-6.

EDU 590 Topics in Education
Concentrated study of designated topics in education. Topics may vary depending on faculty and student interest. May be repeated for credit. Some sections may have prerequisites beyond the following. Prerequisite: Graduate student or permission. Cr 1-3.

Education-Workshops (EDW)

EDW 462 Workshop in Elementary Education (Activity)
Designed to increase the competence of the elementary school teacher, supervisor, curriculum director, administrator, and other school personnel. Considers literature, research and materials concerned with a special aspect of elementary education. Cr 1-6.

EDW 472 Workshop in Secondary Education (Activity)
Designed to increase competence of the teacher, administrator, and other school personnel. Considers literature, research and materials concerned with a special aspect of secondary education. Cr 1-6.

Education-Early Literacy (EEL)

EEL 531 Observing Young Learners to Inform Instruction
Observation of student performance, classroom management, literacy instruction, instructional materials and building a K-2 team. Emphasis is on teacher decision-making to assist literacy growth in the lowest achieving students. Prerequisite: Must currently be teaching at the K-2 level and permission. Cr 3.

EEL 532 Literacy Collaborative: Good First Teaching
Through formal course instruction and individual coaching, practicing teachers in grades K-2 explore the theoretical framework of literacy development for 5-8 year olds. Emphasis is on using framework to build literate environments, assessments to inform instructional decision-making and to support student learning. Prerequisite: Literacy Collaborative Schools. Cr 3.

EEL 546 Teaching and Learning in Early Literacy
Explores frameworks for understanding, thinking and learning (e.g., behaviorist, information processing, socio/cultural, biological) and the influence of these frameworks on literacy instruction. Includes stage theories of child development, theories of language development, research on neurological development and the role of the home and school in influencing language and cognition. Cr 3.

EEL 547 Clinical Practices in Teaching Young Children with Reading Difficulties I
Prepares non-Reading Recovery teachers in a school-based Reading Recovery center to teach young children with reading difficulties. Focuses on observing, recording, and analyzing children's literacy behaviors. Participants are required to tutor two Reading Recovery children daily. Prerequisite: working in a district implementing Reading Recovery. Cr 3.

EEL 548 Clinical Practices in Teaching Young Children with Reading Difficulties II
Participants build on observation skills learned in EEL 547 and focus on instructional implications for teaching children with reading difficulties. Topics include teaching for independent learning, fostering reading strategies and acceleration of learning. Participants are required to tutor two Reading Recovery children daily. Prerequisite: EEL 547; working in a school district implementing Reading Recovery. Cr 3.

Ecology and Environmental Science (EES)

EES 100 Human Population and the Global Environment
Introduces the concepts and principles necessary to evaluate contemporary global issues of population growth, natural resource conservation and environmental protection. Surveys the historical development of environmental awareness in the United States. Develops skills to interpret critically the diverse types of information available about environmental issues. Satisfies the General Education Population and the Environment Requirement. Cr 3.

EES 117 First Year Seminar in Ecology and Environmental Sciences
An introduction to University life and the requirements of the Ecology and Environmental Sciences Program. Emphasis on building skills in use of information resources, writing and oral presentations. Prerequisite: First Year Students in Ecology and Environmental Sciences. Cr 1.

EES 324 Environmental Protection Law and Policy
A survey of the law and policy of environmental protection in the United States with emphasis on Federal statutes and common law approaches to environmental protection. Material covered will include the

basic statutes, the administrative law, the case law of air quality, water quality, hazardous substances and the National Environmental Policy Act. Students will develop an understanding of how the legal process works in the context of specific environmental case studies and will be encouraged through class dialogues and exercises to develop their analytic skills. Satisfies the General Education Population and the Environment Requirement. Prerequisite: POS 100. Cr 3.

EES 350 Principles of Environmental Science
The principles of environmental science grounded in the flows of chemicals and energy through natural systems on one hand and our industrial society on the other. Deals with energy and pollution issues emphasizing atmospheric issues as the illustrative examples. The student will learn a basic understanding of the scientific principles governing environmental processes and how human activities, particularly pollution, interact with and affect these processes. Essential for anyone wishing to pursue a meaningful career in environmental science. Satisfies the General Education Population and the Environment Requirement. Lec 3. Prerequisite: CHY 121 and MAT 122 or permission. Cr 3.

EES 396 Field Experience in Ecology and Environmental Sciences
Approved work experience for which academic credits is given. Students may work part time or full time for a semester in an approved program of work experience which contributes to the academic major. Students have the opportunity to gain practical experience in a job related to their professional career goals. (Pass/Fail Grade Only.) Prerequisite: Junior standing and permission. Cr 1-16.

EES 397 Topics in Ecology and Environmental Sciences Conservation and Management
The conservation and management of natural resources entail dynamic social, economic, and scientific problems. Students investigate a natural resource topic of current national or international concern. Topics vary; course may be repeated for credit. Prerequisite: Ecology and Environmental Sciences major or permission of instructor. Cr 1-3.

EES 400 Senior Paper in Ecology and Environmental Sciences
Students select a problem in natural resource utilization, management, or policy, and prepare a detailed research paper on the topic. Each student will work closely with one of the program faculty in Ecology and Environmental Sciences. . Satisfies the General Education Writing Intensive Requirement and together with NRC 489 satisfies the Capstone Experience Requirement. Prerequisite: Ecology and Environmental Sciences seniors. Cr 3.

EES 424 Environmental Assessment and Management Techniques
An exploration of Federal, state and private sector techniques for environmental impact assessment and management. Develops the general techniques for environmental assessment and management and then will use three current applications to show their applicability. These applications include: National Environmental Policy Act (NEPA); Maine's Site Location of Development Law; and ISO 14000, a predominantly private sector framework for environmental management developed by the International Organization for Standardization. Prerequisite: Junior or senior standing in Ecology and Environ-mental Sciences or Environmental Man-agement and Policy or permission. Cr 3.

EES 489 Critical Issues in Ecology and Environmental Sciences Policy
Current and historically important issues in natural resource management and conservation are evaluated by teams of students and faculty. Interdisciplinary approaches to problem analysis are stressed, with special attention to the ways scientific information and management options affect policy. Together with EES 400 Satisfies the General Education Capstone Experience Requirement. Prerequisite: Ecology and Environmental Sciences seniors. Cr 3.

EES 497 Independent Studies in Ecology and Environmental Sciences
Analysis and investigation of current problems in ecology and environmental sciences in consultation with a faculty member in the program. May be repeated for additional credit. Prerequisite: Ecology and Environmental Sciences majors Cr 1-3.

EES 590 Special Topics in Ecology and Environmental Science
Study of advanced topics in ecology and environmental science, with particular focus on interdisciplinary analysis of ecological interactions at the population, community, ecosystem and landscape levels. Prerequisite: permission. Cr 1-3.

Electrical Engineering Technology (EET)

EET 100 Introduction to Electrical Engineering Technology
Develops a thorough insight into the engineering profession and covers important topics such as success in the classroom, problem-solving and teamwork skills, computer tools for engineers, technical communication and ethics. Also of particular importance will be an engineering design project. The development of project documentation and technical writing skills will be emphasized. Satisfies the General Education Writing Intensive Requirement. Lec 3. (Fall.) Prerequisite BET majors only or permission. Corequisite: ENG 101 or permission. Cr 3.

EET 111 DC Circuit Analysis
Introduction to circuit analysis techniques as applied to d-c electrical circuits. Topics include the basic laws and theorems used in linear circuit analysis. Includes basic computer skills and circuit simulation and numerical computation using spreadsheet programs. A design project is required. Lec 3, Rec 1, Lab 3 (Fall.) Corequisite: TME 151. Cr 4.

EET 112 AC Circuit Analysis
Introduction to a-c circuits, including the study of reactive components, passive filter circuits and the application of phasor analysis to steady state single-phase a-c circuits. Includes a design project. Lec 3, Rec 1, Lab 3 (Spring.) Prerequisite: EET 111 and TME 151. Cr 4.

EET 174 Introduction to Microcomputers
The basic architecture of the microcontroller with particular emphasis on the control and I/O sections. Structured assembly language programming of the microcontroller. Series and parallel data transfer. Analog-to-digital conversion principles. A design project will give students hands-on experience in hardware and software design and testing using microcontrollers. Lec 3, Lab 3. (Spring.) Cr 4.

EET 241 Analog Circuit Fundamentals
Topics include: semiconductor diodes, biopolar transistors, FETs, operational amplifier fundamentals, d-c and a-c analysis and design of single-transistor end FET amplifiers, hybrid pi circuits. Software simulation of circuits is integral to the course. A design project is required. Lec 3, Lab 3. (Spring.) Prerequisite: EET 112. Cr 4.

EET 275 Digital Electronics
Major topics: combinational and sequential digital logic design with SSI, MSI and programmable logic devices, Boolean algebra, truth tables, timing diagrams, Karnaugh maps. Industrial design examples are used throughout the course. A design project is required. Lec 3, Lab 3. (Fall.) Cr 4.

EET 276 Applications of Microcomputer Systems
A continuation of EET 174. Emphasis on the industrial application of microcontrollers.

Major topics are: Memory systems design, programmable communications interfaces and I/O ports, processor timing analysis, interface hardware and supervisory program design, interprocessor communications, synchronous and asynchronous data communications protocols. A design project is required. Lec 3, Lab 3 (Spring). Prerequisite: EET 174. Cr 4.

EET 321 Industrial Power and Sequential Automation
Covers three-phase power, power system supply and distribution, magnetic circuits and transformers, industrial control and communication protocols and programmable controllers. Lec 3, Lab 3 (Spring.) Prerequisite: EET 112. Corequisite: TME 354. Cr 4.

EET 330 Electrical Applications
Introduces the basics of AC and DC circuits along with analog and digital circuit principles, amplifiers and transducers. The laboratory will provide students with hands-on experience with the principles and instrumentation commonly used in industry. Lec 3, Lab 3 (Fall.) Prerequisite: BMT majors or permission. Cr 4.

EET 342 Advanced Analog Circuit Design
Topics include: differential amplifiers, dc and ac analysis of multi-transistor circuits, multi-transistor amplifier frequency analysis, power amplifiers and operational amplifiers. Software simulation of circuits is integral to the course. A design project is required. Lec 3, Lab 3. (Fall.) Prerequisite: EET 241. Cr 4.

EET 343 Design and Applications of Instrumentation
Topics include: precision measurement circuits using operational amplifiers, error analysis in measurement circuits, worst-case specifications and analysis, industrial and scientific instrumentation applications examples, grounding and shielding, environmental effects and robust design. Modeling of measurement circuits using simulation software. A design project is required. Lec 3, Lab 3 (Spring). Prerequisite: EET 342. Cr 4.

EET 385 Robust Design for Manufacturing
Introduces methods for effective product and process design, evaluation and improvement, using design of statistical experiments and utilizing industrial examples. Topics include: process variation and stability, distribution of data, measurements, analysis of variance, full factorial designs, screening designs, fractional-factorial designs, block designs, parameter and tolerance design, robust design analysis, the loss function, response surface experiments and EVOP. A practical approach will be taken and management of industrial experiments and teams will be a focus. A design project is required. Lec 3. Prerequisite: Junior or Senior standing in Electrical Engineering Technology or Mechanical Engineering Technology or permission. Cr 3.

EET 386 Project Management
Covers the basics with particular emphasis on Technical Project Management. Includes designing a project plan, selecting and allocating resources, team-building skills, project plan implementation, and other topics relevant to Project Management. Focuses on developing the skills needed to effectively manage a variety of technical projects, and to prepare students for certification as Project Management Professionals (PMP). Lec 3. Prerequisite: sophomore standing. Engineering or Engineering Technology majors. Cr 3.

EET 394 Electrical Engineering Technology Practice
Cooperative work experience at full-time employment for at least a ten-week period. May be repeated for credit. (Pass/Fail Grade Only.) (Fall, Spring and Summer.) Prerequisite: Junior standing and permission. Cr 1-3.

EET 422 Electric Machines and Power Electronics
Covers AC and DC machinery principles and applications. It introduces basic power electronic principles and provides experience applying and control electronic drives. Computer control of motors and industrial communication protocols are also covered. Lec 3, Lab 3. (Fall.) Prerequisite: EET 321. Cr 4.

EET 424 Introduction to Electromechanical Systems
Topics include: classical analysis and simulation of control systems, utilizing Laplace transforms. Modeling of dynamic electromechanical systems; transfer functions; and block diagrams. Transient analysis of first and second order systems. PID control actions; stability; and steady state errors. Modeling of system behavior using simulation software. A design project is required. Lec 3, Lab 3. (Fall.) Prerequisite: EET 342, TME 354. Cr 4.

EET 425 Design and Applications of Control Systems
Classical design, simulation and analysis of closed-loop control systems, emphasizing industrial control applications and real-world product design examples and practices. Emphasis on frequency-response methods, including Bode plots and root-locus methods. Lec 3, Lab 3 (Spring.) Prerequisite: EET 424. Cr 4.

EET 451 Senior Design Project I
The first of a two-course sequence intended to provide EET seniors with a capstone learning experience. Requirements include selection of a design project, submission of a proposal, completion of a preliminary design and written and oral presentations of project status. Together with EET 452, this course satisfies the General Education Capstone Experience Requirement. Lec 1. (Fall.) Prerequisite: permission. Cr 1.

EET 452 Senior Design Project II
A continuation of EET 451 and the second of a two-course sequence intended to provide EET seniors with a capstone learning experience. Requirements include completion of a final design for the project started in EET 451, construction of the project, a final written project report and an oral presentation of the completed project. Together with EET 451, this course satisfies the General Education Capstone Experience Requirement. Lec 1, Lab 3. (Spring.) Prerequisite: EET 451. Cr 3.

EET 498 Selected Topics in Electrical Engineering Technology
Topics in engineering technology not regularly covered in other courses. Content varies to suit the needs of individuals. May be repeated for credit. (Fall and Spring.) Prerequisite: permission. Cr 1-4.

Education-Gender Studies (EGS)

EGS 500 Seminar in Gender Studies in Education
An introductory survey of educational theory and research aimed at gender-sensitive educational policies and practices. Cr 3.

Education-Human Development (EHD)

EHD 100 New Student Seminar in Education and Human Development
An introduction to university life and the requirements of programs in the College of Education and Human Development. Designed to help incoming students develop skills which enable them to be successful in college. Introduces academic, social resources, campus services and assist in career exploration. An important goal is to connect students with faculty, other students and the university community. (Pass/Fail Grade Only.) Cr 1.

English Language Skills (ELS)

ELS 114 Analytical Reading and Writing
Analytical reading, critical thinking and expository writing practice. Process approach to generating thesis focused,

adequately developed undergraduate essays. Cross-cultural perspectives on academic rhetoric. Standards applied to evaluating student writing in U.S. univer-sities. For non-native speakers of English. Offered for letter grade only. Prerequisite: Score at 480 or higher on TOEFL and permission of IEI Director. Cr 3.

ELS 115 Reading and Writing Academic Argument
Practice reading, and evaluating open and closed forms of academic argumentation. Process approach to writing sound, developed arguments incorporating adequately documented sources. Cross-cultural perspectives on rhetorical principles and documentation. For non-native speakers of English. Offered for letter grade only. Prerequisite: Score at 510 or higher on TOEFL and permission of IEI Director. Cr 3.

ELS 120 English for Academic Purposes
Practice to develop academic language and critical thinking skills for success in American universities. Exposure to textbook readings, lectures, and seminar discussions on topics of current interest and concern. For non-native speakers of English. Offered for letter grade only. Prerequisite: Score at 500 or higher on TOEFL and permission of IEI Director. Cr 3.

Education-Mathematics (EMA)

EMA 314 Teaching Mathematics in Elementary School
An instruction to methods and techniques in teaching mathematics, arithmetic readiness program, instructional and evaluation material. Prerequisite: MAT 107 and PSY 100. Cr 3.

EMA 551 Newer Practices in Mathematics Education
Covers objectives, materials and procedures for improvement of teaching fundamentals of arithmetic and a mathematics readiness program, a sensible drill load, and development of meaningful problem units. Prerequisite: EMA 314 or equivalent. Cr 3.

Education-Middle Level (EML)

EML 595 Seminar in Middle Level Education
Examines current issues in middle level education research and practices: curriculum, communicating with the public, the middle level school in the K-12 spectrum, parent programs and staff development. Prerequisite: EDC 524 or permission. Cr 3.

English (ENG)

ENG 001 Writing Workshop
Designed for students who need to develop and to practice the basic writing habits necessary for successful university-level writing. Taught largely on a small group basis. Students will be selected on the basis of their SAT verbal scores and a written diagnostic essay, or on the recommendation of faculty members. Credit does not count toward graduation. (Pass/Fail Grade Only.) Cr Ar.

ENG 101 College Composition
Students practice the ways in which writing serves to expand, clarify, and order experience and knowledge, with particular attention to persuasive writing. Satisfactory completion of the course depends upon quality of weekly writing assignments as well as demonstration of proficiency in college-level writing. Cr 3.

ENG 103 The Class Book
Focuses on the class book for 2001-2002, Stephen King's *Hearts in Atlantis*, a collection of interrelated short stories and short novels concerned with the events of the 1960s. Includes readings, lectures and films selected to provide a rich context for Hearts in Atlantis and to demonstrate how the events of that decade challenged dominant American institutions and values. Satisfies the General Education Ethics and Artistic and Creative Expression requirements. Cr 3.

ENG 129 Topics in English
Offers small-group discussions of literature focusing on a common theme. Each division takes up a different theme, such as utopianism, the quest myth, growing up in America and the like. Students can expect to read texts closely and write regularly about them. May be repeated for credit. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Open to first-year students only. May be taken before or after ENG 101 or concurrently with permission. Cr 3.

ENG 131 The Nature of Story
Explores the fundamental activity of why and how we create, tell and read/listen to stories. Readings may include selections from folk tale and myth, saga and epic, drama and novel, film and song, poetry and essay—from the ancient world to the modern, from the western cultural tradition and from a variety of other cultures. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Cr 3.

ENG 170 Foundations of Literary Analysis
An introduction to the close reading of literature. Students write frequently, exploring how conventions of genre, form, and style work in literature. Required of English majors. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 101 is strongly recommended. Cr 3.

ENG 205 An Introduction to Creative Writing
Offers students experience in writing in three major forms: autobiographical narrative, fiction, and poetry. Satisfies the General Education Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: ENG 101 or equivalent. Cr 3.

ENG 206 Descriptive and Narrative Writing
Special emphasis on the informal, autobiographical essay. Satisfies the General Education Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: ENG 101 or equivalent. Cr 3.

ENG 212 Persuasive and Analytical Writing
Designed for students wanting practice in those forms of expository, analytical, and persuasive prose required in writing answers to essay test questions, term papers, research projects, and extended arguments. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 101 and at least sophomore standing. Cr 3.

ENG 222 Reading Poems
Focuses on helping students develop critical skills particularly suited to the interpretation and analysis of poetry. Readings will include poems from different eras in both traditional and innovative forms. May cover a range of poetic practices and a variety of media: including, for example, poetry readings, little magazines and presses, digital texts, and poetic movements. Satisfies the General Education Western Cultural Tradition, Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 229 Topics in Literature
Recent topics have included: science fiction, literature and the arts, utopian fiction, literature and the law, nature and literature, literature of the third world and literature of the Vietnam war. May be repeated for credit. Only Literature and the Arts, and Nature and Literature Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: 3 hours of English. Cr 3.

ENG 231 Western Tradition in Literature: Homer Through the Renaissance
Survey of the major writers in the Western literary tradition. The development of our cultural heritage and the evolution of major literary forms. (This course is identical to MLC 231.) Satisfies the General Education Western Cultural Tradition and Artistic and

Creative Expression Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 235 Literature and the Modern World
An examination of the modern sensibility as it has manifested itself in 20th century literature. Some attention also to the history, music, visual arts, social thought, and science of the contemporary epoch. Satisfies the General Education Western Cultural Tradition, Artistic and Creative Expression and Ethics Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 236 Canadian Literature
A survey of Canadian literature from 1850 to the present. Interpretation and analysis of the poetry and prose of major literary figures. Some examination of the impact of British and American models upon the tradition of Canadian literature. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives, Artistic and Creative Expression and Ethics Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 237 Coming of Age in America
The process of moving from innocence to experience has many faces in America, as our literature in the last few decades has begun to chronicle. Explores stories of coming of age in American fiction, nonfiction and film of the last fifty years from writers to many traditions, including Franco-American, Latino-Latina, Native American, African-American and Asian-American. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: 3 hours of English. Cr 3.

ENG 238 Nature and Literature
Looks at the many different ways people have looked at nature and examines the philosophies and values which inform humans' interactions with their environment. Authors will be drawn from traditional literary figures, American nature writers, environmentalists and especially, authors from Maine. Assignment may include field experience. Satisfies the General Education Ethics Requirement. Prerequisite: 3 hours of English. Cr 3.

ENG 241 American Literature Survey: Beginnings Through Romanticism
The major themes, ideas, attitudes and techniques which have developed in our national poetry, fiction, drama, and essay and which have defined them as particularly American. Required for English majors. Satisfies the General Education Western Cultural Tradition and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of literature or permission. (ENG 170 recommended.) Cr 3.

ENG 242 American Literature Survey: Realism to The Present
The major themes, ideas, attitudes and techniques which have developed in our national poetry, fiction, drama, and essay and which have defined them as particularly American. Required for English majors. Satisfies the General Education Western Cultural Tradition and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of literature or permission. (ENG 170 recommended.) Cr 3.

ENG 243 Topics in Multicultural Literature
Topics will vary, including such titles as Ethnicity and Race in American Literature; Caribbean Literature; Third World Literature; and other topics in African, Asian, Francophone, Native American, Chicano and ethnic literatures in the English language. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Ethics Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 244 Writers of Maine
The Maine scene and Maine people as presented by Sarah Orne Jewett, E. A. Robinson, Edna St. Vincent Millay, Mary Ellen Chase, R. P. T. Coffin, Kenneth Roberts, E. B. White, and others. Satisfies the General Education Western Cultural Tradition, Artistic and Creative Expression and Ethics Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 245 American Short Fiction
A study of genre, form, and theme in representative works of American short fiction from Irving to the present. Satisfies the General Education Western Cultural Tradition, Artistic and Creative Expression and Ethics Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 246 American Women's Literature
A survey of the main traditions and writers in American women's literature from the origins to the present. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives, Artistic and Creative Expression and Ethics Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 249 American Sports Literature and Film
Uses readings in fiction, poetry, drama, essays and films to explore social, humanistic, ethical and aesthetic issues in sports and its literature. Examines ways writers capture physical action and the role of sports in various genres and media. Satisfies the General Education Ethics and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 251 English Literature Survey: Beginnings Through Neoclassicism
The major patterns of development within the English literary tradition, with emphasis on the cultural and historical forces which have shaped this tradition. Required for English majors. Satisfies the General Education Western Cultural Tradition and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of literature or permission. (ENG 170 recommended.) Cr 3.

ENG 252 English Literature Survey: Romanticism to the Present
The major patterns of development within the English literary tradition, with emphasis on the cultural and historical forces which have shaped this tradition. Required for English majors. Satisfies the General Education Western Cultural Tradition and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of literature or permission. (ENG 170 recommended.) Cr 3.

ENG 253 Shakespeare: Selected Plays
A study of ten to twelve plays, selected to represent the range of Shakespeare's achievement as a playwright. Recommended for non-majors. Not open to students who have taken ENG 453. Satisfies the General Education Western Cultural Tradition, Artistic and Creative Expression and Ethics Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 256 British Women's Literature
A survey of British women writers and their traditions from the origins to the present. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 271 The Act of Interpretation
An introduction to critical theory. Study of individual critics or schools of literary theory. Application of these interpretative strategies to literary texts. Satisfies the General Education Western Cultural Tradition and Writing Intensive Requirements. Prerequisite: ENG 170. Cr 3.

ENG 280 Introduction to Film
A survey of the history of motion pictures and an exploration of the rhetoric of film, designed to give students with no prior film study an integrated approach to understanding the moving image and how it functions. Satisfies the General Education Western Cultural Tradition, Social Context and Institutions and Artistic and Creative Expression Requirements. Prerequisite: 3 hours of English. Cr 3.

ENG 301 Advanced Composition
The exposition and argument that combines a study of rhetorical theory and practice in developing a command of various expository styles. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 101 and ENG 212 or permission Cr 3.

ENG 307 Writing Fiction
The writing of fiction, for students of demonstrated ability. Submission of writing sample. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 205 or ENG 206 and approval of a portfolio. Cr 3.

ENG 308 Writing Poetry
A course in the writing of poetry, for students of demonstrated ability. Submission of writing sample. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 205 or ENG 206 and approval of a portfolio. Cr 3.

ENG 309 Writing Creative Nonfiction
An intermediate course in such forms of creative nonfiction as memoir, travel literature, autobiography and personal essays. Satisfies the General Education Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: ENG 205, ENG 206, ENG 212 or permission. Cr 3.

ENG 310 Writing and Careers in English
Students research, write and revise scholarly projects in language and literary study, using methods and sources common to the profession while exploring issues in the future of the discipline. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 170 and junior standing. Cr 3.

ENG 317 Business and Technical Writing
Supervised practice in the writing of business and technical reports, professional correspondence, and related materials. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 101 or equivalent and junior or senior standing. Cr 3.

ENG 395 English Internship
An advanced course in writing and collaborative learning. Students first experience collaborative work in essay writing, critical reading of peers' essays, and rigorous practice in written and oral criticism. They participate in supervised tutoring in the English Department's writing center. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 101 or equivalent and at least one other writing intensive course, a recommendation from a UM faculty member, submission of writing sample and permission. Cr 3.

ENG 405 Directed Writing
Supervised practice in the writing of the novel, drama, short story, poetry, essay, literary criticism, technical or professional writing. Individual projects for students with demonstrated ability, usually seniors concentrating in writing. ENG 405 and/or ENG 406 may be taken for credit up to a total of 6 credit hours. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Permission of instructor. Cr 3.

ENG 406 Advanced Creative Writing
A workshop in fiction and poetry at the advanced level. ENG 406 and/or ENG 405 may be taken for up to a total of 6 credit hours. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Permission of instructor. Cr 3.

ENG 417 Advanced Professional Writing
Advanced strategies for researching and analyzing communication problems in the workplace and for adapting documents to a multiple audience. Each student will undertake a major communication project resulting in a professional document. (This course is identical to NMD 417.) Satisfies the General Education Writing Intensive Requirement. Prerequisite: 6 credits in writing, including ENG 317, and permission. Cr 3.

ENG 418 Topics in Professional Writing
Topics vary according to changes in the field, expertise of the faculty, and needs of the students. Possible topics include editing, document design and desktop publishing, and professional writing in intercultural contexts. May be repeated for credit. Satisfies the General Education Writing Intensive Requirement. Prerequisite: 6 credits in writing, including ENG 317, and permission of instructor. Cr 3.

ENG 429 Topics in Literature
Recent topics have included Literature of the Sea, Representing the Holocaust, and Black Women Writers. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 430 Topics in European Literature
Varies in content from generic studies (the novel, the drama) to period studies (the Renaissance, Neo-Classicism. (This course is identical to MLC 430.) Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 435 The Bible and Near Eastern Literature: A Multicultural Perspective
Focuses on the Bible as an anthology of fiction, myth, and polemic arising out of specific cultural and philosophical contexts; exploration of the relationship between Hebrew, Canaanite, Egyptian, Mesopotamian, Greek, Roman, and Christian literature. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 436 Topics in Canadian Literature
An intensive study of a major Canadian writer or a small group of Canadian writers, or an examination of a major theme in Canadian literature. Specific topic varies from semester to semester. Satisfies the General Education Ethics and Writing Intensive Requirements. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 440 Major American Writers
An in-depth study from one to three major American writers. Topics vary, depending on the professor. May be repeated for credit when writers differ. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 442 Native American Literature
Surveys literature by Native American authors from a wide range of tribal backgrounds. Considers the development of a written tradition over time in relation to oral genres. Satisfies the General Education Ethics and Writing Intensive Requirements. Prerequisite: 6 hours literature or permission. Cr 3.

ENG 443 The American Romantics
Major works of such early and mid-19th century writers as Irving, Cooper, Emerson, Fuller, Thoreau, Whitman, Poe, Hawthorne, and Melville. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 444 Contemporary American Fiction
A survey of major trends in American fiction since 1945, such as the continuing tradition of realism, black humor, metafiction and postmodernism, magical realism, hyper-realism, and fiction from African-American, Asian-American, and Native American writers. Satisfies the General Education Ethics Requirement. Cr 3.

ENG 445 The American Novel
Readings from the major American novelists: Stowe, Melville, James, Twain, Dreiser, Wharton, Hemingway, Fitzgerald, Cather, and Faulkner, among others. Focus on thematic, technical, and narrative developments in the 19th and 20th century American novel. Satisfies the General Education Writing Intensive Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 446 American Poetry
Readings from the major American poets. One third of the course is devoted to the 19th century and earlier. The last two thirds covers the 20th century: Robinson, Frost, Pound,

Eliot, Williams, H.D. , Moore, Stevens, H. Crane. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 447 American Drama
A study of 20th-Century American dramatists, including O'Neill, Hellman, Williams, Miller, Albee, Shepard, Mamet, and Henley. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 449 Contemporary American Poetry
American poetry written after World War II. Provides students of poetry with both an historical context for the present practice of poetry in the United States and an introduction to the diverse schools of contemporary poetry and poetics. Prerequisite: 6 hours literature or permission. Cr 3.

ENG 450 Cultural Borderlands in Contemporary American Literature
Explores the psychic middle ground where tensions between competing claims for identity, myth and belonging play out. The tenacity of cultural distinctions, the deep hunger of people for roots, and conflicts between national and cultural mythos will be explored in fiction and nonfiction from contemporary American writers whose native cultural traditions strongly inform their work, including Franco-American, Native American, Latino-Latina and African-American writers. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 451 Chaucer and Medieval Literature
Readings from Chaucer and his English contemporaries. Focus on understanding the nature of the Medieval world and its expression in the literature of the time, and on developing reading skill in Middle English. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 453 The Works of Shakespeare
Readings in the plays of Shakespeare, with some additional attention to his sonnets and narrative poems. Satisfies the General Education Ethics and Writing Intensive Requirements. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 454 Elizabethan and Seventeenth Century Lyric and Narrative Poetry
Readings in the lyric and narrative poets, with particular emphasis on the Elizabethan sonnet, the erotic and religious verse of Donne, the narrative poetry of Spenser and Milton, and the metaphysical and Cavalier poetry of the 17th century. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 455 Eighteenth-Century Fiction, Satire, and Poetry
Readings from the major 18th-century prose writers, such as Defoe, Richardson, Fielding, Sterne, Smollett, Burney, Addison, Steele, Boswell, Johnson, and Goldsmith; the poets and satirists, Dryden, Swift, Pope and Gray, among others. Focus on the legitimation of emotion and of individualism in literature. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 456 The English Romantics
The works of the major Romantic poets including Blake, Coleridge, Wordsworth, Byron, Shelley, and Keats, with some attention to their critical writing. Focus on close reading of texts as well as on developing a sense of the historical and intellectual context of Romanticism. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 457 Victorian Literature and Culture
Readings from the major Victorian British poets, such as Tennyson, Browning, and Arnold; the major essayists, such as Carlyle, Mill, Newman, and Pater. Focus on the major literary and intellectual issues from Romanticism to the beginning of modernism. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 458 British Modernism
Readings from British fin de siecle and modernist writers such as Thomas Hardy, Oscar Wilde, George Bernard Shaw, W.B. Yeats, D.H Lawrence, Wilfred Owen, Edith Sitwell, H.G. Wells, Rebecca West, Joseph Conrad, Ford Madox Ford, James Joyce, and Virginia Woolf. The course studies the evolution of British modernism from its roots in the late nineteenth-century through and beyond its climax in the early 1920s. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 459 Contemporary British Literature
Readings from contemporary British writers such as Auden, Orwell, Beckett, Pinter, Spark, Lessing, Stevie Smith, Murdoch, Dylan Thomas, Seamus Heaney, and Hugh MacDiarmid. Studies the various traditions that have emerged since the advent of modernism and their place in the English tradition. Examines the concepts of "modernism" and "postmodernism," in particular. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 460 Major British Authors
An in-depth study of from one to three major British writers. Topics vary, depending on the professor. May be repeated for credit. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 465 The English Novel
Readings from the major English novelists: Defoe, Richardson, Fielding, Austen, The Brontes, Gaskell, Eliot, Dickens, and Hardy, among others. Focus on the development of the genre, its characteristic themes and methods, from "low entertainment" to respectable art form. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 467 British Drama
Readings in the major British dramatists, such as Marlowe, Jonson, Middleton, Webster, Congreve, Sheridan, Wilde, Shaw, Synge, Beckett, and Stoppard. Focus on Renaissance tragedy, Restoration comedy, and modern absurdist drama with some attention to the historical/generic shifts from tragedy to melodrama and from comedy to farce and tragic farce. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 470 Topics in Literary Theory and Criticism
Studies in the history of literary criticism, in selected theoretic perspectives, or in the application of specific critical approaches. Specific topic varies from year to year. (This course is identical to MLC 473.) Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 471 Feminist Literary Criticism
An examination of the major theoretical tendencies in contemporary feminist criticism, stressing connections with Marxist criticism, Freudianism, existentialism, and poststructuralism. Includes a section on feminist aesthetics. Prerequisite: 6 hours of literature. Cr 3.

ENG 472 English Language and Writing for the Secondary School
Theory, issues and methods in teaching English language and writing (including writing about literature) at the secondary level. Satisfies the General Education Writing Intensive Requirement. Prerequisite: 20 hours of English plus Foundational Education courses required for certification. INT 410 recommended. Cr 3.

ENG 476 History of the English Language
Main aspects of the development of Modern

English from Old and Middle English; words and their backgrounds; changes in sound, form, and meaning. Prerequisite: INT 410 or equivalent. Cr 3.

ENG 477 Modern Grammar
Generative-transformational grammar of English, with emphasis on syntax and semantics. Attention is given to the relation of a transformational to structural grammar. Prerequisite: INT 410 or equivalent. Cr 3.

ENG 480 Topics in Film
A study of film topics at a more advanced level than ENG 280. Specific topics vary from year to year but might include study of a major director(s), of a national cinema, of certain film genres, of aspects of film theory, or of women in films. Prerequisite: 6 hours of literature. Cr 3.

ENG 481 Topics in Women's Literature
An advanced study of specific areas of women's literature: for example, African-American Women's Literature, Women and the Rise of the Novel, Emily Dickinson, etc. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of literature. Cr 3.

ENG 490 Senior Seminar in Literature
A seminar course on a small body of primary literary texts and the critical communities concerned with them. Students propose and write original researched papers that demonstrate knowledge of current research in the field, using appropriate research methods and conventions of scholarly bibliography. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: Senior English majors. Cr 3.

ENG 496 Field Experience in Professional Writing
Students work with businesses, professions, and other organizations approved by the department. The work in the course varies with each student enrolled and with the needs of the cooperating employer but normally involves either research, public relations, reporting, editing, interviewing, indexing, or other allied activity requiring skill in reading and writing. May be repeated for credit up to 6 credit hours. Satisfies the General Education Capstone Experience Requirement. Prerequisite: 9 hours of writing including ENG 317 and permission. Cr 1-6.

ENG 499 Capstone Experience in English
Pre-professional experience supervised by an English faculty member, attached to an appropriate 3 credit English course (i.e., completion of a substantial critical paper based upon content of a 400-level literature course; a semester tutoring in the Writing Center after ENG 395 or completion of a finished creative manuscript after ENG 405 or ENG 406). (Pass/Fail Grade Only.) Satisfies the General Education Capstone Experience Requirement. Prerequisite: Admission to ENG 400-level literature course, ENG 395 and ENG 405 or ENG 406. Cr 0.

ENG 500 Introduction to Graduate Study of Literature
Required of but not limited to all first-year graduate students in English. Sustained practice in methods of inquiry, expression, and research essential in literary criticism. Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 505 Creative Writing Workshop
Discussion of work in progress by students working under faculty direction on extended literary projects. Prerequisite: Limited to the creative writing MA concentration. Others by permission. Cr 3.

ENG 529 Studies in Literature
Intended to supplement and allow occasional experiments within the existing curriculum at the 500 level. Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 536 Studies in Canadian Literature
In-depth study of literature by Canadians, focusing on a particular period, group, movement, issue or major author: e.g., pre-Confederation literature, the Tish poets, the McGill Movement, novels by writers of color, Margaret Atwood and Michael Ondaatje. Prerequisite: graduate standing in English or permission. Cr 3.

ENG 541 American Literature from Colonial Through Romantic
A study of major and representative figures in American Literature up to 1865, with emphasis on Romantics such as Cooper, Emerson, Hawthorne, Poe, Melville, Thoreau, Fuller, Stowe and Whitman. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 542 Studies in Multicultural American Literature
In-depth study of works by American writers of particular ethnic traditions focusing on a particular period, group, movement, issue or individual(s); e.g., Contemporary Native American Writers, African American Literary Tradition and Theory, Literature of Mixed Blood Experience, Jewish American Literature, or Maine Literary History—Franco-American and Wabanaki. Prerequisite: Graduate standing in English or permission of instructor. Cr 3.

ENG 545 American Realism and Naturalism
Emphasis on fiction, and especially on the novels of Twain, Howells, James, Crane, Dreiser, and Wharton. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 546 Modern American Literature
A study of significant themes, literary and cultural, and the esthetics of such authors as Frost, Williams, Pound, Eliot, Stein, Moore, Crane, Cather, Fitzgerald, Hemingway, Porter, Dos Passos, Faulkner. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 549 Studies in Women's Literature
In-depth study of works by and about women, focusing on a particular period, group, movement, issue, or individual; e.g., the New England local color school, early women novelists, the Brontes, 20th century African-American literature, contemporary women dramatists. (Offered once every two years.) Prerequisite: graduate standing or permission. Cr 3.

ENG 551 Medieval English Literature
The major works of the Medieval period, including works by Chaucer, Langland, Malory and the Pearl Poet. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 553 Shakespeare and His Contemporaries
Plays by Shakespeare, Jonson, Middleton, Webster, and Ford, among others. To test dramatic effects and critical principles, the course emphasizes revenge tragedy, city comedy, and tragic farce. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 554 Renaissance and 17th-Century Literature
Readings in the lyric and narrative poetry and in the prose of the period from 1520 to 1660. Special emphasis on Sidney, Spenser, Donne, and Milton. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 555 Literature of the Enlightenment
Investigates unique features of 18th-century literature: e.g., prose satire, the gothic novel, domestic tragedy, the biography, periodical literature, etc. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 556 English Romanticism
A survey of the six major romantic poets with attention to the critical writings of the period. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 557 Victorian Literature
A study of Victorian poetry, prose, and fiction by the major authors: Carlyle, Tennyson, Browning, Dickens, Newman, Ruskin, Morris, Hardy and Yeats. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 558 Modern British Literature
Readings in such major poets as Hardy, Yeats, Auden, and Dylan Thomas; and such novelists as Conrad, Ford, Forster, Woolf, Joyce, Lawrence and Beckett. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 570 Critical Theory
Readings in the theoretical traditions that have determined the possibilities for scholarship and interpretation in literary criticism, and a consideration of significant contemporary experiments that have redefined these possibilities. (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 579 The Theory of Composition
A study in the rhetorical, stylistic and cognitive perspectives—from classical formulations to current research—on the nature of written composition and issues in composition teaching. (This course is identical to CMJ 579.) (Offered once every two years.) Prerequisite: Graduate standing in English or permission. Cr 3.

ENG 580 Topics in Poetry and Poetics
Intensive study of literary language and practice focusing primarily but not exclusively on poetry. Topics will vary widely but fit one or more of the following general areas of emphasis: theories of poetry and poetic production; surveys focusing on work from more than one historical period or national literature; studies of the critical and other prose writings of poets; courses on critical theory in which poetry plays a key role; narratology and genre theory. May be repeated for credit. Prerequisite: Graduate standing in English or permission. Cr 3.

Education-Psychology (EPT)

EPT 522 Advanced Educational Psychology
A seminar to explore theoretical and empirical issues in educational psychology. Prerequisite: EDB 221 and EDS 521 or equivalents. Cr 3.

Education-Literacy (ERL)

ERL 313 Teaching of Reading in the Elementary School
Provides the general background including early literacy, relationships between reading and writing, comprehension, word analysis skills, guided reading lessons, literature based reading and writing programs, recreational reading and evaluation. Prerequisite: PSY 100. Cr 3.

ERL 317 Children's Literature
An overview of literature written for children between the ages of four and twelve. Emphasis on developing criteria for evaluating various types of books and selecting for individual children. Prerequisite: Junior standing and at least one literature course. May be taken con-currently with ERL 313 and ERL 318. Cr 3.

ERL 318 Teaching Language Arts in the Elementary School
Current methods and materials in teaching the writing process including the relationships between reading and writing; conferencing procedures; handwriting, spelling, and oral language development; analysis and correction of basic difficulties. Prerequisite: PSY 100, junior or senior standing. Cr 3.

ERL 418 Teaching Young Adult Literature
Explores the field and characteristic works of young adult literature, its curricular and recreational uses, critical issues surrounding its use, ways of sharing and encouraging reading of a variety of this literature with students, and ways to teach effectively and integrate adolescent literature into various instructional environments. Cr 3.

ERL 440 Teaching Reading in the Secondary School
An exploratory course for high school teachers who wish to develop competence in teaching reading. Includes the nature of the reading process, rationales for continuing reading instruction in junior and senior high schools, reading and study strategies, improving rates of reading, organization, evaluation. Cr 3.

ERL 512 Enriching Literacy Practices in Grades 3-6
Through the use of teaching demonstrations behind a one-way mirror, teachers in grades 3-6 explore theory of literacy development of 8-12 year olds. Emphasis is on teacher decision-making to assist literacy development, appropriate instructional methods, materials and assessment tools. Prerequisite: Access to small groups of students in grades 3-6. Cr 3.

ERL 513 Curriculum and Instruction in Literacy Grades K-8
Introduces students to current theory and practice in reading and language arts instruction for grade K-8. Topics covered include plan and design of reading instruction at the individual, small group and whole class levels, writer's workshop, spelling and word study, integrated language arts and assessment. Cr 3-6.

ERL 517 Literature for Children
A continuation of ERL 317 including a study of the historical development of children's literature; principles, techniques and curriculum planning for the guidance of children's reading; book selection for elementary schools and public libraries. Extensive reading and evaluation of children's books. Prerequisite: ERL 317 or its equivalent. Cr 3.

ERL 518 Literature for Young Adults
Study of the development of literature for adolescents and young adults as it is used in the junior high, secondary school, and public library. Emphasis on recently published books of this nature and the important contributions of the past. Cr 3.

ERL 534 Literacy and Language Development
Examines how oral and written language are acquired; sociocultural linguistic variations, connections between language acquisition and print awareness and classroom practices that promote language development. Cr 3.

ERL 535 Current Practices in Reading
Fundamentals of reading instruction including history, models of reading and reading instruction and development of lifetime readers. Cr 3.

ERL 536 Writing Process in Schools
Process approach to teaching writing with emphasis on language acquisition, cognition, components of a writing program, conferencing and modeling strategies, classroom management, eval-uation, researcher and implementer. Cr 3.

ERL 537 Literacy Across the Curriculum
Examines reading, writing, studying and thinking as elements of content discipline instruction. Cr 3.

ERL 552 Seminar in Teacher Research
History of the teacher as researcher movement. Presents basic research strategies for classroom teachers. Students will test research techniques in classrooms and design a research study. Prerequisite: ERL 534, ERL 535, ERL 536 or a minimum of 15 hours completed in literacy graduate program. Cr 3.

ERL 553 Literacy Assessment
Discussion of both literacy process and product assessment measures and factors affecting these areas. Exploration of past, present and current issues in literacy

assessment. Prerequisite: ERL 535 and ERL 536 or equivalents or permission. Cr 3.

ERL 569 Clinical Practices-Teaching Children
Internship on clinical practices, in small groups and tutoring contexts, for children (K-8) experiencing difficulties in literacy. Emphasis on assessment, interventions and cast study reports. Prerequisite: ERL 553 or permission. Cr 6.

ERL 590 Special Topics in English Language Arts and Related Fields
Offered as need, interest, and research require. Specific topics might include: word processor and writing instruction, comprehension and cohesion, reading and writing in the content areas, vocabulary development, reading and cognition, ethnographic research in the language arts, and teacher as researcher. May be repeated for credit. Prerequisite: permission. Cr 1-3.

Education-Reading Recovery (ERR)

ERR 535 Reading Recovery Teacher Training I
Prepares teachers through school-based outreach centers to implement Reading Recovery procedures with first grade children with reading difficulties: tutoring four children daily; tutoring a child behind the one-way mirror one or two times per semester. Prerequisite: Prior acceptance into Reading Recovery Teacher certification program. Cr 3.

ERR 536 Reading Recovery Teacher Training II
A continuation of ERR 535. Prerequisite: ERR 535. Cr 3.

Education-Science (ESC)

ESC 316 Teaching Science in the Elementary School (K-8)
Presents information and activities designed to encourage students to learn and develop goals and objectives, instructional strategies, selection of curriculum materials K-8, effective management and evaluation techniques. Satisfies the General Education Writing Intensive Requirement. Prerequisite: EDB 204, EDB 221 and 2 science courses (preferably from different disciplines e.g., Life or Earth or Physical Science.) Cr 3.

ESC 340 Studies in the Physical Sciences I
An interdisciplinary study of the physical sciences intended to build science attitudes and knowledge of physical science at pre-service and inservice stages for elementary and junior high school teachers. Laboratory-centered investigations in such areas as light, structure of crystals, liquids and gases, motion and forces, and energy. Cr 3.

ESC 342 Studies in the Earth Sciences I
For elementary/middle school teachers. A series of elementary laboratory and field studies in astronomy and meteorology. Topics will be explored through direct observation and study. Satisfies the General Education Applications of Scientific Knowledge Requirement. Cr 3.

ESC 343 Studies in the Earth Sciences II
An introduction to geology and soil sciences for elementary/middle teachers. Where possible, the studies will be undertaken in a natural setting using equipment and materials appropriate to the learning tasks. Satisfies the General Education Applications of Scientific Knowledge Requirement. Cr 3.

ESC 348 Natural History-Inland (K-12)
Introductory field studies for pre-service or in-service teachers focusing on the natural habitats found in areas surrounding the Orono campus. Emphasis on plants and animals in their environment, their behavior and structural adaptations. Cr 3.

ESC 426 Methods of Teaching Environmental Education (K-12)
Classroom and field-based studies of a broad spectrum of up-to-date environmental teaching methods and resources. Satisfies the General Education Population and the Environment Requirement. Prerequisite: ESC 316 or ESC 452 and permission. Cr 3.

ESC 444 Basic Field Ecology
For teachers (K-12) who wish to learn about the natural environment by carrying out field studies in a variety of biotic communities. Emphasis on experimental procedures and important concepts of ecology. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Cr 3.

ESC 446 Marine Education for Elementary and Middle School Teachers (K-8)
Designed to help elementary/middle school teachers learn about the world's oceans from a multidisciplinary perspective. Particular focus on the Gulf of Maine. Course topics include geology, physical and chemical oceanography, ecology, natural resources. Satisfies the General Education Population and the Environment Requirement. Cr 3.

ESC 452 Teaching Science in the Secondary School
Instructional strategies and general approaches to teaching science in grades 7-12. Emphasis on professional literature, curriculum development, teaching and learning styles and reflective teaching. Satisfies the General Education Writing Intensive Requirement. Prerequisite: EDB 204 and EDB 221. Cr 3.

ESC 463 Workshop in Environmental Education for Elementary Teachers
Natural resource concepts from an ecological perspective. Students will develop a course design to teach these concepts in an elementary school classroom. Includes accessing curriculum resource data bases, using indoor and outdoor activities to teach about natural resources and selection of intended learning outcomes appropriate for elementary students. Cr 3.

ESC 499 Internship in Science and Environmental Education
Supervised internship in such non-school settings as science or environmental education centers or agencies. Learning objectives, teaching assignments and products are pre-established and agreed upon by student, faculty coordinator and placement mentor. Prerequisite: a science or environmental education methods course and permission. Cr 1-3.

ESC 516 Advanced Studies in Science Instruction (Elementary and Middle Schools)
Examines instructional strategies for science education in elementary and middle schools. Prerequisite: ESC 316 or equivalent. Cr 3.

ESC 525 Planning the Environmental Curriculum
Designed to develop skills necessary for curriculum design based on content analysis of student knowledge. A specific topic, such as acid rain or pollution, is selected for group investigation. Cr 3.

ESC 542 Advanced Studies in Science Education (Secondary)
Critical appraisals of curriculum and instructional practices at middle and secondary school levels. Cr 3.

Education-Social Studies (ESS)

ESS 315 Teaching Social Studies in the Elementary School
Examines methods and materials for social studies in the elementary school and ways of relating the work of the social studies class to an understanding of practical problems of the community. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: May be taken concurrently with ERL 313 and ERL 318. Not open to first-year students. Cr 3.

ESS 441 Teaching Social Studies in the Secondary School
Covers current practices in teaching social studies, selection and use of instructional materials, modern trends in curriculum construction for social studies in the secondary school. Prerequisite: Not open to first-year students. Cr 3.

ESS 516 Social Studies Education
Examines the social science content and pedagogical principles relevant for making curriculum, instruction and assessment decisions for K-8 social studies education. Prerequisite: Graduate student or permission. Cr 3.

ESS 541 Social Studies Curriculum
Studies in development of the curriculum, materials, resources and methods of social studies instruction. Prerequisite: ESS 315, ESS 441 or equivalent. Cr 3.

Franco American Studies (FAS)

FAS 101 Introduction to Franco American Studies
Introduces students to the French cultures of the United States, emphasizing the peoples of Maine and the Northeast region. Examines European origins and later migrations, the impact of gender and class, the social significance of language, individual and collective expression, the effects of assimilation and the challenges faced today. Taught in English; no knowledge of the French language is presumed. Satisfies the General Education Western Cultural Tradition, Social Context and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

FAS 220 Franco American Literature in English
Surveys Franco American writing in English. We begin with the oral tradition of Franco American culture, exploring their various incarnations, their place in traditional culture and their modern day incarnations. We subsequently examine how this oral culture continues to inform Franco American writing and how Franco American writing diverges from these traditional cultural forms. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: FAS 101 or permission. Cr 3.

FAS 230 Franco American Women's Experience
Examines the immigration experience and subsequent lifestyles of the present-day Franco American woman and her cultural ancestors. Studying the immigration of these women from France to New France, Canada and across the border into the U.S., class participants will learn about the historical and cultural implications of immigration for these women and the definition they imparted to the culture. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FAS 101, WST 101 or permission. Cr 3.

FAS 329 Topics in Franco American Studies
Focuses on themes and issues drawn from, or related to, the history, traditions, and contemporary experience of the Franco American community of Maine and the northeast region. Prerequisite: FAS 101 or permission. Cr 3.

FAS 440 Franco American Civilization
An interdisciplinary study of the French heritage in North America. Taught in French. (This course is identical to FRE 440.) Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3.

FAS 442 French Language of North America
A historical, linguistic and socio-linguistic approach to the study of the Franco-Quebecois and the Franco American languages. Emphasis on the morphology, syntax, vocabulary and phonetic system in order to understand the present status of the languages. Research in the areas of the spoken and written language. Taught in French. (This course is identical to FRE 442.) Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission. Cr 3.

FAS 458 History of French Canada and Franco Americans
The common historical heritage of French Canadians and Franco-Americans from the establishment of New France and Acadia to the great migrations to the United States in the 19th century. The separate development of French Canadians and Franco-Americans from this point to the present. (This course is identical to HTY 458.) Prerequisite: 6 hours of History or permission. Cr 3.

FAS 459 Colonial Canada
Studies Canada's history from New France to 1850, emphasizing political, social and economic developments and relations with the American people. (This course is identical to HTY 459.) Prerequisite: HTY 103 or permission. Cr 3.

Forest Ecosystem Science (FES)

FES 100 Introduction to Forest Biology
Introductory concepts related to forest plants, animals, environment and ecology. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec, Rec 2, Lab 4. Cr 4.

FES 110 Introduction to Tree Biology
Introductory concepts for the role of trees in forests and on how trees function. (Note: because of overlap, FES 110 and FES 100 cannot both be taken for degree credit.) Lec 2, Lab 4, Rec 2. Prerequisite: Limited to students transferring into Forest Ecosystem Science; Forest Operations Science; Forestry; Parks , Recreation and Tourism; and Wood Science who have a previous course in general biology. Cr 2.

FES 345 Special Problems
Original investigation and/or readings in forest ecosystem science areas; subject to be chosen in consultation with one or more departmental faculty. May be repeated for credit. Cr 1-6.

FES 407 Forest Ecology
Biological principles and environmental factors governing the natural establishment and development of forest trees and stands. Lec 3. Prerequisite: FTY 107 or BIO 464 or permission. Cr 3.

FES 408 Silviculture
Theory and practice of controlling the composition, growth, quality and regeneration of forest stands. Lec 3. Prerequisite Corequisite: FES 407 or equivalent. Cr 3.

FES 409 Forest Ecology and Silviculture Field Laboratory
Measurement, assessment and analysis of forest vegetation from a biological and silvicultural perspective. Designed to develop understanding and proficiency in: silvical properties of northeastern tree species; forest regeneration, succession and stand dynamics; prescribing silvicultural treatments; and formulating silvicultural systems. Weekly labs and several one-day field trips. Prerequisite: Concurrent enrollment in FES 408; WLE 200 or concurrent enrollment in FES 407. Cr 2.

FES 416 Functional Structure of Woody Plants
Wood and bark are studied as a means to understanding tree physiology, phylogenetic relationships and taxonomic identification. (This course is identical to WSC 416.) Lec 2, Lab 4. Prerequisite: FES 100 or permission. Cr 3.

FES 435 Managing Forest Succession
Ecological principles, technologies, methods and sociological issues associated with managing the course and rate of vegetation succession in forest management. (Note: because of overlap, FES 435 and FES 535

cannot both be taken for degree credit.) (This course is identical to FES 535.) Rec 3. Prerequisite: FES 407, FES 408 or permission. Cr 3.

FES 498 Senior Research I
An original investigation of a problem in Forest Ecosystem Science, under the guidance of a faculty member. Students will select an area of study, perform a literature search and prepare a written study plan for their research. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: permission and junior or senior standing in Forest Ecosystem Science. Cr 2.

FES 499 Senior Research II
Students will complete the research initiated in FES 498 and prepare a written final report. The completed project should demonstrate the student's ability to understand and apply scientific principles in research. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: FES 498 and senior standing. Cr 2.

FES 508 The Industrial Spruce-Fir Ecosystem
Biological and socioeconomic issues related to the ecology and management of Maine's spruce-fir resource. Four 1-2 day field trips. Lec 3. Cr 4.

FES 519 Functional Structure of Woody Plants
Focuses on how cambial activity determines basic structure and biophysical properties of wood. Explores practical applications in areas such as stand management for wood quality and dendroecology. Credit 2. (or 3 with lab.) Prerequisite: permission. Cr 2.

FES 520 Developmental Physiology of Woody Plants
Understanding plants as production systems for foliage, fruits, and wood. Structure and function of apical meristems and the cambium, reproductive biology and embryogenesis, developmental changes. Developmental physiology of organogenesis both natural and in vitro, with an introduction to gene expression as it relates to development. Lec 2, Rec 1. Offered alternate years (odd.) Prerequisite: BIO 452, BIO 453 or permission. Cr 3.

FES 521 Research Methods in Forest Resources
Prerequisite: permission. Cr 3.

FES 535 Managing Forest Succession
Ecological principles, technologies, methods and sociological issues associated with managing the course and rate of vegetation succession in forest management. (Note: because of overlap, FES 435 and FES 535 cannot both be taken for degree credit.) (This course is identical to FES 435.) Prerequisite: FES 407, FES 408 or permission. Cr 3.

FES 536 Forest Stand Dynamics
Tree growth and stand development from a quantitative ecological and silvicultural perspective. Critical review of representative growth simulation models in terms of biological realism. Lec 2, Lab 1. Prerequisite: prior instruction in silviculture/forest ecology and forest biometry, or permission. Cr 3.

FES 541 Disturbance Ecology of Forest Ecosystems
Effects of fire, wind, land-use history and other disturbances on the composition, structure and function of forest ecosystems. Prerequisite: FES 407 or permission. Cr 3.

French (FRE)

FRE 101 Elementary French I
A systematic study of the basics of the French language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of French or fewer than two years in high school. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3-4.

FRE 102 Elementary French II
Continued study of the basics of the French language with equal emphasis on developing reading, comprehension, speaking and writing skills. For students with no previous study of French or fewer than two years in high school. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 101 or equivalent. Cr 3-4.

FRE 103 Elementary French I: Module
A systematic study of the French language that allows for the intensive exploration of specific components of the language acquisition process. The semester is divided into four modules, each lasting three weeks and during which classes meet for one hour each day. Modules will focus on acquiring specific skills associated with early language development listening comprehension, speaking and vocabulary expansion. Students wishing a more formalistic approach to language learning can register for modules focused on developing reading and writing skills in which the analysis of language functions is stressed. For students with no previous study of French or fewer than two years in high school. Satisfies the General Education Cultural Diversity and International Perspective Requirement. Cr 1-4.

FRE 104 Elementary French II: Modules
Continues study of the French language that allows for the intensive exploration of specific components of the language acquisition process. The semester is divided into four modules, each lasting three weeks and during which classes meet for one hour each day. Modules will focus on acquiring specific skills associated with early language development: speaking, accelerated vocabulary development, reading and writing. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 103 or equivalent. Cr 1-4.

FRE 199 Review French
For students who have taken 2 or more years of high school French, but do not feel ready to complete the FRE 201/202 sequence. Fast-paced review of basic grammar, pronunciation and vocabulary, with strong emphasis on oral communication. This is not the equivalent of FRE 201/202 level language courses. 2 class meetings per week, with substantial listening and writing assignments. Lec 2. Prerequisite: 2 years of high school French or permission. Cr 2.

FRE 201 Intermediate French I
An integrated approach. Reading texts of a literary and/or cultural nature, and audio-visual materials will be employed to strengthen reading, writing and especially speaking and comprehension skills. Includes a systematic but gradual review of the essentials of French grammar. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 102 or equivalent. Cr 3-4.

FRE 202 Intermediate French II
A continuation of FRE 201. Designed to strengthen reading, writing, speaking and comprehension skills. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 201 or equivalent. Cr 3-4.

FRE 209 Readings in French Literature I
Practice in reading French. Also prepares students for literature and civilization courses at the 400 level. Discussion in French. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 202 or the equivalent. Cr 3.

FRE 211 Intermediate French I: Modules
The semester is divided into four modules, each lasting three weeks and during which classes meet for one hour each day. Focuses on the exploration of a variety of cultural, literary, professional topics accessed through reading, audio-visual materials and multi-media documents. The program aims at

heightening the participant's proficiency at comprehending, speaking, reading and writing French and includes a programmed review of essential grammar for accurate expression both in speaking and writing. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 104 or equivalent. Cr 1-4.

FRE 212 Intermediate French II: Modules
A continuation of FRE 211. The semester is divided into four modules, each lasting three weeks and during which classes meet for one hour each day. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 1-4.

FRE 250 Multidisciplinary Readings in French
Intended to be taken in conjunction with a course from another department, this course supplements the content areas of the course to which it is attached and promotes increased proficiency in French through reading and discussion in French. May be repeated for credit. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 202 or permission. Cr 1.

FRE 305 French Conversation and Composition I
Systematic training in the correct usage of spoken and written French through a broad range of conversational situations and writing topics. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: FRE 202 or equivalent. Cr 3.

FRE 306 French Conversation and Composition II
Continued training in the correct usage of spoken and written French. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: FRE 305 or equivalent. Cr 3.

FRE 307 French for Business
For students of business, international affairs or related careers. Focuses on the development of vocabulary and the improvement of oral proficiency in business and social settings applied to various francophone settings. Applies technology to education by basing itself on a video textbook and requiring regular use of the Internet as a source of reading and information. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 212 or equivalent. Cr 3.

FRE 310 Readings in French Literature II
Continued practice in reading and discussion in French. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 305 or the equivalent. Cr 3.

FRE 315 Advanced French Conversation
Oral practice for the advanced language student. Course work revolves around the discussion of cultural and intellectual issues, as well as current political and social events, with a view toward increasing idiomatic and abstract vocabulary. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 305 or equivalent. Cr 3.

FRE 397 French (May Term)
Total immersion program. May be repeated for credit. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 212 or permission of instructor Cr 3.

FRE 398 French Immersion: Western France
A two-week total immersion program offered in Western France. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 205 or equivalent. Cr 3.

FRE 400 Advanced French Grammar
An exposition of grammatical and syntactical principles through conceptual presentations along with demonstrations and practice through exercises. Designed to enhance French language competency. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 305 or FRE 306 or permission. Cr 3.

FRE 401 Translation and Comparative Stylistics
An exposition of the principles of translation and comparative stylistics with practice via exercises and the translation of texts in both English and French. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: FRE 400 or permission. Cr 3.

FRE 404 Medieval and Renaissance French Literature
Origin, formation and development of a national literature as seen through prose, poetry and theater through the 16th century. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission of instructor. Cr 3.

FRE 405 Seventeenth Century French Literature
Literary trends in French classicism: Descartes, Pascal, Corneille, Racine, Moliere, La Fontaine, Lafayette. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission. Cr 3.

FRE 406 Eighteenth Century French Literature
Readings from the works of Montesquieu, Voltaire, Rouseau, Diderot, etc. , with special attention to Enlightenment thought and to the novel genre. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission of instructor. Cr 3.

FRE 407 19th Century French Literature
Readings of major 19th century figures, including Chateaubriand, Hugo, Flaubert, Zola, Balzac, Stendhal, Sand, and Baudelaire, with particular attention to social and philosophical themes as well as concepts of language. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission of instructor. Cr 3.

FRE 408 Twentieth Century French Literature
Readings in the novel, poetry or drama (content varies.) May be repeated for credit, with permission of instructor. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission of instructor. Cr 3.

FRE 413 Advanced Composition and Stylistics
An exposition of the fundamentals of French stylistics with practice of these principles via compositions and exercises. Designed to enhance competence in written idiomatic French. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: FRE 400 or permission. Cr 3.

FRE 420 French Phonetics
A formal study of the French sound system with considerable practice in phonetic transcription. Practical and remedial work in pronunciation. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 202 or the equivalent. Cr 3.

FRE 440 Franco-American Civilization
An interdisciplinary study of the French heritage in North America. (This course is identical to FAS 440.) Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3.

FRE 442 French Language of North America
A historical, linguistic and socio-linguistic approach to the study of the Franco-Quebec and the Franco-American languages. Emphasis on the morphology, syntax, vocabulary and phonetic system in order to understand the present status of the languages. Research in the areas of the spoken and written language. (This course is identical to FAS 442.) Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission. Cr 3.

FRE 457 French Civilization
Readings, discussions, lectures, written and oral reports on varied aspects of French Civilization, its people, attitudes, institutions, and culture. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 202 or the equivalent. Cr 3.

FRE 463 Quebec Poetry
A survey of Quebec poetry from the 19th century to the present, focusing on language, theme, socio-historical and political context, ideology and Quebec identity. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Prerequisite: FRE 209 or FRE 310 or permission. Cr 3.

FRE 464 Quebec Theatre
A survey of Quebec from the 1940s to the present, focusing on language, theme, character, theatricality, socio-historical and political context, ideology and Quebec identity. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Prerequisite: FRE 209 or FRE 310 or permission. Cr 3.

FRE 490 Topics in French
Topics in French and French-Canadian literature may include: contemporary cinema, surrealism, contemporary French thought, modern French critical theory, semiotics, symbolism, literature of commitment, images of women, women writers. Topics vary. May be repeated for credit. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: FRE 209 or FRE 310 or permission. Cr 1-3.

FRE 497 Independent Projects I
Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 1-3.

FRE 498 Independent Projects II
Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 1-3.

FRE 500 History of the French Language
Study of the evolution of standard and regional French from the earliest times to the present. Cr 3.

FRE 504 Seminar in Medieval and Renaissance Literature
History and development of literary ideas expressed through the epic, theater, romance and poetry of the Medieval period. Readings from the major writers of the French Renaissance: Rabelais, Montaigne, DuBellay, Ronsard. Cr 3.

FRE 505 Seminar in French Classicism
Aspects, groups, and genres in literature of the 17th century. Special emphasis on Corneille, Descartes, Pascal, Racine and Moliere. Cr 3.

FRE 506 Seminar in Literature of the Eighteenth Century
Individual writers, genres, or themes. Special emphasis on Montesquieu, Prevost, Voltaire, Rousseau and Diderot. Cr 3.

FRE 507 Seminar in Literature of the Nineteenth Century
Individual writers, genres, or themes. Special emphasis on Hugo, Stendhal, Balzac, Flaubert, Zola, and Baudelaire. Cr 3.

FRE 508 Seminar in the Novel
Trends and periods in development of the novel and narrative form in France. Content varies from year to year. May be repeated for credit. Cr 3.

FRE 509 Seminar in Poetry
Movements in French poetry. The periods, groups and trends studies vary year to year. Course may be repeated for credit. Cr 3.

FRE 510 Seminar in the Theatre
Content varies year to year. Course may be repeated for credit. Cr 3.

FRE 520 French Linguistics
French phonology and morphology studied from the generative transformational viewpoint. Analysis of selected areas of French grammar. Attention given to historical development of the language in relation to its present structure. Prerequisite: INT 410 or FRE 420 or permission. Cr 3.

FRE 597 Projects in French I
Cr 3.

FRE 598 Projects in French II
Cr 3.

Forest Operations Science (FSC)

FSC 300 Forest Products Protection
Covers factors affecting wood quality in living trees and of wood in service. Includes tree response to injury and infection, and how wood is attacked by fungi and other agents. Fundamentals of how wood may be protected from decay, etc. to prolong useful life are discussed. Basic factors affecting timber quality are examined. Taught at a general level, topics include importance of decay of woody material to carbon cycling, and management recommendations to improve timber quality. Addresses environmental concerns associated with the use of wood preservatives. Rec 3, Lab 2. Cr 4.

FSC 301 Forest Machinery
A study of the selection, design, and operation of forest machines in forest operations, including machine types, functions, capabilities, and maintenance. Power sources, power transmission, traction, and impacts on the forest environment are analyzed. Emphasis on harvesting machines and systems, including cable logging, but coverage of nearly all machines that are used in other forest operations is included. Lec 2, Lab 2. Prerequisite: PHY 111 or permission. Cr 3.

FSC 345 Special Problems
Original investigation in forest engineering, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

FSC 394 Cooperative Education
Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission. Cr 1-16.

FSC 395 Internship
A professional activity under the general supervision of an experienced professional with a high degree of responsibility placed on the student. Learning objectives are pre-established and agreed upon between the faculty coordinator and the placement supervisor. Not normally repeated. Cr Ar.

FSC 396 Field Experience
A field experience is a professional activity participated in by students under the supervision of a practicing professional in the field. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of a

faculty member for academic credit for the learning involved. May be repeated. Cr Ar.

FSC 401 Timber Harvesting
Harvesting methods in the United States and Canada, with special emphasis on Maine. Discussion on organization, equipment, forest road construction and regulations. Lec 2, Lab 3. Cr 3.

FSC 403 Forest Roads
Design, construction, and maintenance of improvised road systems and bridges; road-vehicle interactions; design and construction of light buildings for forest and recreational use. Lec 2, Lab 3. Cr 3.

FSC 405 Timber Appraisal and Acquisition
An in-depth treatment of the procurement process, including acquisition and appraisal, from the perspective of foresters, loggers, and landowners. Provides students with both broad experiential and analytic exposure as it occurs on both private industrial and non-industrial forest ownerships by procurement foresters representing large and small timber-fiber processing concerns, consulting and landowner assistance foresters, and professional loggers. Prerequisite: FSC 401. Cr 2.

FSC 408 Forest Operations Planning and Analysis
Forest operations planning and analysis procedures, particularly as they pertain to timber harvest planning and administration in the context of an appreciation for other forest values, as well as social and environmental constraints. Satisfies the General Education Capstone Experience Requirement. Prerequisite: FSC 301, FSC 403, FSC 405 and WSC 425 or permission. Cr 3.

FSC 489 Social Dimensions of Forest Practices
Explores the social environment within which forest operations are conducted, including public attitudes, timber-dependent community stability and sustainability, labor issues and forest ownership. (Because of overlap, students may not enroll in FSC 489 and FSC 501.) Cr 3.

Food Science and Nutrition (FSN)

FSN 101 Introduction to Food and Nutrition
A survey of food and nutrition principles, including the influence of food patterns on health and physical performance; description of a balanced diet; study of the nutrients, interrelationships, sources, effects of processing and storage, food safety, fads, controversies. Satisfies the General Education Applications of Scientific Knowledge Requirement. Cr 3.

FSN 103 Science of Food Preparation
Basic food preparation skills. The relationship between structure, composition and nutritive value of foods. Lec 2, Lab 2. Prerequisite: FSN 101. Cr 3.

FSN 202 Foodservice Management
An overview of the foodservice industry including quantity food production and service, designing physical facilities and administration of foodservice facilities. Topics covered include food and worker safety, menu planning, purchasing, receiving, storage, production, assembly, distribution, service, facility design and equipment, management functions and financial principles. Lec 3, Lab 4. Prerequisite: FSN 103 and COS 101, COS 102, COS 103. Cr 4.

FSN 230 Nutritional and Medical Terminology
Fundamentals of vocabulary for nutritionists and other health professionals. Web-based. Cr 1.

FSN 238 Applied Food Microbiology and Sanitation
Microbiology as it applies to the causes and control of food spoilage; issues of food safety and sanitation in food systems. Upon completion of the course, students will be eligible for an Educational Foundation SERSAVE certification. Cr 3.

FSN 270 World Food and Nutrition
Investigation of the adequacy of world food supplies, and of the contributions to malnutrition made by poverty, government policies, and population growth. Satisfies the General Education Cultural Diversity and International Perspectives and Population and the Environment Requirements. Cr 3.

FSN 280 Human Nutrition for the Health Professions
Designed for nursing, premedical students and others in the health professions. Discussion of both nutrition, health and disease, nutrient metabolism and nutritional assessment. Prerequisite: BMB 208 and BIO 208. Cr 3.

FSN 301 Life Cycle Nutrition
Principles of nutrition applied to needs of individuals throughout life. Study of relationship among nutrition, growth, development, and aging with emphasis on physical and psychosocial influences on nutritional status. Satisfies the General Education Writing Intensive Requirement. Lec 3. Prerequisite: FSN 101, CHY 121 BIO 208 or equivalent and junior standing or permission. Cr 3.

FSN 330 Introduction to Food Science
Covers general characteristics of raw food materials, principles of food preservation, processing factors which influence quality, packaging, water and waste management and sanitation. Lec 3. Prerequisite: BIO 100 and CHY 121 or permission. Cr 3.

FSN 340 Food Processing Laboratory
An introduction to thermal processing, freezing, dehydration, extrusion and curing as applied to food products in the laboratory. Lab 3. Corequisite: FSN 330. Cr 1.

FSN 396 Field Experience in Food Science and Human Nutrition
An approved program of work experience which contributes to the academic major and for which academic credit is given. Students may work part time or full time for a semester in a job related to their professional career goals. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission. Cr 1-16.

FSN 397 Independent Studies
Independent studies in specific areas of food management, food science and human nutrition. Prerequisite: permission. Cr 1-6.

FSN 401 Community Nutrition
Examines human needs and delivery systems within community setting. Focus on designing, implementing, and evaluating nutrition education programs or intervention projects. Field experience. Satisfies the General Education Capstone Experience Requirement. Lec 2, Lab 4. Prerequisite: FSN 301 and senior standing or permission. Cr 4.

FSN 410 Human Nutrition and Metabolism
Science of human nutrition is studied, stressing body metabolism as integrated with organ function for normal individuals, and requirements for energy and nutrients. Prerequisite: BIO 208 and BMB 322. Cr 3.

FSN 420 Abnormal Nutrition
Metabolic and physiological alterations of disease processes. Modification of normal diets to treat specific diseases. Development of nutrition care plans. Lec 4. Prerequisite: FSN 410 and BIO 377 or NUR 303. Cr 4.

FSN 430 Counseling and Diet Therapy
Nutrition counseling theory and techniques including patient interviews and diet education sessions. Calculate diet modifications for different disease states. Develop patient education materials. Prerequisite: FSN 420 or permission. Cr 3.

FSN 436 Food Law
Examination and discussion of federal laws and regulations applying to the processing, handling, distribution and serving of food products. Satisfies the General Education Ethics and Writing Intensive Requirements. Prerequisite: FSN 330 or permission. Cr 3.

FSN 438 Food Microbiology
Examines the importance of microorganisms in food processing, spoilage, and preservation; the role of microorganisms in fermentation and production of protein, enzymes, and other products; food as vehicle of infection and intoxication. Lec 3, Lab 4. Prerequisite: BMB 300. Cr 4.

FSN 440 Utilization of Aquatic Food Resources
Utilization and food quality of wild and farmed aquatic animals including production, chemical/physical properties, nutritional value, post-harvest changes, processing systems, regulatory issues, by-product utilization and food safety. Lec 3. Prerequisite: BIO 100 and CHY 121 or permission. Cr 3.

FSN 450 Food Biotechnology
Introduction to methods and tolls applied to the production of biotechnology-derived foods and food ingredients. Discussion of food safety, product quality, consumer acceptance, regulatory oversight and ethical issues regarding the use of biotechnology to enhance the food supply. Lec 2. Prerequisite: BIO 100 or permission. Cr 2.

FSN 482 Food Chemistry
Study of the composition, structure, and properties of foods and chemical changes occurring during processing and utilization. Lec 3. Prerequisite: BMB 322 or CHY 252. Cr 3.

FSN 483 Food Chemistry Laboratory
Laboratory exercises covering the principles presented in FSN 482. Lab 3. Corequisite: FSN 482. Cr 1.

FSN 489 Senior Project in Food Science and Human Nutrition
A research project will be conducted under the supervision of a faculty member. Written reports and an oral presentation of results are required. Satisfies the General Education Writing Intensive Requirement. Prerequisite: senior standing and permission. Cr Ar.

FSN 501 Advanced Human Nutrition
Basic nutrition science with emphasis on protein, vitamin, macromineral and endocrine function and metabolism. Relationships of diet to human health and well-being. Prerequisite: FSN 410 or permission. Cr 3.

FSN 502 Food Preservation
Chemicals and processes (freezing, dehydration, canning, irradiation, extrusion) used to extend food quality and safety. Prerequisite: FSN 330 or permission. Cr 3.

FSN 510 Trace Minerals
A study of trace mineral metabolism with special emphasis on digestion and absorption. Covers excretion, storage and homeostatic mechanisms and the interactions of trace minerals to other dietary inorganic and organic components. Emphasis on clinical conditions. Prerequisite: FSN 410 and BIO 377 or permission. Cr 3.

FSN 512 Hazard Analysis Critical Control Points
In-depth study of the development of the Hazard Analysis Critical Control Points (HACCP) system and its application to the food processing industry. Understanding the role of HACCP in insuring a safe food supply at the local, national and international level is studied. Lec 3. Prerequisite: permission. Cr 3.

FSN 514 Principles of Thermal Processing
Principles of processing of low-acid canned foods and acidified foods, including an understanding of thermal process schedules, types of processing equipment, sanitation and spoilage of thermally processed foods. Lec 1. Prerequisite: permission. Cr 1.

FSN 520 Food Product Development
An overview of the processes required to create and introduce new food products to the marketplace. Students will follow the development team approach to conceptualize, formulate and evaluate food products. Satisfies the General Education Capstone Experience Requirement. Lec 2, Lab 3. Prerequisite: FSN 330 or permission. Cr 3.

FSN 530 Complementary Nutrition Practices
Review of nutrition research study criteria and discussion of alternative practices such as traditional Chinese medicine, Ayurvedics, homeopathy, naturopathy and dietary supplements and their effects on nutritional status. Prerequisite: one human nutrition course at the 300-level or higher and one statistics course or permission. Cr 3.

FSN 540 Advanced Clinical Topics
A critical evaluation of medical nutrition therapy in the inpatient clinical setting. Application of the current medical literature to practice decisions. Nutritional goals for a variety of medical conditions are discussed. Prerequisite: FSN 420 or equivalent. Cr 3.

FSN 571 Technical Presentations
Introduction to technical presentations. Computer graphics, slide making and presentation skills are emphasized. Students present one 15-20 minute talk. Cr 1.

FSN 581 Problems in Food Science and Human Nutrition
Special topics - Opportunity is provided to pursue an individualized topic in the food science or human nutrition area. Prerequisite: permission. Cr Ar.

FSN 582 Major Food Constituents
Composition, structure and properties of foods and the chemistry of changes occurring during processing and utilization. Prerequisite: BMB 322 or CHY 252 or permission. Cr 3.

FSN 584 Lipids in Health and Disease
Lipid metabolism and the effect of dietary lipids on cardiovascular disease. Includes lipid classification, digestion, absorption and metabolism, with emphasis on cholesterol and lipoproteins. An in-depth look at recent research advances in lipids, particularly as they relate to atherosclerosis. Prerequisite: FSN 410 and BIO 377. Cr 3.

FSN 585 Sensory Evaluation of Foods
Methods and techniques including experimental design and statistical analysis. Prerequisite: MAT 437 or PSE 509 or permission. Cr 3.

FSN 587 Food Analysis
Nutrient composition, residues and natural toxicants, with emphasis on the use of GC and HPLC. Lec 1, Lab 6. Prerequisite: BMB 322 or FSN 582 or permission. Cr 3.

Forestry (FTY)

FTY 101 Introduction to Forest Resources
A survey course designed to introduce first-year, first-semester forestry students to the history, current issues and breadth of professional opportunities related to forestry. Rec 2. Cr 1.

FTY 104 Statistical Inference for Forest Management
Provides an introduction to the language of probability and statistical inference applied to forestry. Topics include: distribution of binomial and normally distributed random variables, two-sample tests, simple random, systematic and stratified sampling, multi-stage sampling, confidence intervals and basic regression analysis. Satisfies the General Education Mathematics Require-ment. Lec 3. Prerequisite: At least MAT 111-level competence is required. Cr 3.

FTY 105 Introduction to Forest Measurements
Basic field measurements for determining the volume of standing and felled timber. Basic field data collection methods and data recording techniques. Cr 3.

FTY 107 Forest Vegetation
An introduction to the identification, distribution, taxonomy, silvics and utilization of North American tree species. Emphasis on the dominant forest cover types typical of each region of the U.S. together with their

associated shrub and herbaceous communities. Site affiliations and the relationships to selected vertebrate wildlife species are included. Lec 3, Lab 3. Prerequisite: Forest Ecosystem Science, Forest Operations Science, Forestry, Parks, Recreation and Tourism and Wood Science and Technology Majors Only. Cr 4.

FTY 206 Photogrammetry and Remote Sensing
Vertical and horizontal measurements from air photos and topographic maps. Interpretation and mapping of forest types, introduction to non-photographic remote sensing systems. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Prerequisite: MAT 122 (or higher) or FTY 208. Cr 3.

FTY 208 Forest Surveying and Mapping
An introductory course presenting fundamental plane surveying concepts and mapping techniques including: distance and angular measurements, traverse computations, area determination, land surveying and recording systems, basic skills of map preparation, and computer-assisted cartography. Lec 3, Lab 4. Prerequisite: Algebra and trigonometry. Cr 3.

FTY 210 Wildland Fire Management
Forest fire behavior as influenced by fuels, weather, topography. Ecological effects of fire. Methods of preventing and controlling fires. Use of fire in forest management. Rec 2. Cr 2.

FTY 241 Field Practice in Forest Management
Three-week intensive field training in the skills needed for professional, integrated management of productive woodlands. Reinforces basic skills in forest mensuration; stresses the multi-dimensional nature of forest resources and introduces the disciplines of forest protection, forest roads, forest products, forest ecology, GPS and Geographic Information Systems. Field work includes an in-depth training in forest harvesting techniques and field trips on selected forestry topics. Prerequisite: First-year student and American Red Cross Adult First Aid/CPR current certification. Cr 3.

FTY 266 Advanced Forest Measurements
The objective of the course is to gain both an understanding of and field practice in forest management that builds on the knowledge; experiences and analytical skills obtained in FTY 105. Specific subject areas include cull estimation; local volume table construction using simple linear regression; site quality evaluation; tree growth and stem analysis; stand growth; growth and yield and the use of multiple regression estimation; timber trespass estimation; probability proportional to prediction forest sampling and forest inventory planning, execution and analysis. Lec 2, Lab 3. Prerequisite: FTY 104, FTY 105 Cr 3.

FTY 345 Special Problems
Original investigation and/or readings on forest resources problems, the subject to be chosen after consultation with staff. Open to high-ranking juniors and seniors. Cr Ar.

FTY 349 Principles of Forest Management
A survey of forest management designed for students majoring in related fields. Emerging technologies, conflicts and issues are presented relative to defining and achieving land management goals and objectives. Lectures apply forest ecology, biology, silviculture, harvesting, and economics to the protection and management of public and private forest land. Laboratories reinforce practical field skills in locating, inventorying and assessing stands and forests. Lec 2, Lab 2. Prerequisite: Third or fourth-year majors in Ecology and Environmental Sciences (Resource and Environmental Policy Concentration), Parks, Recreation and Tourism or Wildlife Ecology or permission. Closed to majors in programs leading to a B. S. in Forestry or Forest Operations Science Cr 3.

FTY 394 Cooperative Education
Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission of the Forestry Curriculum Committee. Cr Ar.

FTY 396 Field Experience
A field experience is a professional activity participated in by students under the supervision of a practicing professional in the field. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of the Forestry Curriculum Committee for academic credit for the learning involved. May be repeated. (Pass/Fail Grade Only.) Prerequisite: permission. Cr Ar.

FTY 410 Artificial Regeneration
Production of planting stock, establishment of forest plantations and application of tree improvement in artificial regeneration. Lec 3. Cr 3.

FTY 415 Forest Genetics
The distribution of genetic variation in forest tree populations as related to processes of natural selection and adaptation to environmental factors and the impacts of forest management practices on genetic variation. Lec 3. Prerequisite: FES 100 or BIO 100. Cr 3.

FTY 430 Urban and Community Forestry
Management of tree populations in urban areas, including economic, biological, and social benefits of urban trees and community forests. Cr 3.

FTY 444 Forest Resources Economics
Economics of domestic and international forest resources production, processing and distribution. Contributions of forest resources to local, regional, and national economies. Fundamentals of financial analysis. Evaluation of priced and unpriced forest resources for acquisition, taxation, management, and disposal. Satisfies the General Education Social Contexts and Institutions Requirement. Lec 3. Prerequisite: INT 110 or equivalent. Cr 3.

FTY 446 Forest Resources Policy
Mechanisms involved in, and influences on the evolution of national, state and private forest policies in the United States and other nations. Development of professional codes of ethics in Forestry and examination of professional, private business, environmental, and public sector ethical challenges, particularly in the formation of forest policies. Satisfies the General Education Social Contexts and Institutions and Ethics Requirements. Lec 3. Cr 3.

FTY 456 Advanced Forest Biometry
Principles and exploration in detail of approaches to forest sampling and inventory and advanced aspects of the growth and yield modeling of forest stands. Prerequisite: FTY 266. Cr 3.

FTY 457 Forest Watershed Management
Relationship between forests and the water resource. Effects of forest activities and other aspects of land use on water yield and quality. Overview of current water resource problems and conflicts. Prerequisite: PSE 250, FES 407. Cr 3.

FTY 476 Forest Management I
Principles for establishing and operating a small forestry business. Administration of private, state and federal forestry enterprises. Forestry decision support systems. application of both traditional field forestry skills and modern software to develop a practical plan for the management of a real, small-woodland scale working forest. Together with FTY 477 this course Satisfies the General Education Capstone Experience Requirement. Prerequisite: Senior Standing in Forestry or Forest Operations Science or permission of instructor. Cr 4.

FTY 477 Forest Management II
Integration of biophysical and socioeconomic

sciences for the multiple use management to achieve desired products, services and conditions of forest lands. Application of modern analytical procedures for strategic, tactical and operational forest management planning up to the landscape level. Together with FTY 476, Satisfies the General Education Capstone Experience Requirement. Prerequisite: FTY 476 or permission. Cr 4.

FTY 480 Applied Geographic Information Systems
An introduction to the methods and processes for the application of geographic information systems to natural resource management. Emphasis is placed on project planning and hands-on experience in systems operation. Lec 3, Lab 2. Prerequisite: FTY 208 or SIE 211 and permission of instructor. Cr 3.

FTY 526 Satellite Remote Sensing of Forests
Advanced remote sensing concepts, characteristics of satellite multispectral scanner systems, geo-based digital image processing and natural resource applications. Environmental monitoring case studies. Lec 3, Lab 1. Prerequisite: permission. Cr 4.

FTY 532 Forest Influences
Effects of forest vegetation on climate, soil water, stream flow, erosion and soil productivity. Prerequisite: FES 407 and PSE 250. Cr 2.

FTY 540 Forest Products Marketing
Development of market segments and marketing strategies for domestic and international forest products markets including pulp and paper, hardwood lumber, softwood lumber, logs and in wood-based composites. Lec 3. Prerequisite: permission. Cr 3.

FTY 546 Forest Policy Analysis
Methods of economics and management science suitable for the assessment of priced and unpriced forest resource values. Analytical methods for individual and social decision making in the allocation and management of forest resources. Applications to problems posed by current Maine, U.S. and international forest management problems and forest policy issues. Prerequisite: permission. Cr 3.

FTY 575 Advanced Forest Management
Application of advanced strategic, tactical and operational planning concepts and models to the multiple-use management of public and private forest lands. Prerequisite: FTY 475 or equivalent or permission. Cr 3.

General Engineering (GEE)

GEE 100 Introduction to General Engineering
An introduction to University life and the requirements of the General Engineering program. Emphasis on building skills in use of information resources, group dynamics and study skills. (Pass/Fail Grade Only.) Prerequisite: General Engineering first-year students Cr 1.

GEE 126 Engineering Fundamentals I
A calculus based course focusing on the fundamentals of basic engineering areas. Topics will include statics, circuits, and dynamics. Calculus topics studied will include differential and integral methods, basic vector and linear algebra techniques, and associated topics. Prerequisite: Students must pass the math placement exam. Cr 4.

GEE 284 Engineering Economics
A study of economic theory and applications in engineering and industrial organizations including capitalization, amortization, time value of money, cost comparison analysis, and breakeven value. Also included are personal finance topics as applied to engineering situations and case study. (This course is identical to MET 484.) Lec 3. (Fall.) Prerequisite: permission of instructor. Cr 3.

GEE 398 Special Topics in Engineering
Topics will vary from semester to semester. Cr Ar.

Geography (GEO)

GEO 201 Introduction to Human Geography
A survey of human geography, paying particular attention to the five themes of Geography: location, cultural and economic aspects of place, human-environment interaction, movement and migration and regional geography. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Population and the Environment Requirements. Cr 3.

GEO 210 Geography of Maine
A survey of spatial relationships and characteristics with a brief study of the development of Maine's landscapes and focus on land use change and conflict, regional inequalities, locational decision-making, environmental management and planning and the personality of places. Cr 3.

GEO 250 Early Modern North America in Atlantic Perspective
Reflecting the increasing globalization of modern society, this course employs an Atlantic perspective to understand the international history of early modern North America. Focuses on the geography of the European empires that shaped North America, beginning with the Spanish and the French, and then focusing on the British and the revolt of the American colonies. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Cr 3.

GEO 401 Historical Geography of the United States
A survey of the exploration, settlement, economic development and cultural landscape of the United States from 1500 to the present. Particular attention paid to the New England region. Prerequisite: junior standing. Cr 3.

GEO 425 Historical Geography of Maine
A geographical analysis of the historical development of Maine. Pays particular attention to environmental, cultural, and trans-border issues. Satisfies the General Education Population and the Environment Requirement. Prerequisite: Junior standing. Cr 3.

GEO 450 Historical Geography of Canada
A survey of the exploration, settlement, economic development and cultural landscape of Canada from 1500 to present. Particular attention paid to Atlantic Canada. Prerequisite: junior standing. Cr 3.

German (GER)

GER 101 Elementary German I
The basics of the German language. Emphasis on developing reading, comprehension, speaking and writing skills. For students with no previous study of German or fewer than two years in high school. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3-4.

GER 102 Elementary German II
Continued study of the basics of the German Language. Emphasis on developing reading, comprehension, speaking and writing skills. For students with no previous study of German or fewer than two years in high school. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 101 or equivalent. Cr 4.

GER 121 Elementary German (Schnelldeutsch)
A beginning course in the German language for students with no previous study of German or fewer than two years in high school. A full year's work covered in one semester. Satisfies the General Education

Cultural Diversity and International Perspective Requirement. Cr 6.

GER 199 Review German
For students who have taken 2 or more years of high school German, but do not feel ready to complete the GER 203-204 sequence. Fast-paced review of basic grammar, pronunciation and vocabulary, with strong emphasis on oral communication. This is not the equivalent of GER 203/204 level language courses. 2 class meetings per week, with substantial listening and writing assignments. Lec 2. Prerequisite: 2 years of high school German or permission. Cr 2.

GER 203 Intermediate German I
An integrated approach. Reading texts as well as various audiovisual materials will be employed to strengthen reading, writing and especially speaking and comprehension skills. Includes a systematic but gradual review of the essentials of German grammar. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 102 or equivalent. Cr 3-4.

GER 204 Intermediate German II
A continuation of GER 203. Designed to strengthen reading, writing, speaking and comprehension skills. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 203 or equivalent. Cr 3-4.

GER 223 Intermediate German (Schnelldeutsch)
An integrated approach employing various materials to strengthen reading, writing, speaking and comprehension skills. Includes a systematic but gradual review of the essentials of German grammar. A full year's work covered in one semester. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 102 or GER 121 or equivalent. Cr 6.

GER 305 Practical German
Conversational and composition language course designed to further develop students' comprehension, speaking and writing skills for everyday use. All classes are conducted in German. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: GER 204 or equivalent. Cr 3.

GER 306 Readings in German Literature I
An introduction to German literature and culture. Accessible but significant texts from 18th to 20th century. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 204 or equivalent. Cr 3.

GER 307 German for the Professions
Students of International Relations, Business, Engineering or related fields with moderate proficiency will gain familiarity with specialized language and conventions in professional situations. Authentic, up-to-date information will require the regular use of the Internet as a source of reading. Audio-visual material will be integrated with cultural awareness training. Multiple types of writing assignments will help students improve written structure. All classes are conducted in German. Satisfies the General Education Social Contexts and Institutions, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: GER 204 or equivalent. Cr 3.

GER 401 German Civilization
Readings, discussions, lectures, oral and written reports on Germany, its people, institutions, and culture provide background essential to an understanding of German literature, thought, and artistic expression. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 204 or the equivalent. Cr 3.

GER 402 Contemporary Germany
A study of modern German civilization and Landeskunde; the political, social and intellectual development of Germany from 1945 to present. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 204 or the equivalent. Cr 3.

GER 403 History of the German Language
Studies the development of the German language from Indo-European times to the present. Places present day German in its linguistic perspective, and examines the reasons and origins of specific forms, patterns and usages. Provides the prospective teacher with a linguistic background in German. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: GER 204 or the equivalent. Cr 3.

GER 404 Translation: Theory and Practice
Thought and theory behind the process of translation with ample opportunity for analysis and practice. (German-English, English-German.) Prerequisite: GER 204 or equivalent. Cr 3.

GER 406 Goethe
Readings from selected works of prose, poetry and drama from Goethe's classical period, with lectures on historical background and influence on later German literature. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3.

GER 420 German Film
Examines development of German film from its beginnings. Student analyzes various film genres as artistic expression of specific time periods. Critical readings of gender representation and minority perspectives clarify the Nazi legacy and other issues facing multi-cultural post-war Germany, Austria and Switzerland. Film theory and issues of script writing and story board development will be as much part of class discussion as the connections between German exiles in Hollywood and the Central European film industry. Class conducted entirely in German. Satisfies the General Education Western Cultural Tradition and Artistic and Creative Expression Requirements. Prerequisite: Any 300-level course or instructor permission. Cr 3.

GER 490 Topics in German
Specific topics vary from semester to semester. May be repeated for credit. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 1-3.

GER 497 Projects in German I
Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 1-3.

Geological Sciences (GES)

GES 100 An Introductory Survey of Geology
An introduction for non-science majors to the main features and processes included in the science of geology. This course has two main goals: (1) To develop an appreciation by the students of the scientific method as applied by geologists, and (2) To develop in the students an appreciation of the aesthetic, social, political, environmental and economic aspects of the topics included in the study of geology. One field trip. Satisfies the General Education Applications of Scientific Knowledge Requirement. Lec 3. Cr 3.

GES 101 Introduction to Geology
A study of earth materials and processes, including their impact on humans. Topics include mineralogy, formation of igneous, metamorphic and sedimentary rocks, geologic time, weathering and soil formation, glaciation, deserts and desertification, coastlines, earthquakes and seismology, and evolution of mountain belts and plate tectonics. Laboratory work includes the study of rocks, minerals, topographic maps and aerial photographs in preparation for a one-day field trip to Acadia National Park. Satisfies the General Education Laboratory in the Basic or Applied Sciences Requirement. Lec 3, Lab 3. Cr 4.

GES 102 Environmental Geology of Maine
After developing an understanding of rocks, minerals and geologic time, the course explores the modern distribution of natural geologic resources that limit human activity and influence political and economic decision-making. Examines the impact of humans on the physical and chemical environment and subsequent impact on the biosphere, and geologic hazards. Ends with a detailed look at the terrestrial and marine geologic records related to climate change and explores hypotheses related to the mechanisms and rates of climate change. The emphasis in the course is on the Maine geologic environment. One-day field trip. Satisfies the General Education Laboratory in the Basic or Applied Sciences and Population and the Environment Requirements. Lec 3, Lab 3. Cr 4.

GES 103 Dynamic Earth
Explores how Earth's dynamic processes interact with humans by evaluating: the interplay between Earth's interior, hydrosphere, biosphere and atmosphere; the effects and underlying causes of natural hazards such as earthquakes, volcanic eruptions, tidal waves and global warming; Earth's economic and energy resources how they form and how long they will lasts; and the global environment and how best to interact with it. Satisfies the General Education Applications of Scientific Knowledge and Population and the Environment Requirements. Lec 3. Cr 3.

GES 104 Dinosaurs
A study of this fossil group emphasizing the paleontological methods scientists use to learn about the environments in which Dinosaurs evolved, lived, and their habits and behavior. Topics include: Origin, evolution, and characteristics of the principal groups of Dinosaurs, Dinosaur trace fossils, Behavior and biology, and controversial topics including "Warm-Blooded Dinosaurs", the Origin of Birds, and Dinosaur Extinction. Two lectures plus one 2-hour laboratory each week, and a required field trip to the Triassic of the Connecticut River Valley and Dinosaur State Park. Laboratory and Field Trip. Satisfies the General Education Applications of Scientific Knowledge Requirement. Lec 2. Prerequisite: GES 101 recommended but not required. Cr 3.

GES 108 Beaches and Coasts
An introduction to coastal landforms, including beaches, salt marshes, tidal flats and sea cliffs, their origins, global distribution, and associated nearshore processes. Human impacts to the coastal zone, including coastal erosion, land loss and management, and human responses to sea-level change are considered. One day field trip. Lec 3. Satisfies the General Education Applications of Scientific Knowledge and Population and the Environment Requirements. Cr 3.

GES 109 Geology of Maine
An introduction to the minerals, rocks, groundwater, coastline, geomorphology, geological history, and geoenvironmental problems of Maine. Three weekend field trips. Prerequisite: GES 101 or GES 102 or permission of instructor. Cr 3.

GES 110 Coastal Geology of New England and the Canadian Maritimes
Reviews the bedrock, glacial and coastal processes that formed the shoreline of New England and adjacent Canadian Provinces. The distinction between this region and the rest of the east coast of North America is developed. Stress is placed on understanding the integrated influence of bedrock, glacial and modern processes on the geomorphology of coastal regions. Cr 3.

GES 121 Humans and Global Change
Explores how Earth's climate system works and how past environmental changes affected humans on time scales ranging from interannual to hundreds of thousands of years. Topics will range from the development of agriculture at the beginning of the current interglaciation to how humans are now changing global climate through the addition of greenhouses gases to the atmosphere. Satisfies the General Education Population and the Environment Requirement. Cr 3.

GES 140 The Atmosphere
The nature of planetary atmospheres, physical processes in the atmosphere, clouds and precipitation, global climate, seasons, natural and anthropogenic climate change, forecasting of storms. Satisfies the General Education Laboratory in the Basic or Applied Sciences Requirement. Lec 3, Lab 2. Cr 4.

GES 200 Earth Systems
A survey of dynamic topics in earth sciences, emphasizing active participation in on-going faculty research in topics such as: global climate change, changing sea levels, geochemical cycles, plate tectonics and mountain building, and the geological evolution of the northern Appalachians. Multiple field trips and ideal for students with interest in studying or teaching earth sciences. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 3. Prerequisite: any 100-level UMaine Geology course. Cr 4.

GES 221 Geologic Problems I
Students conduct an original investigation and report findings. May not normally be used as a required geology elective. May be repeated for credit. Prerequisite: permission of instructor. Cr 1-3.

GES 222 Geologic Problems II
Students conduct an original investigation and report findings. May not normally be used as a required geology elective. May be repeated for credit. Prerequisite: permission. Cr 1 or 2.

GES 314 Invertebrate Paleontology
Description and classification of the important phyla of fossil invertebrates and a survey of their use in biostratigraphic, evolutionary, paleoecologic, and other studies. One or more day or weekend field trips. Lec 2, Lab 4. Prerequisite: GES 101 or GES 102. Cr 3.

GES 315 Principles of Sedimentology and Stratigraphy
Basic concepts and techniques of stratigraphy and sedimentation. Field trips to local environments and outcrops. Laboratories emphasize practical analytical techniques of sedimentology, petrography of sedimentary rocks in hand specimens and thin section, and modern stratigraphic approaches. Satisfies the General Education Writing Intensive Requirement. Lec 3, Lab 3. Prerequisite: GES 101 or GES 102 or GES 106, MAT 232 or permission. Cr 4.

GES 324 Geology of North America
Covers the geologic development of selected regions of North America that illustrate the theories and principles of continental evolution. Lec 3. Prerequisite: GES 101 or GES 102. Cr 3.

GES 325 Ore Deposits-Origin and Exploration
The chemical and physical factors controlling the formation of metallic mineral deposits. Information derived from experimental work is considered and related to field observations. Techniques employed in ore deposit exploration are explained as they apply to specific geologic situations. Lec 4. Prerequisite: GES 330 and GES 416 or permission. Cr 4.

GES 330 Mineralogy
Introduction to crystallography and the crystal chemistry and identification of common rock-forming minerals. Minerals will be identified using various physical properties and analytical methods. Lec 3, Lab 4. Prerequisite: CHY 121. Cr 4.

GES 333 Igneous and Metamorphic Petrology
Serves as an introduction to the formation, textures and classification of igneous and metamorphic rocks. Field relationships and

hemical systems of these rocks are vestigated. Several weekend field trips are quired. Petrographic microscopes and other nalytical techniques are used in the boratory. Lec 3, Lab 3. Prerequisite: GES 30. Cr 4.

ES 416 Introduction to Structural Geology
xplores the principles of structural geology, ith emphasis on the geometry, kinematics nd dynamics of Earth deformation. Includes veral field trips with the aim of integrating eld observations and theory. Satisfies the eneral Education Writing Intensive equirement. Lec 2, Lab 3. Prerequisite: GES 33, PHY 111 or PHY 112, MAT 126. Cr 4.

ES 417 Introduction to Geophysics
ntroduction to geophysical studies of the arth. Seismological, gravity, magnetic, lectrical and geothermal studies of the arth's lithosphere are emphasized. Field xercises on one afternoon of selected weeks; ourse problem solving requires spread heeting/ graphical applications using vailable personal computers. Lec 3. Prerequisite: GES 101 or GES 102, MAT 127, PHY 111 and permission. Cr 3.

ES 441 Principles of Glacial Geology
Topics include glaciers and their deposits, low dynamics of glaciers, mechanics of rosion, transportation and deposition, evelopment of soils, isotopic and edimentologic techniques in stratigraphy, hronology, and reconstruction of aleoglacial events from glacial deposits. Required field trips. Lec 2, Lab 2. Prerequisite: GES 101, GES 102, GES 104 or permission. Cr 3.

GES 498 Undergraduate Thesis
Original research in geological sciences. The research problem must be identified prior to the start of the senior year and may be of an experimental, empirical or theoretical approach. A committee of three or more faculty will supervise the thesis and its defense. Satisfies the General Education Capstone Experience Requirement. Prerequisite: Senior standing. Cr 3.

GES 499 Summer Field Camp
Participants must attend an approved five- or six-week geological field camp run by an American university. To be approved, the camp must emphasize techniques of field geology, which typify the work of professionals within the discipline. It must also provide a synthesis of core components of the Department's undergraduate curriculum. Within three months of returning to the University of Maine from field camp, a written report and 30-minute oral presentation are required by each participant describing how the activities engaged in at the field camp promoted this synthesis. Satisfies the General Education Capstone Experience Requirement. Prerequisite: Senior standing. Cr 6.

GES 510 Special Topics
One to two week intensive treatment of specialized geologic topics by scientists from government and other institutions. Specific topics vary. May be repeated for credit. Prerequisite: permission. Cr 1 or 2.

GES 521 Low Temperature-Pressure Geochemistry
Algebraic and graphical analysis of water-mineral interactions at earth surface conditions. Topics include congruent and incongruent solubility, complexing, redox reactions, ion exchange, coprecipitation, chemical precipitation, evaporation, and diffusion. Prerequisite: CHY 121, MAT 126. Cr 3.

GES 523 Physical Geochemistry
Introduction to thermodynamics and its application to petrology. Emphasis on geologically relevant heterogeneous equilibria at elevated pressure and temperature. Mathematical methods beyond MAT 127 are introduced. Prerequisite: CHY 121, GES 331, MAT 127 or permission. Cr 3.

GES 524 Aqueous Terrestrial Geochemistry
A survey of earth surface or near surface processes involving chemical reactions between rocks, organic matter and water. Topics include soil genesis, supergene enrichment, nutrient cycling, ground water evolution, and river and lake chemistry and cycles. Prerequisite: GES 521 or SMS 520. Cr 2.

GES 527 Isotope Geology
Theory of variations in the relative abundances of naturally occurring radioactive and stable isotopes. Applications will emphasize the use of isotopic tracers in studies of petrogenesis, geochronology, paleoceanography and paleoecology. Prerequisite: GES 333 or permission. Cr 3.

GES 532 Advanced Sedimentology
Advanced concepts of sedimentology: hydrodynamics of sediment transport and deposition, origin and characteristics of the major sedimentary rock types, facies analysis and modern stratigraphic approaches. Laboratories emphasize textural analysis, numerical and computer applications, and sequence stratigraphy. Research paper and verbal presentation required. Lec 3, Lab 3. Prerequisite: GES 315, SMS 270 or permission. Cr 4.

GES 534 Coastal Sedimentology
Covers principles of sedimentary processes in the coastal zone and the resultant coastal geomorphology, three-dimensional sedimentary bodies, stratigraphic sequences and evolution of coastal systems through geologic history. Emphasis on modern coastal systems such as estuaries, beaches, barrier-lagoon complexes, and rocky coasts. Lec 3, Lab 2. Prerequisite: GES 315 or permission. Cr 4.

GES 538 Geology of Continental Margins
A study of the structural framework, stratigraphy and sedimentation. An integrated analysis based on modern marine geological discoveries of structural controls and sedimentation along continental margins, with emphasis on the U.S. east coast. Prerequisite: GES 315 or SMS 560 or permission. Cr 4.

GES 542 Quaternary Environments and Climatic Change
Study of the physical environments of the Quaternary Period with special emphasis on ice-age theories, world-wide terrestrial and marine glacial stratigraphy, paleoclimatology, and effects of environment on society. One weekend field trip. Lec 2, Lab 2. Prerequisite: GES 541 or permission. Cr 3.

GES 543 Quaternary History of Northeastern North America
An interdisciplinary approach with emphasis on glacial and nonglacial episodes and discussion of associated climatic and biologic changes. One weekend field trip. Rec 2. Prerequisite: GES 541 or permission. Cr 3.

GES 544 Glaciology
A study of the dynamics of ice sheets including creep deformation of ice and the interaction between a glacier and its bed, numerical methods for modeling advance and retreat of ice sheets during times of climatic change, glacial erosion and deposition. Lec 3. Prerequisite: MAT 127, COS 210 or COS 220 or permission. Cr 3.

GES 545 Glaciology Laboratory
Experiments in creep deformation. Cr 1.

GES 547 The Role of Continental Glaciers in Global Climate Change
Integrates critical aspects of glacial geology and glaciology to better understand the configuration and dynamics of paleo continental glaciers. Examines the role of ice sheet dynamics in long term and abrupt global climate change. Landscape features used to diagnose such ice sheet changes are found in many areas as well as in Maine. Examples of critical features will be examined during field trips. Prerequisite: GES 441 (or equivalent), MAT 126 or permission. Cr 3.

GES 552 Geomorphology
Emphasis on physical geomorphic processes

and how these processes control landform development and evolution. Topics include drainage networks, rivers, slopes, shore processes, weathering, soils, mass movement, glacial landforms, arid region landforms and climate change. Prerequisite: GES 315 or GES 324 or permission. Cr 2-3.

GES 555 Microstructural Processes
An examination of deformation mechanisms and resulting microstructures in rocks, use of prophyroblast-matrix relationships to determine timing relations between deformation and metamorphism and interpretation of kinematic indicators that form during rock deformation. Lec 2, Lab 2. Prerequisite: GES 333, GES 416. Cr 3.

GES 578 Metamorphic Petrology
A study of the genesis of metamorphic rocks with emphasis on the regional petrologic and geologic history of a metamorphic terrain, the procedures for ascertaining the pressure and temperature prevailing during metamorphism, and a detailed consideration of the composition of fluid and volatile phases participating in the metamorphic mineral reactions. Lec 3, Lab 4. Prerequisite: GES 331. Cr 4.

GES 580 Introduction to Hydrogeology
The role of groundwater in geologic processes: the hydrologic cycle, groundwater transport equations, chemical evolution of groundwater, and groundwater as a geologic agent. Prerequisite: GES 101 or GES 102 or GES 106, MAT 127. Cr 3.

GES 582 Advanced Topics in Geophysics
Advanced treatments of geothermal, gravity, or seismological studies of the earth. Specific topics vary. May be repeated for credit. Prerequisite: GES 417, MAT 452, MAT 454, PHY 238 or PHY 462 or permission. Cr 3.

GES 583 Advanced Structural Geology
Examines the determination of strain in rocks and the relationship of strain to fold features. Lec 3. Prerequisite: GES 416, MAT 228. Cr 3.

GES 588 Topics in Applied Hydrogeology
Topics will vary and will include ground-water flow modeling, ground-water chemistry and modeling, and data analysis in hydrogeology. A discussion of the methods behind computational tools used in hydrogeology will be followed by the application of software. May be repeated for credit. Prerequisite: COS 101, COS 102, COS 103, GES 580 and MAT 127 or permission of instructor. Cr 3.

GES 591 Introduction to Meteorology and Climatology
The climatic system, survey of atmospheric behavior and climatic change; meteorological measurements and analysis; formulation of physical principles governing weather and climate with selected applications to small and large scale phenomena. Prerequisite: PHY 112 or PHY 122, MAT 126 or permission. Cr 3.

Greek (GRE)

GRE 101 Elementary Greek I
Fundamentals of the Greek language for students who have had little or no preparation in ancient Greek. Prerequisite: intermediate language skill in another language or permission of the instructor. Cr 4.

GRE 102 Elementary Greek II
Fundamentals of the Greek language for students who have had little or no preparation in ancient Greek. Prerequisite: intermediate language skill in another language or permission of instructor and GRE 101 or equivalent. Cr 4.

Education-Higher Education (HED)

HED 561 Developmental Theory in Higher Education
Developmental theory as a foundation for student affairs emphasizing the interdependence of theory and practice. Prerequisite: permission. Cr 3.

HED 562 Impact of College on Students
Integrating empirical knowledge and theoretical propositions in the context of the impact of higher education on students. Prerequisite: HED 561 or equivalent. Cr 3.

HED 580 History of Higher Education in the United States
History of American higher education, colonial period to the present. Prerequisite: permission. Cr 3.

Honors (HON)

HON 111 Civilizations: Past, Present and Future I
The four courses constituting Civilizations: Past, Present and Future follow a chronological trajectory from earliest recorded times through the present, examining philosophy, history, literature, the arts and natural, physical and social sciences. In particular, by incorporating primary sources, small group discussions and multiple perspectives, these courses explore the way in which civilizations and cultures have been developed and have interacted with others. Completion of any of these courses (HON 111, 112, 211 or 212) satisfies either the General Education Western Cultural Tradition or the Cultural Diversity and International Perspectives requirement. Completion of any two satisfies the Western Cultural Tradition, Cultural Diversity and International Perspectives, and Ethics requirements. Completion of three satisfies the Western Cultural Tradition, Cultural Diversity and International Perspectives, Social Context and Institutions, and Ethics requirements. Completion of all four satisfies all the Human Values and Social Context requirements and the Ethics requirement. In addition, HON 211 and 212 each are designated Writing Intensive. Cr 4.

HON 112 Civilizations: Past, Present and Future II
The second course in the Honors Civilizations sequence. Cr 4.

HON 151 Honors First-year Summer Seminar
Provides students with an opportunity to continue or begin their study of primary texts during the summer. Texts will be chosen that supplement those of the first-year Honors sequence but do not assume knowledge of them. Focus will be on analysis and reaction to the readings through discussions and written work. Prerequisite: HON 111 or HON 112 or permission. Cr 3.

HON 190 Honors Summer Readings: Basic
An individually arranged program of readings during the summer. For students wanting to supplement their work in HON 111 and HON 112. Prerequisite: permission. Cr 1.

HON 211 Civilizations: Past, Present and Future III
The third course in the Honors Civilizations sequence. Cr 4.

HON 212 Civilizations: Past, Present and Future IV
The fourth course in the Honors Civilizations sequence. Cr 4.

HON 290 Honors Summer Readings: Intermediate
Guided summer readings and reports, individually adapted to the student's program of study. For students wanting to supplement their readings in HON 211 and HON 212. Prerequisite: permission. Cr 1.

HON 309 The Honors Read Tutorial
An opportunity through careful reading, analytic and synthetic writing and extensive discussion, to select, from among eight texts nominated by the University community, the "Honors Read" for incoming students in the Honors College a year hence. The tutorial will include developing and refining criteria for the decision, analysis and reaction to the

texts incorporating those criteria and preparing a summative letter of transmittal to be included with the texts delivered to the incoming students. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: Third-year standing in The Honors College with at least one first- or second-year Honors course. Cr 3.

Note: HON 310 will appear on transcripts as HON 312-HON 349 for purposes of tracking General Education Requirements.

HON 310 Honors Tutorial
Small group discussions, under tutorial direction, of important readings in a specific topic or theme. May be repeated for credit with the permission of the director of The Honors College. May satisfy several General Education categories. See the director of The Honors College. Prerequisite: Third-year standing in The Honors College and at least one of HON 111, HON 112, HON 211 or HON 212. Cr 3.

HON 350 Honors Seminar
Topics in such subject areas as the arts, philosophy, history of science, the study of society, etc. Specific topics vary. Cr 3.

HON 391 Introduction to Thesis Research
A series of weekly meetings designed to provide prospective Honors thesis writers with the background, resources and understanding necessary to produce quality independent work. Will engage students in investigating previous theses written in The Honors College, discussions with students currently writing theses and faculty advising theses, identifying a thesis advisor, developing an individual thesis topic, increasing information literacy and research skills and producing an annotated bibliography or literature review. (Pass/Fail Grade Only.) Prerequisite: Third-year standing in The Honors College. Cr 1.

HON 396 Honors Independent Study
A tutorially conducted study of a topic outside the student's major field. May be repeated once for credit, with permission. Prerequisite: permission. Cr 1-3.

HON 397 Honors Specialized Study
A tutorially conducted study in the student's major field, usually resulting in the choice of a thesis topic or initiation of thesis research. . May be repeated once for credit, with permission. Prerequisite: permission. Cr 1-3.

HON 398 Honors Independent Research
Tutorially conducted independent research. May be repeated once for credit, with permission. Prerequisite: permission. Cr 1-3.

HON 450 Honors Distinguished Lecture Series
A series of lectures by a distinguished lecturer or lecturers, involving collateral reading and group discussions. Cr 1-3.

HON 498 Honors Directed Study
Tutorially directed research for the senior thesis or project. Graded "T" (meaning acceptable, but deferred.) Required of all four-year students graduating with a degree with Honors. Cr 3.

HON 499 Honors Thesis
The completion of the senior project begun in HON 498. Required of all four-year students graduating with a degree with Honors. The grade for this course is retroactive to HON 498 and counts for the combined six hours of HON 498 and HON 499. Satisfies the General Education Writing Intensive Requirement. Cr 3.

History (HTY)

HTY 103 United States History I
Examines the historical experience of the American people through the major ideas and forces that have shaped the Republic. Focus on the exploration of America through post-Civil War Reconstruction. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

HTY 104 United States History II
Examines the historical experience of the American people through the major ideas and forces that have shaped the Republic. Focus on the urban-industrial age, liberal political reform, and American world leadership. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

HTY 105 History of European Civilization I
Political, economic, social, and intellectual developments in Europe from antiquity to 1715, emphasizing those features which help to explain our present-day civilization. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

HTY 106 History of European Civilization II
Political, economic, social, and intellectual developments in Europe from 1715 to the present, emphasizing those features which help to explain our present-day civilization. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

HTY 107 East Asian Civilization I
A survey of China's and Japan's social, economic, cultural and political life from prehistoric times to the present. Whenever applicable, Korea and Vietnam will be discussed. Emphasis on key periods in each country, especially changes in the 19th and 20th centuries. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

HTY 108 South and Southeast Asian Civilization
A survey of the social, economic, cultural and political life of India and some Southeast Asian countries from prehistoric times to the present. Emphasis on key periods, especially the 19th and 20th centuries. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

HTY 109 Introduction to Latin America
The historical experience of the people of Latin America from prior to contact through conquest and colonization; cultural exchange; the social, economic, and political developments following independence in the nineteenth century; and the evolving crises of the twentieth century. Satisfies the General Education Western Cultural Tradition, and Cultural Diversity and International Perspectives Requirements. Cr 3.

HTY 112 Introduction to Africa
A survey of Africa's social, economic and political history from 1800 to the present. Emphasis on African and European interaction, pan-Africanist currents, and the national histories of Nigeria, South Africa, Congo and Ghana. Satisfies the General education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

HTY 197 Technology and Society I
A survey of the development of modern technology. The interaction of engineering with other facets of modern society examined in relation to issues of current or recent interest. (This course is identical to TSO 198.) Satisfies the General Education Social Contexts and Institutions and Western Cultural Tradition Requirements. Cr 3.

HTY 198 Technology and Society II
A survey of the interaction of modern technology and contemporary societies with emphasis on particular cases and technologies of current interest. Concludes with discussion of possible scenarios for future technological and societal developments based on present trends. (This course is identical to TSO 199.) Satisfies the General Education Social Contexts and Institutions and Western Cultural Tradition Requirements. Cr 3.

HTY 199 Problems in History
An analysis of a selected controversial or

contemporary historical problem. In some cases the specific topic and methodology may be chosen jointly by interested students and an instructor. Cr 3.

HTY 210 History of Maine
A survey of Maine's social, economic, and political life, from primitive times to the present. After a brief study of Native American life preceding white settlement, the periods of colonial, provincial, and state history are covered. Satisfies the General Education Western Cultural Tradition, and Social Contexts and Institutions Requirements. Prerequisite: No-first-year students. Cr 3.

HTY 218 History of Film
Global history of film with emphasis on the cultural, technological, and philosophical sources of film in the 20th century. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Cr 3.

HTY 220 North American Indian History
An introductory history of North American Indians, from before European contact to the present. Within a broad chronological framework, the course will look at critical themes in American Indian history; American Indians prior to contact; cultural contact; treaty making, treaty rights, sovereignty; impact of government policies on Native populations; and contemporary issues. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

HTY 241 History of Globalization, 1900-Present
An introductory history of globalization. Explores the major political, economic, cultural and technological features of the twentieth century that have helped to create today's global society. Emphasizes global changes and their effects on everyday life. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

HTY 276 Sports in the Western World
A survey of the origins and evolution of competitive sport from the ancient world to the present with emphasis on the relation of sport to changes in technology, political systems, and social values. Satisfies the General Education Western Cultural Tradition Requirement. Cr 3.

HTY 278 American Military History
America's experience with warfare, from the colonial period through the Vietnam era. How American wars have been fought, and the complex interrelationship between American society and the military, including economic, political and social factors. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

HTY 279 European Military History
A survey from the 18th Century to the present. Examines the causes and nature of war, the relationship of soldiers and civilians, and war's impact on modern society. Satisfies the General Education Western Cultural Tradition Requirement. Cr 3.

HTY 280 Naval History
The history of navies in the modern period (c. 1500 to the present) including use of naval forces in the achievement of national goals, development of naval technology and tactics, effects of naval construction and manning upon society, sociology of navies, comparison of naval policies in various states, the current balance sheet of navies. (This course is identical to NAV 202.) Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

HTY 311 Research Seminar
A writing-interview research seminar on varying topics designed to give students experience in all aspects of historical research from choosing a topic, through weighing and sifting of evidence, to writing and finished paper. May be repeated once on a different topic. (Offered at least once per academic year.) Satisfies the General Education Writing Intensive Requirement. Cr 3.

HTY 332 Womanhood in America
Examines the changing experiences of American women from colonial times to the present. Emphasis on what women did and what they were told to do, the experiences of different groups of women, and the ways in which women worked to change their situation. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: First-year students require permission. Cr 3.

HTY 338 Everyday Life in America, 1600-1850
Examines the experience of everyday life for ordinary Americans living during the 17th, 18th and early 19th centuries. In order to explore this everyday world the class will analyze a wide variety of sources including architecture, clothing, decorative arts, folktales, diaries and family history. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Prerequisite: HTY 103 or permission. Cr 3.

HTY 343 History of International Relations, 1800-Present
Advanced survey of international relations in the modern world. Explores both the broad-ranging problems of international power and the difficulties it poses for individual states. Emphasizes the role of war, peace-making and diplomacy. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: Junior standing. Cr 3.

HTY 377 Mathematics in Cultural Context: A History of Mathematics for the Humanities
Designed for humanities students with an interest in the role of mathematics in culture and society. Concentrates on representative examples of developments in (elementary) mathematics with emphasis on the cultural and societal contexts in which they took place. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: Junior standing. Cr 3.

HTY 398 Historical Issues
An exploration of selected contemporary historical issues not covered in existing courses. In some cases the specific topic and methodology may be chosen jointly by interested students and an instructor. Prerequisite: first-year students require permission. Cr 3.

HTY 401 History of Greece
Ancient Greece from the "Heroic Age" to the "Classical and Hellenistic", including the discovery of rational thought; the development, crisis, and failure of democracy in classical Athens; unification of city-states and creation of a world empire that launched a new era in world history. Prerequisite: HTY 105 or permission. Cr 3.

HTY 402 Roman History
The rise of ancient Rome from a small Italian town to mistress of the Mediterranean. Problems of excessive greatness including failure of a city-state republic to rule a vast empire and triumph of Caesarism. Covers the establishment of the "Roman Peace" under the emperors, "Christianization" and problem of the "Decline of Rome". Prerequisite: HTY 105 or permission. Cr 3.

HTY 403 Early Middle Ages
Europe from late antiquity to about 950, considering the social, economic, political, and intellectual developments during Merovingian and Carolingian times, emphasizing the early medieval agricultural revolution and reconstructing the factors affecting the lives of ordinary people. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and

nternational Perspectives Requirements. Prerequisite: HTY 105 or permission. Cr 3.

HTY 404 Late Middle Ages
Social, economic, political, and intellectual history of Europe from 950 to the Renaissance, focusing on the medieval frontier period and the late medieval era of environmental crisis and economic contraction. Satisfies the General Education Western Cultural Tradition and Population and the Environment Requirements. Prerequisite: HTY 105 or permission. Cr 3.

HTY 405 Early Modern Europe: Renaissance, Reformation and the Foundation of the Modern World-System
A survey of the cultural, religious, social, economic and political history of Europe from 1300 to the end of the period of religious wars. Emphasis on the cultural rebirth following upon the recovery of the art, literature and philosophy of cultural antiquity; on the Reformation and Counter-Reformation as marking the end of the "closed," relatively homogenous world of Medieval Christendom and an entrance into a more open universe of spiritual and intellectual possibilities; and on the economic, social and technological transformations that made possible and were in turn accelerated by the expansion of European societies into Africa, Asia and the Americas. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: HTY 105 or permission. Cr 3.

HTY 407 The Age of Revolution, 1789-1860
Emphasis on the effects of the Industrial and French Revolutions on European politics, society, and thought; the transformation of a peasant, agrarian world to a middle-class, urban society. Considers the movement from oligarchial to liberal politics, from aristocratic to middle-class tastes, from enlightened thought and the romantic reaction to Marxist and Darwinian intellectual bombshells. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

HTY 408 19th Century Europe, 1815-1914
Europe from the Congress of Vienna to World War I: industrialization, the emergence of modern ideologies, German and Italian unification, the rise of democracy, imperialism and the road to World War I. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: HTY 106 or permission. Cr 3.

HTY 409 Twentieth Century Europe I, 1914-1945
Europe in the age of the two world wars, focusing on the causes and consequences of the wars themselves, concurrent political and economic problems, the challenge of totalitarianism, and the intellectual and cultural contexts. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

HTY 410 20th Century Europe II, Since 1945
Europe in the age of Cold War division, focusing on the contrasting development of prosperous democracies in western Europe and the Soviet imperium in eastern Europe, culminating in the overcoming of this division and this imperium in the revolutions of 1989/1991. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 106 or permission. Cr 3.

HTY 411 The Holocaust
The Nazi persecution and extermination of European Jews (1933-1945) including the exploration of modern anti-Semitism, Nazi ideology, the persecution of German Jews after 1933, and the extermination of six million European Jews in Nazi occupied Europe during the Second World War. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

HTY 412 European Imperialism, 1870-1914
A comparative examination of the "New Imperialism. " Explores the theory and practice of European territorial and economic expansion in the late-19th Century. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 106, HTY 112 or permission. Cr 3.

HTY 415 African-American History
Examines the African-American experience both thematically and chronologically, from slavery to emancipation, and the lives of African-Americans in the twentieth century. Includes African survivals and slave culture; the impact of racism, religion, and family on African-American lives; efforts by blacks to improve their lives; and the meaning of their history for contemporary African-Americans. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

HTY 416 The American South
The American South is part of the United States, yet its history and traditions are very different from those of the rest of the country. Considers the separate history of the American South, addressing such issues as slavery, the South's failed war for independence, race relations, the New South, and the civil rights movement. Examines images and stereotypes of the South in popular culture and the question of southern distinctiveness, in order to assess the place of the South in the nation. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

HTY 420 Science and Society Since 1800
Examines the development of science, with emphasis on America, since the Scientific Revolution, both 'internally'—as ideas and experiments—and 'externally'—as related to America and other societies that have produced them and upon which they in turn have had impact. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: Not open to first-year students. Cr 3.

HTY 423 History of Russia I
Russian history from the earliest times to the 1870s, including political, economic, cultural and social developments during the Kievan, Tartar, Muscovite and Imperial periods. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements.) Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

HTY 424 History of Russia II:The Russian Revolution, 1881-1991
The history of the Russian Empire and the Soviet Union during the last 125 years, including the problems and achievements of Imperial Russia, World War I and the Bolshevik seizure of power, the development of Communist totalitarianism, Russia as a world power, and contemporary dilemmas. Satisfies the General Education Ethics and Cultural Diversity and International Perspectives Requirement. Prerequisite: HTY 106 or permission. Cr 3.

HTY 426 History of Modern Germany
Includes major political, economic, cultural, and social developments during the Imperial, Weimar, National Socialist, and Federal Republic eras. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 106 or permission. Cr 3.

HTY 429 History of Modern Italy
Covers the economic, social, political, and cultural developments of the Italian people from 1796 to the present. Explores Italian unification, Fascism, and the Italian migration to the U.S. Satisfies the General

Education Western Cultural Tradition Requirement. Prerequisite: Six hours of history or permission. Cr 3.

HTY 433 Greek and Roman Mythology
The study of classical myths as the poetic expression of the Greek and Roman spirit, as the depiction of everything considered sacred, and as the embodiment of the basic patterns of the human psyche. Discusses the major theories of myth. Uses modern psychology and anthropology to show how the myths reveal secrets of our emotional, intellectual, and spiritual lives. Prerequisite: GRE 101 or LAT 101 or PHI 101 or permission. Cr 3.

HTY 434 Greek and Roman Heritage in America
The influence of Greek and Roman thought on North American culture from the colonial period to the 20th century. Prime examples: the idea of a Classical Republic, Greek architecture, pro- and anti- slavery arguments based on Plato and Aristotle. Prerequisite: one of the following: HTY 106; PHI 101; LAT 101, LAT 102; GRE 101, GRE 102; ARH 251, ARH 253; POS 301 or permission. Cr 3.

HTY 436 History of China
History and culture of the Chinese people, emphasizing the Western penetration of China, coming of the missionaries and the gunboats, impact of Western ideas, and the resulting nationalist and revolutionary movements. Prerequisite: HTY 107 or HTY 108 or six hours of history, or permission. Cr 3.

HTY 437 History of Modern Japan
The history of Japan during the past century, including Western penetration, the influence of Western ideas on traditional Japanese culture, the emergence of the modern Japanese industrial state, and the rise and defeat of the Japanese empire. Prerequisite: HTY 107 or HTY 108 or six hours of history or permission. Cr 3.

HTY 442 The United States and Vietnam: A History
Traces the history of relations between the United States and Vietnam since the beginning of World War II. The economic, social, political, ideological, and cultural origins of the Vietnam conflict; the conduct of the war and the aftermath in Vietnam, East Asia, and the United States will be examined. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

HTY 446 History of Modern Middle East, 1800-Present
The economic, social, and political transformations experienced by the Middle East in the nineteenth and twentieth centuries. Focus on the rise of Arab nationalism and the Israeli-Arab conflict. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: One survey course in history. Cr 3.

HTY 449 History of South Africa
Examines the political, economic, and social history of South Africa from 1652 to the present. Emphasis on race relations from the establishment of the Cape Colony to the fall of Apartheid. Explores European colonization, the formation of the Zulu Empire, the South African War, and the birth of the New South Africa. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 106 or HTY 112 or permission. Cr 3.

HTY 450 The Rise and Fall of the British Empire
The expansion of imperial apparatus and opinion in 17th - 18th-century Britain to the height of empire, c. 1875-1914, especially in India, Africa and Asia; and the loss of empire in the 20th century. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 105, HTY 106 or permission. Cr 3.

HTY 454 History of Ireland II
The history of Ireland from the late seventeenth through twentieth centuries, examines nationalist movements, the land question, and the development and issues of Northern Ireland. Prerequisite: HTY 105 or HTY 106 or six hours of history. Cr 3.

HTY 455 History of England I
The political, socio-economic, and constitutional aspects of British history from Roman Britain to 1700, emphasizing economic growth and the development of political institutions. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 105 or HTY 106 or six hours of history. Cr 3.

HTY 456 History of England II
The political, socio-economic, and constitutional aspects of British history from 1700 to the present, emphasizing economic growth and the development of democracy. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 105 or HTY 106 or six hours of history. Cr 3.

HTY 458 History of French Canada and Franco Americans
The common historical heritage of French Canadians and Franco-Americans from the establishment of New France and Acadia to the great migrations to the United States in the 19th century. The separate development of French Canadians and Franco-Americans from this point to the present. (This course is identical to FAS 458.) Prerequisite: 6 hours of History or permission. Cr 3.

HTY 459 Colonial Canada
Canada's history from New France to 1850, emphasizing political, social, and economic developments and relations with the American people. (This course is identical to FAS 459.) Prerequisite: HTY 103 or permission. Cr 3.

HTY 460 Modern Canada
Canada's history from Confederation to the present, emphasizing political, social, and economic developments and Canada's relations with the United States. Satisfies the General Education Cultural Diversity and International Perspectives and Ethics Requirements. Prerequisite: HTY 104 or permission. Cr 3.

HTY 461 America Takes Shape: The Colonies to 1740
The founding and development of the American colonies. Emphasis on the expropriation of Native American lands, enslavement of blacks, the role of women, the American family, and internal conflicts. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 103 or permission. Cr 3.

HTY 462 Rebellion and Revolution in America, 1740-1789
The social tensions of a maturing society: rebellions, religious revivals, violence. The origins and consequences of the American Revolution, Founding Fathers, and the new Constitution. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 103 or permission. Cr 3.

HTY 463 The Early Republic, 1789-1840
Explores the shaping of American society by people and events between the years 1789-1840. While paying due attention to political and economic changes during this period, the focus will be on the lives and experiences of ordinary people: their families, work, homelife, communities, attitudes and expectations. Satisfies the General Education Western Cultural Tradition, and Social Contexts and Institutions Requirements. Prerequisite: HTY 103 or permission. Cr 3.

HTY 464 America at the Crossroads: The Era of Civil War Reconstruction 1840-1876
Problems and processes involved in territorial expansion, economic growth, the slavery issue, civil war, and the reconstruction of American society. Satisfies the General Education Western Cultural Tradition

equirement. Prerequisite: HTY 103 or ermission. Cr 3.

ITY 465 American Landscapes, 1600-1850
ivestigates the shaping of American ndscapes and interpretation of those ndscapes in history, fiction and art. In articular, the course explores the ways in hich Americans used idealizations of the hysical environment to define certain ultural attributes and to explain social ansformations. Satisfies the General ducation Population and the Environment equirement. Prerequisite: HTY 103 or ermission. Cr 3.

ITY 467 Early 20th Century America, 914-1945
hanges in American politics, economics, ociety, and culture including the Wilson era f reform and intervention in World War I, he age of business, depression and the New Deal of FDR, World War II and American lobal power. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 104 or permission. Cr 3.

ITY 468 America Since 1945
hanges in American politics, economics, ociety, and culture including the Cold War nd McCarthyism, protest movements of the 960s, Watergate, the energy crisis and conomic recession, affluence and poverty in he 1980s. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: HTY 104 or permission. Cr 3.

HTY 473 History of U.S. Foreign Relations I
U.S. foreign relations from the Revolution to World War I. Explores the role of government and private individuals and groups (pioneers, businesspeople, missionaries) in shaping U.S. interactions with other societies and nations as it expanded across the North American continent and evolved into a world power. Includes critical examinations of U.S. foreign relations by Indian, Latin American, Asian and European nations, and by internal dissenters. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

HTY 474 History of U.S. Foreign Relations II
Explores the role of the U.S. in international affairs from 1914 to the present. Considers formal U.S. diplomacy and military activities and role of private individuals and groups such as businesspeople, labor and peace activists, and peddlers of American cultural products (movies, jeans, etc.) in shaping U.S. interactions with other nations. Includes critical examinations of U.S. foreign relations by other nations and by internal dissenters. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

HTY 477 The American Worker
Examines changes in the world of work during successive phases of capitalist development since the Revolutionary War. Focus on skilled and unskilled labor; the evolving factory system; public policies and effects of technological change; ethnicity, race, and gender on worker responses. Assesses contemporary workplace issues from an historical perspective. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 103, HTY 104 or permission. Cr 3.

HTY 479 U.S. Environmental History
The attitudes, policies, and behavior of Americans and their government toward the environment. Current issues evolving out of past attitudes and policies. Satisfies the General Education Ethics and Population and the Environment Requirements. Prerequisite: 6 hours of history or permission. Cr 3.

HTY 481 Amerindians of the Northeast: A History
Considers Amerindian history from a regional perspective, with emphasis on intersocietal and interethnic relations between the 16th and 19th centuries. It encompasses the Algonquian and Iroquoian speaking peoples from the Atlantic seaboard to the upper Great Lakes and from the Ohio Valley to the Hudson Bay. Cr 3.

HTY 482 History of Canadian-American Relations
Explores the historical relations of the Canadian and American nations and examines the major determinants influencing their interrelationship since the late eighteenth century. Familiarizes students with the major events that have shaped Canadian-American relations, and how to use Canadian-American history as an analytical model for exploring international relationships. Prerequisite: 6 hours of American or Canadian history or permission. Cr 3.

HTY 483 Violence in North American History
Focuses on collective or group violence in the United States and Canada from the colonial era to the present. Familiarizes students with violent episodes that have shaped the histories of both countries and uses these examples as a theoretical device for comparing and contrasting nationalistic ideals and myths in the United States and Canada. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: 6 hours of history or permission. Cr 3.

HTY 484 History of Jazz
Origin and development of the American form of improvised music popularly known as "Jazz. " Study and analysis of the styles of Jazz as forms of musical art through exposure to the music, especially as played by major innovators. Prerequisite: HTY 103, HTY 104 or permission. Cr 3.

HTY 486 The Sea and Civilization: An Introduction to Maritime Studies II
A study of humankind in relation to the sea from 1800 to the present including demographic and social effects of the seas on human populations, marine technology, economics of the seas, national and international ramifications, contemporary problems. Prerequisite: Not open to first year students. Cr 3.

HTY 491 Technology and Society Until 1800
Examines the development of technology from earliest times through the English Industrial Revolution, both 'internally', as tools and machines, and 'externally', as related to the societies that have produced them and upon which they in turn have had impact. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: Not open to first-year students. Cr 3.

HTY 492 Technology and Society Since 1800
Examines the development of technology, with emphasis on America, since the English Industrial Revolution, both 'internally'—as tools and machines—and 'externally'—as related to America and other societies that have produced them and upon which they in turn have had impact. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: Not open to first-year students. Cr 3.

HTY 494 Women, History and American Society: Selected Topics
Examines the changing experiences of American women via several intensive, topical, interdisciplinary explorations. Emphasis on women's historical relationship with different institutions or bodies of knowledge. Possible topics include: history of women, family, and the law; women and technology; women and work; or women and racism. May be repeated once for credit. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: 6 hours of history or permission. Cr 3.

HTY 495 Cities in Nineteenth-Century America
Considers the challenge of creating viable

American cities, 1790-1917; changing urban forms; impact of urban life on culture, politics, and society; problems associated with rapid industrial and demographic growth, ethnic and class cleavage, and new urban technologies. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

HTY 497 The Rise of Industrial America, 1790-1929
Traces the transformation of America into a predominantly industrial society including foundations for the rise of industry; impact on cities and farms, trade and commerce, money and banking; changing forms of business organization; national and international politics. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

HTY 498 Senior Seminar in History
Intensive reading, research, and writing under the close supervision of an instructor on a selected problem in American or European history. Required of History majors. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. (Offered each semester.) Prerequisite: Restricted to senior History majors. Cr 3.

HTY 499 Contemporary Problems in History
In-depth analysis of a selected controversial, contemporary historical problem. The specific topic and methodology will be chosen jointly by interested students and an instructor. Prerequisite: permission. Cr 1-3.

HTY 501 History of U.S. Foreign Relations
Examines the historical literature in the field of U.S. foreign relations. Special focus on current methodological debates over how to internationalize U.S. diplomatic history and how to incorporate themes of class, race and gender. Prerequisite: graduate students, senior history majors and others by permission. Cr 3.

HTY 502 American Intellectual History
Advanced reading seminar. Major intellectual currents in American history, e.g., Transcendentalism, Pragmatism, progress, mission. Interrelationship between ideas and their social environment. Content varies. Prerequisite: graduate students, senior history majors and others by permission. Cr 3.

HTY 503 American Regional History
Advanced reading seminar. Emphasis on various historically discrete areas, such as the South, West, New England; their distinctive development and interrelationship to broader American history. Content varies. Prerequisite: graduate students, senior history majors and others by permission. Cr 3.

HTY 505 American Political History
Advanced reading seminar. Covers major political ideas, constitutional and legal development, political issues and their impact on American society, political party evolution. Content varies. Prerequisite: graduate students, senior history majors and others by permission. Cr 3.

HTY 507 American History to the Civil War
Exposes graduate students to the basic themes of American history and a wide range of readings. Key topics to be addressed include colonial, urban, diplomatic, labor, political, legal, business, western, New England, cultural, women's, southern and African-American history, and the history of technology. (Taught annually.) Cr 3.

HTY 508 American History from the Civil War to the Present
Exposes graduate students to the basic themes of American history and a wide range of readings. Key topics to be addressed include colonial, urban, diplomatic, labor, political, legal, business, western, New England, cultural, women's, southern and African-American history, and the history of technology. (Taught annually.) Cr 3.

HTY 517 Seminar in Premodern European History
Current research on premodern European history, especially as applied to graduate research and problems of teaching European or World Civilization at secondary school or college level. Cr 3.

HTY 518 Readings Seminar in Modern European History
Reading and discussion of important recent books and articles in modern European history. Emphasis on publications and historical problems that apply to teaching European and world history on the secondary school and college levels, and on preparation for graduate study in European history. Prerequisite: seniors and graduate students. Cr 3.

HTY 519 Modern Britain and Empire
Evaluation of selected problems in English history since 1815 including the gradual democratization of British government, continuing industrial revolution, and impact of two world wars on English social, cultural, and political life. Prerequisite: graduate students, senior history majors, and others by permission. Cr 3.

HTY 520 Canadian Historiography
Critical analysis of works by selected historians of Canada from F. X. Garneau to the present. (Taught annually.) Cr 3.

HTY 521 Canada and the United States, 1783 to the Present
Wars, migration, boundaries, resources, and trade, emphasizing the historical background to contemporary political, strategic, economic, and cultural issues in Canadian-American relations. (Taught annually.) Prerequisite: HTY 459, HTY 460, or HTY 473, HTY 474 or POS 374 or permission. Cr 3.

HTY 550 Readings in Bibliography and Criticism in:
1. American History
2. European History
3. British and Commonwealth History
4. Canadian History
5. African History
6. Asian History Cr Ar.

HTY 577 Environmental History
Surveys major trends in environmental and conservation thought and major developments in land use and environmental change. Cr 3.

HTY 597 Field Work in Historical Institutions
Field work in local museums, state agencies, and other historic laboratories. Involves preparation and repair of exhibits, research and preparation of historic preservation documents, and beginning archival and artifact handling. Prerequisite: graduate students, senior history majors and others by permission. Cr 3-12.

HTY 598 Editing and Producing a History Journal
Introduction to the various stages and procedures involved in editing and producing a scholarly journal in history, including editorial revisions, layout, graphics, proofreading, and printing. Practicum format in association with the Maine Historical Society Quarterly (MHSQ.) Prerequisite: graduate standing. Cr 1-3.

HTY 599 Special Topics in History
Exploration and analysis of new trends in research and interpretation in history. Prerequisite: graduate students, senior history majors and others by permission. Cr 3.

Human Development (HUD)

HUD 511 Seminar in Family Relationships
Reports and discussions of current literature in family relationships and related social sciences with special attention to critical analysis. Cr 3.

HUD 525 Theories of Child Development
Theoretical conceptualizations influencing the study of child development. Prerequisite: permission of instructor. Cr 3.

UD 535 Recent Research in Human evelopment
dvanced study of topics in human evelopment. Reports and evaluation of irrent research on topics across the lifespan. lay be taken more than once for credit. rerequisite: permission of instructor. Cr 3.

IUD 540 Theories and Concepts of Family evelopment
n interdisciplinary and developmental pproach to the evaluation of theories used in e study of family functioning. Prerequisite: ermission of instructor. Cr 3.

IUD 560 Seminar in Human Development
eports and discussion of research findings in uman development. Topics may vary emester by semester. May be repeated for redit. Prerequisite: permission. Cr 3.

ntensive English Institute (IEI)

EI 010 Developing Accurate Listening
ntensive listening practice to improve nderstanding of the everyday idiomatic nglish of native speakers in America. For on-native speakers of English. Prerequisite: EI Placement Testing. Cr 0.

EI 012 Oral Communication Skills
ractice of strategies for effective oral ommunication in modes typical of onversational, professional and academic ettings. For non-native speakers of English. rerequisite: IEI Placement Testing. Cr 0.

EI 013 Writing Fluently and Accurately
ntensive English writing process practice anging from personal free-writing to omposing correspondence and essays so as o develop fluency, clarity, organization, xpression, grammatical accuracy and editing kills. For non-native speakers of English. rerequisite: IEI Placement Testing. Cr 0.

IEI 014 Vocabulary and Reading Development
Strategies for effective reading and the acquisition of new vocabulary. Intensive work with level-appropriate texts to develop reading comprehension and speed. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 016 English Through U.S. History and Culture
Intensive work with adapted and authentic texts and other media to improve English language proficiency while learning about U.S. culture and history. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 017 English Through Film
Mining rich sources of comprehensible input found in film to develop aural comprehension, communication fluency, and cultural awareness as well as analytical and critical thinking skills. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 018 TOEFL Workshop
Focus on language skills (grammar, listening, reading, vocabulary, short essay writing) and test taking strategies for improved performance on TOEFL and TWE. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 019 Special Topics in ESL
Language activities to advance English acquisition. Issues and themes from contemporary society. Cross-cultural perspectives. Topics vary. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 020 English for Academic Purposes
Practice in academic skills required for university studies. Selecting courses, analyzing course expectations, taking notes, working with various lecture styles, researching library and on-line sources, giving presentations, increasing reading efficiency, and interacting with professors. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 024 Academic Composition and Critical Reading
Intensive practice reading for and writing analytical papers and reports with emphasis on developing students' critical assessment of their own research and writing. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 025 Advanced Speech Communication
Intensive practice in advanced academic, professional, and public communication. Strategies for group discussion, debate and argumentation—including relevant socio-linguistic conventions in U.S. culture. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 026 Business English Studies
Development of business communication skills. Selected topics in management, marketing and strategic planning. Influence of American values, customs and practices on U.S. approaches to business. For non-native speakers of English. Prerequisite: IEI Placement Testing. Cr 0.

IEI 470 The Teaching of English As A Second Language
Basic principles underlying ESL pedagogy and current techniques for second and foreign language teaching. Students review published materials, develop activities, plan lessons, and compile a teaching materials portfolio. For practicing teachers seeking Maine's ESL endorsement or individuals planning to teach EFL overseas. Prerequisite: junior standing. Cr 3.

IEI 475 Curriculum Development in English As A Second Language/English As A Foreign Language Contexts
Principles of syllabus design and processes for ESL/EFL curriculum development. For practicing teachers seeking Maine's ESL endorsement or individuals planning to teach EFL overseas. Also suitable for those preparing to teach a second language other than English. Prerequisite: junior standing. Cr 3.

IEI 480 Testing and Assessment in English As A Second Language/English As A Foreign Language Contexts
Principles of second/foreign language assessment. Examines various instruments and procedures: helps students develop reliable and valid techniques; explores placement and diagnosis; reviews curriculum and program evaluation. For practicing teachers seeking Maine's ESL endorsement or individuals planning to teach EFL overseas. Also suitable for those preparing to teach a second language other than English. Prerequisite: junior standing. Cr 3.

IEI 490 Topics in Teaching English As A Second Language
Topics not regularly covered in other courses, such as Teaching English for Specific Purposes, English As A Second Language Program Administration, Writing Materials for Limited English Proficient (LEP) Students with Special Needs, Issues in Second Language Acquisition, etc. May be repeated for credit. Offered as need, interest and research require. Prerequisite: 6 hours of TESL coursework, including IEI 470 or equivalent. Cr 1-3.

IEI 497 Independent Study
Independent study of a specialized topic related to the teaching of English as a second or other language (TESOL) issues. Supervised by one faculty member. May be repeated for credit with change of topic. Prerequisite: permission. Cr 1-3.

International Affairs (INA)

INA 201 Topics in International Affairs
Offers a detailed examination of selected topics in international affairs, providing an opportunity for students to integrate what they have learned about international affairs by focusing in depth on a specific topic. Topics may include globalization and its impact, democratization, role of ethics in

international affairs, global stability and peace and ecological environmental issues. (May be repeated if topics vary.) Cr 3.

Interdisciplinary (INT)

INT 101 (ART, ENG, SPA) The Performance Event
An introduction to the arts through attendance at artistic events on the University of Maine campus. Students normally attend ten events, along with classes and workshops designed to help students understand and appreciate the events they attend. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Artistic and Creative Expression Requirements. Cr 3.

INT 105 (ECO, REP) Environmental Policy
Examines the relation between the natural environment and the economy, the economic sources of environmental degradation and economic analysis of alternative approaches to environmental regulation and management. Satisfies the General Education Population and the Environment Requirement. Cr 3.

INT 110 (ECO, REP) Modern Economic Problems
An introduction to the operation of modern economic systems. Topics include: the price system, resource allocation, the organization of markets, the economics of government policy, and international aspects of the economy. This course does not substitute for either ECO 120 or ECO 121. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

INT 121 (CHB) Introduction to Biomedical Engineering
A survey of the various career options available through faculty discussions, laboratory interactions, presentation/ discussions from outside field professionals and tours to area biomedical facilities. Prerequisite: Engineering majors or permission. Cr 1.

INT 190 (BSC, REP) World Food Supply, Population and the Environment
Reviews past and current trends in population, population distribution, and food production. Examines the physical and biological limits to food production, sustainability, distribution issues and relevant government policies. Satisfies the General Education Population and the Environment Requirement. Cr 3.

INT 200 (BSC) Orientation to Health Professions
An exploration of career opportunities within the health care industry by course lectures, presentation from health professionals, assigned readings, as well as, individual and team projects. Provides students with an understanding of the history, ethics, personal commitment and other requirements for a career in the healthcare industry. Field (laboratory) experiences enhance course work by directly involving students in: first aid, CPR, patient care, medical records, medical laboratory and x-ray services, athletic trainer services, pharmacy, optometry, podiatry, nursing and ambulance services. These experiences prepare the student for future mentoring opportunities within the health professions community. Prerequisite: BIO 100. Lec 3, Lab 1 Cr 3.

INT 211 (CHB, MET) Introduction to CAM and Welding
Introduction to computer aided design and computer aided manufacturing software. Covers programming and operation of computer numerical control machine tools. Welding principles and practice including AC and DC stick welding, Oxy-fuel cutting and welding, GTA/GMA with iron, steel and aluminum. Lab 3. (Spring.) Prerequisite: MET 107, MET 121 and permission of instructor. Cr 2.

INT 219 (BSC) Introduction to Ecology
Emphasis on ecological principles and their relationships to the natural environment and human beings. Not open to majors in biological sciences or resource management. . Satisfies the General Education Population and the Environment Requirement. Rec 3. Prerequisite: BIO 100. Cr 3.

INT 256 (BSC, FES) Tree Pests and Disease
Principles of studying tree pests and disease with emphasis on identification, ecology and control. Satisfies the General Education Writing Intensive Requirement. Lec 3, Lab 3. Prerequisite: FES 100 or equivalent, FTY 107 or BIO 464. Cr 4.

INT 305 (SOC) Women of Maine: An Autobiographical Approach
An ongoing study of the language and communication patterns of women and men. Students learn oral history techniques and tape interviews with persons born in Maine. Interview transcripts are prepared and analyzed based on the historical period under examination and on relevant language and communication theories. Taught by cooperating faculty in Communication and Journalism, Anthropology, and History. Prerequisite: No first-year students. Cr 3.

INT 308 (SMS,WLE) Conservation and Ecology of Marine Mammals
Examination of variations in ecological strategies in marine mammals and investigation of marine mammal conservation and health issues. Lec 3. Prerequisite: BIO 319 or SMS 300 or WLE 200. Cr 3.

INT 392 (AVS, REP) Equine Experience
A supervised independent activity that emphasizes practical, hand-on experience and training with horses. Programs may include, but are not limited to, equitation training with an approved instructor and similar activities. Students are required to maintain a weekly log relating how they are accomplishing objective. May be repeated for up to 9 credit hours. Does not substitute for AVS 397. (Pass/Fail Grade Only.) Cr 1-9.

INT 398 (CHB, CHY, ECE) Undergraduate Research Participation
Research topics chosen by students in consultation with faculty members. Students submit a final report describing their research and present an oral seminar. (Fall and Summer.) Cr 1-3.

INT 410 (ANT, ENG, MLC) Introduction to the Study of Linguistics
A survey of language structure and its socio-cultural, psychological and historical aspects. Provides conceptual and technical tools for understanding the phenomenon of language. No previous training in languages or linguistics is required. Cr 3.

INT 421 (CHB) Directed Study in Biomedical Engineering
A self-directed study opportunity coordinated by the biomedical engineering minor faculty. Prerequisite: INT 121 or permission; engineering majors only. Cr 1-3.

INT 441 (ANT, HTY, SMS) Maritime History and Archaeology of New England
An overview of maritime aspects of New England history, from aboriginal uses through the current state of maritime New England. Emphasis will be given not only to history, but also pertinent archaeological research. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: HTY 103 or HTY 104 or permission of instructor. Cr 3.

INT 450 (PSE, REP) Design and Management of Agroecosystems
Students utilize concepts in crop/pest ecology and economic analysis to evaluate farming system of selected operating farm and recommend appropriate changes. Students work as teams making oral and written presentations of findings. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: Must have completed introductory courses in two of the three pest sciences or permission. BIO 326, BIO 327, PSE 403 and INT 256. Cr 3.

INT 460 (BSC, CHB, CIE, SMS) Environmental Aspects of Aquaculture
Impact of the environment, including currents, waves, tides, temperature, bottom type, nutrients, food availability, and pollution on aquaculture, using algae and shellfish as demonstration species. Projects involving site evaluation for aquacultural activities will utilize GPS, GIS and numerical flow models. Prerequisite: BIO 100, MAT 126, MAT 434. Cr 3.

INT 475 (BSC, FTY, SMS, WLE) Field Studies in Ecology
An intensive ecology field trip of one to several weeks to an area of ecological interest scheduled during Christmas, midyear, spring recess or summer. Field and living conditions may be rigorous and/or primitive. Other preparation and/or recommended prerequisites announced for each trip. Credit depends upon specific trip. Prerequisite: a course in ecology. Cr Ar.

INT 482 (BSC, PSE) Pesticides and the Environment
Study of the properties of pesticides and their fate in the environment. Includes application technology, governmental regulations, and environmental concerns. Lec 3. Prerequisite: One semester of biology and one semester of chemistry; juniors standing. Cr 3.

INT 484 (BMMB,SMS) Introduction to Systems Modeling for Biological Sciences
An introduction to the use of computer modeling, simulation and analysis for understanding general physical, chemical and biological systems ranging from sub-cellular to the biosphere. Includes basic principles of simulation modeling and uses STELL software for PC or Mac to implement models of a wide range of phenomena. Relevant mathematical concepts are reviewed and provided as necessary. (Taught at the Darling Marine Center as part of the Semester-by-the-Sea program.) Prerequisite: permission. Cr 2.

INT 490 (University Wide) Lies, Deception and Heroification
Explores the theme of "heroification" as it is developed in the 1998-99 University of Maine Class Book, Lies My Teacher Told Me: Everything Your American History Textbook Got Wrong. In this book, author James Loewen maintains that the creation of sanitized heroic figures in high school history textbooks, social archetypes rather than human beings, creates not only "culture-serving distortion" but boring and inaccurate history. Students will explore how lies in history, education, government, business and society in general create "cultural distortion. " Emphasizes history as interpretation, the elusive nature of truth in history, and the dynamic variables contributing to moral and ethical tensions swirling around identity, race, gender, freedom, privacy, censorship, governance, propaganda, sexuality and ethnicity. Satisfies the General Education Cultural Diversity and International Perspectives and Social Context and Institutions Requirements. Cr 3.

INT 491 (University Wide) A Midwife's Tale and the Social Web
Investigates the concept of "social web" as introduced in the 1999-2000 University of Maine Class Book, A Midwife's Tale: The Life of Martha Ballard, Based on Her Diary, 1785-1812. The "social web" is a metaphor to describe how the late eighteenth century community of Hallowell, Maine was woven together by the intricate warp and woof of social relations documented in Ballard's diary and contextualized and interpreted by historian Laurel Ulrich. Using primary, secondary and fictional sources, an interdisciplinary group of faculty will lead students through an investigation of the ethical, legal, social and spiritual issues attendant upon womanhood and women's work in Martha Ballard's time and today. Satisfies the General Education Ethics, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

INT 494 (PAA, POS) Field Experience
Students participate in a political or governmental organization. Readings and reports required in addition to meetings with faculty sponsor and/or other field experience participants. Six credit hours maximum for any single field experience registration. Majors within the department may not receive more than a total of 12 credit hours toward graduation for any combination of internships and field experience, and not more than 6 credit hours may be used toward the department major. Satisfies the General Education Capstone Experience Requirement. Prerequisite: junior or senior standing. Cr Ar.

INT 500 (ANT, BSC, GES, PSE, QUS) Seminar in Quaternary Studies
Selected areas of study - physical, biological and anthropological - related to the Quaternary Period. One weekend field trip may be required. May be repeated for credit. Prerequisite: permission. Cr Ar.

INT 510 (BSC, SMS) Marine Invertebrate Zoology
Covers systematics, adaptive-functional anatomy, and life histories of free-living marine invertebrates, excluding protozoans. Laboratory emphasis on studies of living material from the local fauna. Numerous field trips required. Rec 2, Lab 6. Prerequisite: BIO 353 or equivalent. Cr 5.

INT 514 (ECO, REP) Microeconomic Theory
An examination of modern economic analysis with regard to the consumer, the firm and market structures. Prerequisite: permission. Cr 3.

INT 525 (BSC, CHB, FTY) Tropical Deforestation Seminar
Local, regional and global issues associated with tropical deforestation are addressed. Discussions focus on ecological, social, political, economic and cultural aspects of tropical forests and human interactions for understanding the causes and consequences of deforestation. Lec 1. Prerequisite: Senior or graduate status or permission. Cr 1 or 2.

INT 530 (ECO, REP) Econometrics
An introduction to economic concepts and relationships expressed in quantitative terms. Covers problems of ordinary least squares, generalized least squares, estimation and use of ultiequation models and forecasting. Prerequisite: ECO 485 or permission. Cr 3.

INT 551 (BUA, CHB, FTY, WSC) Structure of the Pulp and Paper Industry
Includes an historical overview of the industry, products and product classifications, profiles of industry leaders, management styles, trends in strategic planning, financial aspects, capital investment and budgeting and an analysis of issues related to raw material availability and the environment pressures facing the industry. Prerequisite: senior or graduate level standing in Business, Chemical Engineering, Forest Management or Wood Science and permission. Cr 3.

INT 553 (BUA, CHB, FTY, WSC) Markets and Marketing in the Pulp and Paper Industry
A detailed look at the markets and marketing of pulp and paper both domestically and internationally. Buyer/seller relationships, distribution, promotion, strategic planning, competitive/competitor analysis and pricing for commodity and specialty producers. Prerequisite: INT 551. Cr 3.

INT 563 (BSC, SMS) Marine Benthic Ecology
Advanced ecological studies of benthic intertidal and subtidal marine organisms. Includes discussion of distributions, zonation, biotic interactions, food webs, succession, hypothesis testing, problems of scale, recruitment community structure and organization. Lec 2, Rec 1. Prerequisite: a course in ecology. Cr 3.

INT 570 (CHE, CHY, ECE, MEE, PHY, SIE) Emerging Science and Technology: Integration Into K-12 Classrooms
A preplanned experience requiring regular school visits to selected K-12 schools

throughout the semester, during which undergraduate and graduate science and engineering students share their knowledge of emerging science and technology with K-12 school teachers and students. May be repeated for credit. Prerequisite: senior or graduate student standing and permission. Cr 1-3.

Information Systems Engineering (ISE)

ISE 102 Fundamentals of Information Systems
Students develop the fundamental knowledge of information systems, including formal systems and models. Covers use of data, information, and knowledge in organizations, information lifecycle; collection, storage, processing, retrieval, delivery; and overview of the various components of an information infrastructure including computing platforms, software architectures, and telecommunications networks. Types of information systems, client server architectures, and emerging information systems. (This course is identical to NMD 102.) Lec 3. Cr 3.

ISE 104 Design Basics for New Media
Introduction to principles and theories of visual design, in traditional and electronic media; processes, methods and technologies relative to the creative production of two-dimensional visual imagery; use of the computer as a creative tool for the development of expressive and professional images. Focus on the creative process in visual design. (This course is identical to NMD 104.) Studio 3. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

ISE 112 Using Geographic Information Systems
Review of major elements of geographic information systems (GIS); uses in society; hands-on analysis, modeling and display of spatial data; study of collection and analytical methods for geographic data sets; focus on Census Bureau population data and its use for market research, health care, crime analysis and environmental applications; exposure to Internet mapping and GIS analysis on the Web. (This course is identical to NMD 112.) Lec 3. Cr 3.

ISE 201 Principles of Geographic Information Systems
Covers traditional representation of spatial data and techniques for representing spatial data in digital form. Combines an overview of general principles associated with the implementation of geographic information systems and practical experience in the analysis of geographic information. Also covers typical operations on spatial information and techniques for analyzing spatial information. Students convert map data to digital form, perform coordinate transformations and analysis. Lec 2, Lab 1. Prerequisite: Sophomore standing and permission. Cr 3.

ISE 206 Project Design Lab: I
Introduces theories of signs and visual communication as applied to interactive information design. Explores how signs and symbols influence meaning and facilitate expression and perception of ideas and information. Provides a general knowledge of the history of visual theory and the interpretation of icons, symbols and indexes, including the unspoken "language" of design structures. Visual culture, semiology, and cultural/information artifacts as manifested by such designed items as Web sites, interactive media and databases are studied. Prerequisite: NMD 102 or NMD 104 or permission. Cr 3.

ISE 213 Information Ethics
Ethical and social issues associated with information system design and use. Morality and law in cyberspace. Values, ethical theories and their relation to information professionals. Free speech, intellectual property, privacy and security. Access to government information and government surveillance. Western values and norms compared to developing world perspectives. (This course is identical to NMD 213.) Lec 3. Satisfies the General Education Ethics and Cultural Diversity and International Perspectives Requirements. Cr 3.

ISE 301 Formal Foundations for Information Systems
Students develop an understanding of the approach to information systems development offered by formalisms. Draws on previous mathematics courses to consolidate familiarity with formal syntax and language. Develops understanding and technical ability in handling discrete and geometrical formal structures. Covers set theory, functions and relations, logic (propositional and predicate calculi, logics of uncertainty), algebraic structures, partially ordered sets, lattices, Boolean algebras, graphs, digraphs, geometries, analytic and geometric topology, information theory, formal languages, and algorithms. Lec 3. Prerequisite: MAT 228, ISE 102 or permission of instructor. Cr 3.

ISE 302 Information Systems Design
Theoretical foundation for representation of knowledge in information systems. Introduces students to the fundamental concepts necessary to design and implement information systems. Uses logic programming as a tool for fast design and prototyping of data models. Covers formal languages and formal models, conceptual modeling techniques and methods for data abstraction, major database models including relational, object-relational, and object-oriented models. Satisfies the General Education Writing Intensive Requirement. Lec 3. Prerequisite: COS 220 and ISE 301. Cr 3.

ISE 303 Human-Computer Interaction
Students are introduced to the fundamental theory and concepts of human-computer interaction. Students will gain a theoretical knowledge and practical experiences in the fundamental aspects of designing, implementing and evaluating interfaces. Covers topics relating to human factors in interface design, usability, visual interfaces, direct manipulation and graphic interactions, touch, gesture, natural language and speech interfaces. In addition, the course will offer students evaluation techniques to help understand if their designs are effective. Lec 3. Prerequisite: COS 221 or permission of instructor. Cr 3.

ISE 304 Digital Image Processing
Introduction to image processing and analysis techniques suitable to the processing of close-range, aerial or space-borne sensor data. Topics include elements of digital image processing and analysis systems; image digitization, quantization and sampling; geometric operations; image enhancements, point operations and filtering; transformations in spatial and frequency domains; image segmentation and feature extraction; automated information extraction and incorporation in information systems; term project. Lec 2, Lab 1. Prerequisite: MAT 228, PHY 122 and MAT 262 or MAT 258. Cr 3.

ISE 305 Digital Video Analysis
Basics of video image acquisition; data analysis: image sequence analysis, object and feature tracking, spatiotemporal change detection; image modeling: image and spatiotemporal compression, motion modeling and spatiotemporal trajectories, image formats; scene modeling: image registration, producing and managing virtual models of 3D scenes; image and video indexing and retrieval. Lec 2, Lab 1. Prerequisite: ISE 304. Cr 3.

ISE 350 Junior Seminar
Students develop and apply knowledge in how to examine critically a small set of state-of-the-art publications, in the field of Information System Engineering synthesize them, in writing and present a coherent summary verbally. Lec 1. Prerequisite: ENG 317. Cr 1.

ISE 401 Information System Architecture
Students develop the fundamental knowledge of information systems architectures. Covers aspects of data sharing and computation in distributed information system environments. Layered architecture of distributed information systems; types of distributed system architectures; name spaces, data replication, and caching; scalability and performance of distributed information systems; middleware; open distributed information systems; interoperability aspects. Data dissemination, and emerging distributed information systems. Lec 3. Prerequisite: ISE 302, programming experience in Java or C++ or COS 221. Cr 3.

ISE 402 Information Retrieval
Covers the computational issues needed to design Web search engines. Deals with querying structured data vs. semi-structured or unstructured data, and introduces students to various methods for making syntactic matches, in particular for similarity searches. Extends to modeling semantics in the form of ontologies, and their use in information retrieval. Lec 3. Prerequisite: ISE 401. Cr 3.

ISE 403 Spatial Database Systems
Students develop the fundamental knowledge of spatial database systems. Covers spatial data models, spatial query languages, database architecture, database technology for spatial database systems. Storage structures, file organization, general and spatial index structures, implementation of relational and spatial operators, spatial query processing and optimization, transaction management and crash recovery, distributed spatial database systems. Lec 3. Prerequisite: ISE 302, programming experience in Java, or C++ or COS 221. Cr 3.

ISE 404 Time in Information Systems Design
The study of temporal aspects within information science offers new perspectives for understanding and communicating information. Introduces students to concepts necessary for designing and using a temporal information system. Covers formal models of time, conceptual models of time, fundamentals of temporal databases, temporal query languages, and spatio-temporal database systems. In addition, topics relating to event-based modeling and the visualization of temporal data will be covered. Lec 3. Prerequisite: COS 221, ISE 302 or permission of instructor. Cr 3.

ISE 405 Statistics for Information Engineering
Students develop the fundamental knowledge of statistical analysis of engineering data. Introduces the concepts of statistical metrics like averages, standard deviations and their use to handle measurement redundancy in engineering applications. Covers propagation of random errors and variance-covariance, the adjustment of engineering observations through various stochastic models, combining observations and conditions among parameters, proceeding with sequential solutions in the presence of steady information flow, modeling and communicating uncertainty in information systems, devising statistical tests. Some concepts from linear algebra and statistics are also reviewed. Lec 2, Lab 1. Prerequisite: MAT 262 or MAT 258. Cr 3.

ISE 406 Image Metrology
Image formation, black and white and color film, cameras, panchromatic, multispectral and radar imagery, principles of stereoscopic viewing and measurement, orientations, aerotriangulation, matching, orthophotography, accuracy and reliability of image measurements, satellite programs. Lec 2, Lab 1. Cr 3.

ISE 450 Information Systems Project I
The first course in a two-semester sequence that provides a coherent view of the processes involved in the development of information systems in a multidisciplinary context. Small teams of students will design, implement, evaluate, and document an information system. Part one: project selection, requirements analysis, functional specifications, database design and proposal writing. Lec 3. This course, in conjunction with ISE 451, Satisfies the General Education Capstone Experience Requirement. Cr 3.

ISE 451 Information Systems Project II
The second course in a two-semester sequence that provides a coherent view of the processes involved in the development of information systems in a multidisciplinary context. Small teams of students will design, implement, evaluate, and document an information system. Part two: interface prototyping and evaluation, project development, and project evaluation. Lec 3. This course, in conjunction with ISE 450, Satisfies the General Education Capstone Experience Requirement. Prerequisite: ISE 450. Cr 3.

Kinesiology and Physical Education (KPE)

KPE 100 Athletic Training Observation I
Designed to encourage students to observe certified athletic trainers and other sports medicine professionals relative to athletic training. Areas of study include bloodborne pathogen training, rules of patient confidentiality, information about the National Athletic Trainer's Association and other governing bodies for certified athletic trainers ad other material as it relates to working in an athletic training setting. Prerequisite: KPE 250 or by permission of ATE Director. Cr 1.

KPE 200 Coaching Fundamentals
Includes the minimal requirements to coach at the middle school or high school level in most states. Studies the basic principles of coaching including: sport philosophy, sport psychology, sport pedagogy, sport physiology and sport management. Students will develop a basic knowledge of sport injuries, recognition of common injuries and be able to administer sport first aid and CPR. Cr 1.

KPE 201 Athletic Training-Clinical Skills I
For the beginning athletic training student and emphasizes decision-making skills in the application of theory and skills to practical situations in the student's first clinical experiences. Students will be introduced to the organization and administration specific to an athletic training room setting. Students will also become proficient in taping, wrapping, padding bracing and padding techniques. Prerequisite: KPE 250 Cr 3.

KPE 202 Athletic Training-Clinical Skills II
Students will become proficient at strength and flexibility testing and fitness protocols. Anthropometric measurements, isometric, isotonic, and isokinetic, strength training and measurements will be covered. Based on hands-on experience in the athletic training settings where the student will he under the direct supervision of a certified athletic trainer. Prerequisite: KPE 253 Cr 3.

KPE 209 Wilderness First Responder
Covers a wide spectrum of emergency care topics relative to wilderness medicine and caring for injuries and illnesses over prolonged periods of time. A combination of discussions, practical stations and real-life simulations. Topics include assessment and management of traumatic injuries such as fractures, burns and wounds; circulatory, nervous and respiratory system problems; common injuries such as blisters, sprains and strains; medical problems such as anaphylaxis, toxins, altitude, hypothermia, hyperthermia, and infections; and use of improvised materials in remote situations. Includes information on personal outdoor preparedness, accident management and prevention and introduces simple evacuation techniques and ropework. Upon completion students receive nationally recognized Wilderness First Responder certification and CPR certification. Cr 3.

KPE 223 Lifeguard Training
Develops the necessary skills and competencies to qualify as a certified American Red Cross nonsurf lifeguard. Prerequisite: permission. Cr 1.

KPE 231 Badminton
Instruction to develop skills and teaching techniques in this leisure net sport. Prerequisite: KPE major or permission. Cr 1.

KPE 232 Golf
Instruction to develop skills and teaching techniques in this leisure activity. Prerequisite: KPE major or permission. Cr 1.

KPE 233 Volleyball
Instruction to develop skills and teaching techniques in this leisure net sport. Prerequisite: KPE major or permission. Cr 1.

KPE 234 Racquetball
Racquetball skills and teaching techniques along with instructions and rules will be presented. Prerequisite: KPE major or permission. Cr 1.

KPE 235 Rhythmic Activities
Develops skills, teaching techniques and an understanding of basic rhythms, particularly as they relate to folk, social, and square dance patterns. Prerequisite: KPE major or permission. Cr 1.

KPE 236 Dance Fitness
To develop skills and teaching techniques in performing and teaching aerobic dance. Prerequisite: KPE major or permission. Cr 1.

KPE 237 Swimming Skills
Teaching and improving the skills in swimming, springboard diving, water polo, and related aquatic skills. Each phase developed carefully and fully, enabling the more capable to learn how to teach these basic skills at each level, including the beginning level. Prerequisite: KPE major or permission. Cr 1.

KPE 238 Tennis
Instruction to develop skills and teaching techniques in this leisure net sport. Prerequisite: KPE major or permission. Cr 1.

KPE 240 Methods of Teaching and Coaching Track and Field
Designed to develop proficiency in basic track and field skills and knowledge of methods of teaching and/or coaching track and field. Cr 1.

KPE 241 Methods of Teaching and Coaching Basketball
Practical instruction in basketball to develop skills, techniques and understandings for people preparing to enter the teaching and coaching professions. Cr 1.

KPE 242 Methods of Teaching and Coaching Baseball
Provides the student with the skills, techniques and understandings necessary to teach and/or coach baseball to youngsters representing all ability levels. Cr 1.

KPE 243 Methods of Teaching and Coaching Football
Develops proficiency in basic football skills and knowledge of methods of teaching and/or coaching football. Prerequisite: sophomore standing. Cr 1.

KPE 244 Methods of Teaching and Coaching Soccer
Practical instruction in soccer to develop skills, techniques, and understandings for those preparing to enter the teaching and/or coaching professions. Prerequisite: sophomore standing. Cr 1.

KPE 247 Methods of Teaching and Coaching Softball
Provides the student with comprehensive instructional materials, including the guiding principles for all aspects of the game. Content includes the skills of softball and methods of coaching and teaching. Prerequisite: sophomore standing. Cr 1.

KPE 248 Methods of Teaching and Coaching Field Hockey
Identifies for the prospective teacher/coach the basic skills and techniques used in field hockey. Emphasis on teaching and coaching methods. Prerequisite: sophomore standing. Cr 1.

KPE 250 First Aid and Emergency Care
Involves instruction in and practice of first aid and emergency medical care procedures. Students will be required to pass written examinations and practical tests to demonstrate competency in cardio-pulmonary resuscitation and appropriate medical care for and prevention of injuries, illnesses and various medical emergencies such as bleeding, wound care, shock, musculoskeltal injuries and illnesses commonly seen in the physically active population. Prerequisite: KPE major or permission. Cr 3.

KPE 253 Theories of Conditioning
Familiarizes the student with different physical conditioning regimens and what these programs can and cannot accomplish. Investigates specific traits and components of physical fitness and develops competencies to prescribe conditioning programs to meet specific needs. Prerequisite: KPE major or permission. Cr 3.

KPE 262 Methods-Teaching Physical Education
Methods of teaching physical education to all grade levels and abilities. Teaching models and practical application of models by students will be stressed. Teaching effectiveness techniques, theories, principles, instructional design and methods of evaluation will be examined. Prerequisite: KPE major or permission only. Cr 3.

KPE 270 Motor Development and Learning
The understanding and application of major principles in the development and learning of motor behavior from conception through adolescence. The effects of development in the cognitive and affective domains upon the motor domain. Prerequisite: KPE major or permission. Cr 3.

KPE 271 History and Philosophy of Kinesiology and Physical Education
Provides historical and philosophical knowledge in relation to physical education and sport. Current sociological issues will be discussed. Oral and written presentations will be required covering historical, philosophical and social issues relating to sport and physic physical education. Satisfies the General Education Writing Intensive Requirement. Prerequisite: ENG 101. Cr 3.

KPE 273 Anatomy and Pathology of Athletic Injuries
Familiarize students with human anatomy and the pathology associated with sports and fitness injuries. Students will focus on human neuromusculoskeltal anatomy, physiological responses of tissues to trauma and the etiology and signs and symptoms of common sports specific injuries and conditions. Prerequisite: BIO 208 or KPE 250. Cr 3.

KPE 278 Health Education
Examines all the factors that influence health. Serves as a channel for education students in all the choices they have for creating positive, healthy lifestyles. Current health issues and information will be presented and discussed. Cr 2.

KPE 280 Introduction to White Water Kayaking
Covers the fundamentals of white water paddling, the basic strokes, maneuvers, rolling, and river reading and strategy. Discussion and projects will focus upon, current issues in paddling, equipment development and sport specific training. Cr 1.

KPE 281 Introduction to Sea Kayaking
Typically taught off the Maine coast in Penobscot Bay, this course is designed to teach the basics of sea kayaking beginning with the safety issues of maritime travel. Addresses paddling technique, equipment design and care, coastal navigation and travel, tidal activity, island ecology and general trip planning. Cr 1.

KPE 282 Introduction to Skin and Scuba Diving
Strives to develop safe, competent diving skills, providing a basic knowledge of dive physics, dive physiology, environmental issues and diving maladies as related to human performance underwater. Information on lifesaving and first aid procedures with respect to diving. Several pool and open water sessions are included. Successful completion of this course results in Professional Association of Diving Instructors (PADI) certification. Cr 1.

KPE 283 Introduction to Nordic Sports
Covers the fundamentals of two areas of Nordic skiing: classical cross country and skating cross country. Discussions and projects will focus upon personal fitness, equipment development and sport specific training. Cr 1.

KPE 284 Rock Climbing-Principles and Movement
Focuses on developing personal movement skills related to rock climbing and helps participants become more familiar with various techniques for climbing slabs, face, cracks and overhangs. Includes basic rope management skills such as knot tying and belaying. Students are expected to develop a concurrent fitness training plan and measure their climbing progress over the length of the course. Cr 1.

KPE 285 Artificial Climbing Wall Management
Provides the fundamental skills for organizing and supervising a climbing wall in a school or camp-like setting. Focuses on learning to teach basic rope techniques and to coach climbing technique. Also includes route setting, facility inspection, operational guidelines and common administrative issues. Prerequisite: KPE 284. Cr 1.

KPE 286 Adventure Activities and Initiatives
Familiarizes the student with the use of cooperative new games and group initiatives in adventure-based programming. These activities are used to foster personal confidence, decision-making and problem-solving, communication and trust among team members and leadership skills. Students will learn to apply the educational concepts of adventure-based methods to conduct adventure-based activities. Cr 1.

KPE 287 Ropes Course Management
Familiarizes you with the concepts of adventure based programming which relies on activities such as cooperative games, group initiative and problem solving elements, trust activities, and low and high ropes course elements to help individuals and groups learn about concepts such as decision making and problem solving, leadership and how to be a team player. Introduces the technical methods and skills required to conduct ropes course activities, as well as the associated management issues of the safety, liability and staffing training. Prerequisite: KPE 286. Cr 1.

KPE 288 Introduction to Top Rope Rock Climbing
Covers the fundamentals of belaying, rappelling and anchor establishment for traditional and re-directed top rope climbing. Upon completion, students should be able to begin climbing on their own. Note: This course should only be taken by students who are personally interested in learning to rock climb. Participants will be required to provide a moderate amount of personal equipment. Prerequisite: KPE 284 or permission of instructor. Cr 1.

KPE 300 Athletic Training Observation II
Designed to familiarize students with health care professionals comprising the sports medicine team. Guest lecturers will discuss their backgrounds and their roles in relation to treating the physically active. Students are required to observer health care professionals outside classroom time. Prerequisite: Acceptance in ATE or permission of ATE Director Cr 1.

KPE 301 Athletic Training-Clinical Skills III
Through hands-on experience under the direct supervision of a certified athletic trainer, the student will focus on evaluating and treating athletic injuries using assessment skills, therapeutic modalities and rehabilitation skills necessary for the profession. Focuses on lower extremity evaluations using theories and problem solving skills while in an athletic training setting. Prerequisite: KPE 387, KPE 388 or permission of ATE Director. Cr 3.

KPE 302 Athletic Training Clinical Skills IV
Focus in on evaluation and treatment sing assessment skills, therapeutic modalities and rehabilitation exercises for head, cervical/ thoracic spine and upper extremity injuries. The student will develop competency and proficiency in these skills while working in and athletic training setting and will be under the direct supervision of a certified athletic trainer. Prerequisite: KPE 386, KPE 387 and KPE 388 Cr 3.

KPE 303 Pharmacology in Athletic Training
Provides information in pharmacology applications including indications, contraindications, precautions and inter-actions of medications commonly used for injuries, illness or conditions of the physically active. Regulations of various local and national governing bodies will be discussed. Prerequisite: Admission in ATE program or by ATE Director permission. Cr 1.

KPE 310 Outdoor Leadership
Develops and evaluates educational experience which can be pursued beyond the classroom setting. Emphasis will be on leadership, safety and liability in the field of outdoor education. Prepares student to meet the challenges of leading wilderness trips and conducting outdoor education classes. Cr 3.

KPE 311 Wilderness Education Skills
Establishes a professional field foundation for students pursuing careers in wilderness education and outdoor program management. Participation requires a significant commitment from the student. Provides instruction in a variety of general outdoor skills that are essential to be an outdoor leader. Topics include: environmental ethics, expedition behavior and group dynamics, basic camping skills, nutrition and ration planning, equipment and clothing selection and use, weather, health and sanitation, travel techniques, navigation, safety and risk management, wilderness emergency procedures, specialized travel and trip planning. Each topic is explored in depth and students are asked to practice teaching methods during the course. Prerequisite: Instructor permission. Cr 3.

KPE 344 Principles of Coaching
Supplies an appreciation and background in the art of coaching. Deals with the complex problems facing those that accept the challenge of handling our youth of today in a sport setting. The complete role of the effectiveness of the coach will be surveyed. Field trips to study experienced coaches will be required. Prerequisite: sophomore standing. Cr 3.

KPE 350 Educational Gymnastics, Games and Dance
Development of basic games analysis technique, gymnastic progressions and spotting techniques and group dance development and organization for the elementary and secondary schools. To develop skills in teaching games, dance and gymnastics, utilizing movement themes and activity. Prerequisite: KPE 262; KPE major or permission. Cr 3.

KPE 364 Elementary School Physical Education
Specifically designed for the elementary physical educator for the purpose of studying the movement education curriculum used in elementary schools. Emphasis will focus on effective teaching techniques, instructional planning and on the progression of skills used

in games, dance and gymnastics. A laboratory teaching experience will be implemented at a local elementary school. Prerequisite: KPE 262. Cr 3.

KPE 365 Curriculum and Instruction in Secondary Physical Education
Provides the preservice teacher with an opportunity to practice learned effective teaching behavior in various teaching settings. Also provides the preservice teacher with an overview of secondary schools. Prerequisite: KPE 262. Cr 3.

KPE 367 Mainstreaming in Physical Education-Recreation
Helps teachers, coaches, and recreation personnel meet state and federal requirements for equal opportunities for handicapped persons. Content includes etiology and characteristics for handicapping conditions; implications for teaching; direct experience with handicapped persons. Cr 3.

KPE 372 Tests and Measurements in Physical Education-Recreation
Discussion and use of procedures and instruments for evaluation of persons in physical education, recreation and athletic programs. How to select, construct, administer, score, and interpret tests for psychomotor, affective and cognitive abilities will be emphasized. Satisfies the General Education Mathematics Requirement. Cr 3.

KPE 376 Kinesiology
An introduction to the analysis of human motion based on anatomic knowledge, basic biomechanics and kinesiological principles as they apply to teaching and coaching sport skills. Prerequisite: BIO 208, KPE 253. Cr 3.

KPE 378 Physiology of Exercise
Develops an understanding of the integration and regulation of physiological functions during physical activity. Through investigation of factors affecting human performance, and the coordinated adjustment of body functions to the stress of exercise, students will become more aware of the theoretical and practical applications of exercise science. Prerequisite: BIO 208, KPE 253. Cr 3.

KPE 383 Organization and Administration in Athletic Training
Designed to prepare the student with knowledge, skills and values necessary for the entry-level certified athletic trainer who is interested in developing and/or administering an athletic training room or other health care facility. Topics such as budgeting, leadership, planning a facility and professional development will be covered. Prerequisite: KPE 250. Cr 3.

KPE 384 Practicum in Kinesiology and Physical Education
Leadership experiences under staff supervision in the service program. Limited opportunities also exist in local public schools. Prerequisite: Consult with Dr. Cobb before registering. Cr 1-3.

KPE 385 Assessment and Evaluation of Upper Extremity Athletic Injuries
Provides theories and techniques for the assessment and evaluation of athletic related injuries specific to the upper extremity. Students are expected to have an understanding of musculoskeletal, neurological and vascular anatomy as well as the biomechanics and injuries specific to the upper extremity. Determination of severity and referral protocols will be presented in reference to management and treatment. The class will consist of lectures and practical lab applications. Prerequisite: KPE 273 and KPE 376 Cr 3.

KPE 386 Assessment and Evaluation of Lower Extremity Athletic Injuries
Provides theories and techniques for the assessment and evaluation of athletic related injuries specific to the lower extremity. Students are expected to have an understanding of musculoskeletal, neurological and vascular anatomy as well as the biomechanics and injuries specific to the lower extremity. Determination of severity and referral protocols will be presented in reference to management and treatment. Lec 3. Prerequisite: KPE 273 and KPE 376. Cr 3.

KPE 387 Rehabilitation of Athletic Injuries
Addresses flexibility, cardiovascular and strength needs as they relate to the rehabilitation of injured athletes. Proper progression of exercises, use of equipment and criteria to return to activity will be discussed. Student will become proficient with these through practical application. Lec 3, Lab 1. Prerequisite: KPE 273 or permission. Cr 4.

KPE 388 Therapeutic Modalities
Provides specific content in the application and analysis of physical agents utilized in the treatment of athletes, including heat, cold, electricity, light, sound, water, traction and massage. Course format includes lab time to allow the student to become proficient with such modalities. Lec 3, Lab 1. Prerequisite: KPE 273 and PHY 105 or equivalent. Cr 4.

KPE 398 Problems in Kinesiology and Physical Education
Individual work on a problem in the area of health, physical education or recreation. Cr 1-3.

KPE 400 General Medical Conditions and Disabilities in Sport
Offers an overview of general medical topics designed to meet the needs of advanced athletic training students for recognizing and managing medical conditions and disabilities of the physically active. The student will become competent in screening, treating and referring the athlete appropriately for significant medical problems. Structured by body systems combining didactic teachings with practicums. Prerequisite: 3rd or 4th year standing in ATE program or ATE Director permission. Cr 3.

KPE 401 Athletic Training Senior Seminar
Designed to prepare athletic training students for the NATABOC examination, graduate school and entry-level employment in athletic training. Will familiarize the student with sports medicine research - case studies, literature reviews, and outcome-based studies. Students will walk through the beginning of their own outcome-based research project. Prerequisite: Final year in ATE program or ATE Director permission. Cr 1.

KPE 409 Wilderness Education Skills and Leadership
Establishes a professional foundation for students pursuing careers in wilderness education and outdoor program management. Participation in the course requires a significant commitment from the student. In exchange, students will gain leadership experience and improve their knowledge and skills in a variety of areas including: philosophy and educational models of adventure education; expedition behavior; leading group and personal growth discussions; use of new games and initiatives; environmental awareness and minimum impact techniques; judgement and decision-making; emergency procedures/evacuation; expedition planning and organization; and basic wilderness skills such as cooking and nutrition, equipment maintenance and navigation. Prerequisite: KPE 310 or equivalent and instructor permission. Cr 4.

KPE 424 Adult Fitness
Adult fitness is designed as an introductory class which provides the student with a broad theoretical background in the area of adult exercise and physical training. The role chronic exercise has in the possible prevention and retardation of coronary heart disease serves as the basic premise of the course. Prerequisite: KPE 378. Cr 3.

KPE 425 Health Promotion and Disease Prevention
Provides specific content in health promotion and disease prevention and explores current public health issues. Program planning, needs assessment, intervention strategies and evaluation models will be presented with the constructs of epidemiological principles as

they relate to increasing employee health and wellness and decreasing the incidence and prevalence of chronic disease. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Junior standing and permission Cr 3.

KPE 426 Exercise Leadership and Class Management
Provides specific knowledge, skills and competencies needed to appropriately develop, prescribe, instruct and manage various kinds of exercise programs for diverse populations. Prerequisite: KPE 262 and KPE 378. Cr 3.

KPE 427 Health Fitness Internship
Supervised experience in fitness, health promotion and in conducting recreation programs in camp, community, social agency or institution situations. Satisfies the General Education Capstone Experience Requirement. Prerequisite: KPE 426 and permission. Cr 6.

KPE 483 The Comprehensive School Health Program
Examines the components of a school health program. Includes policies, procedures and activities designed to promote health of students and staff. Components that will be addressed include: health instruction, curriculum development, school health services, environment and promotion. Designed for those seeking teacher certification in health. Cr 3.

KPE 485 Psycho-Social Aspects of Sport
An analysis of sociological and psychological dynamics and processes of sport. Topics will include: performance enhancement, gender and racial issues in sport, youth sport, and violence/aggression in sport. Prerequisite: Junior or Senior standing and PSY 100 or SOC 101. Cr 3.

KPE 560 Assessment and Evaluation of Human Performance
The assessment and evaluation of selected anatomical, physiological and psychological aspects of human performance for the purpose of developing prescriptive exercise programs based upon individual needs, goals and interests. Prerequisite: KPE 378 and permission. Cr 3.

KPE 573 Motor Performance and Learning
Study of motor performance to aid the instructor to provide better theoretical framework to structure learning experiences for skillful individual performance. Prerequisite: permission. Cr 3.

KPE 575 Current Studies in Kinesiology and Physical Education
Analysis of current and emerging trends in kinesiology and physical education based on experiments, research, literature and empirical observations. Cr 3.

KPE 580 Mechanical Analysis of Human Movement
Analysis of activities provide the student with scientific basis for teaching and evaluating correct form for execution of the fundamental movements. Prerequisite: KPE 376. Cr 3.

KPE 588 Advanced Exercise Physiology
Broadens the knowledge base of graduate students and to identify potential research areas. Involves in depth study of selected topics in exercise physiology and requires students to extensively utilize the current research literature. Prerequisite: KPE 378 and permission. Cr 3.

KPE 590 Nutrition for Sports and Exercise
In-depth study of the role nutrition plays in the training regime of athletes and those in the general population who include regular exercise in their personal lives. Topics include: digestion and absorption of food nutrients, bioenergetics, fluid balance and rehydration, ergogenic aids, proper weight lost and disordered eating. Prerequisite: KPE 378, FSN 101. Cr 3.

Liberal Arts and Sciences (LAS)

LAS 100 Majoring in the Liberal Arts and Sciences
Introduces students to the faculty, students, facilities and resources central to their intended academic major. Topics covered include the specific program requirements of the intended major, the requirements of the B.A. and B.S. degrees, library resources and organization, special laboratory facilities, and the special expertise of faculty. (Pass/Fail Grade Only.) Prerequisite: permission of Dean's Office. First-year students only. Cr 1.

LAS 101 First-Year Seminar in Liberal Arts and Sciences
Students explore a variety of current interdisciplinary topics in small seminars limited to incoming first-year students. Satisfies the General Education Writing Intensive Requirement. Prerequisite: First-year student. Cr 3.

LAS 351 Experience in Group Learning, Leadership and Mentoring
Training and support for student Peer Lead Team Learning (PLTL) leaders who are participating in a PLTL workshop program conducted in conjunction with a University of Maine 100 or 200 level course. Discussion in PLTL leadership sessions will include both theoretical and practical aspects of leading a workshop. Cr 1.

LAS 499 Senior Capstone in Interdisciplinary Studies
Students develop extended research projects or engage in significant internship experiences related to their individualized programs of study in the College of Liberal Arts and Sciences' Bachelor of Arts in Interdisciplinary Studies. Projects are supervised by the student's advisory committee and must be approved by the college's Interdisciplinary Studies Committee. Satisfies the General Education Capstone Experience Requirement. Prerequisite: permission. Cr 3.

Latin (LAT)

LAT 101 Elementary Latin I
Fundamentals of the Latin language. Cr 4.

LAT 102 Elementary Latin II
Fundamentals of the Latin language. Prerequisite: LAT 101 or equivalent. Cr 4.

LAT 199 Review Latin
Fast-paced review of elementary Latin grammar for those who have taken two or more years of high school Latin but do not feel qualified to go on to LAT 203/204; substantial written assignments. The course is also appropriate for students at all levels who have been away from Latin for sometime and wish to review their Latin skills. This class is not the equivalent of LAT 203/204 level language courses. Lec 2. Prerequisite: 2 years of high school Latin or permission of instructor. Cr 3.

LAT 203 Readings in Latin Literature I
Selections from Latin prose authors: Cicero, Caesar, the letters of Pliny. Facility in reading through grammatical analysis will be emphasized. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

LAT 204 Readings in Latin Literature II
Selections from Latin poetry. Meter, scansion and the interpretation of poetry will be emphasized. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: LAT 203 or the equivalent or permission of instructor. Cr 3.

LAT 247 Latin Prose Composition and Stylistics I
Review of grammar and syntax, with particular attention to Cicero and Tacitus. The writing of prose, especially in the style of

Cicero. Required for majors; should be taken in the junior year or earlier, if possible. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: LAT 204 or the equivalent or permission of instructor. Cr 3.

LAT 248 Latin Prose Composition and Stylistics II
Continued study of grammar and syntax. Required for majors; should be taken in the junior year or earlier, if possible. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: LAT 247 or permission of instructor. Cr 3.

LAT 451 Roman Comedy: Plautus and Terence
A study of the source of Roman comedy, its literary features, and influence upon later literature. One play by each dramatist will be read. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Given every three years. Prerequisite: LAT 204 or permission. Cr 3.

LAT 452 Roman Philosophical Thought
Examines the three major philosophical schools: Academic, Stoic, Epicurean, and their influence on Roman thought with selections from: Lucretius, De Rerum Natura, and Cicero's philosophical essays. . Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Offered every three years. Cr 3.

LAT 453 Poetry of the Republic and Early Empire
Considers the lyric poetry of Catullus, the Odes of Horace and the origin and development of satire, with selections from the satires of Horace and Juvenal. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Offered every three years. Cr 3.

LAT 454 Prose of the Republic and of Early Empire
Includes selections from Cicero's letters, Pliny's letters, and Tacitus' Annals. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Offered every three years. Cr 3.

LAT 481 Virgil: The Ecologues, Georgics, Aeneid
The poet's background achievements and influence upon later literature. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Offered every three years. Cr 3.

LAT 482 Medieval Latin
Introduction to a variety of Latin prose and texts from the Middle Ages. Emphasis on stylistic and thematic continuities with an differences from classical Latin prose and poetry. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Offered upon sufficient demand. Cr 3.

LAT 497 Projects in Latin I
Individual work on a project selected by the student. (maximum: 3 credit hours.) Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: LAT 204 or equivalent or permission of instructor. Cr Ar.

LAT 498 Projects in Latin II
Individual work on a project selected by the student. (maximum: 3 credit hours.) Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: LAT 204 or equivalent or permission of instructor. Cr Ar.

Library (LBR)

LBR 200 Information Literacy
Introduces students to the production, transmission, organization, use and control of information. Provides the skills necessary to navigate the many kinds of information resources available today, including the Internet, other electronic formats and print materials. Emphasis on developing critical thinking skills. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

Landscape Horticulture (LHC)

LHC 110 Horticultural Science
General horticultural principles and practices as related to fruits, vegetables and ornamentals. Emphasis on science and application aspects of horticulture. Rec 3. Prerequisite: PSE 100 and LHC majors only. Cr 3.

LHC 130 Floral Design: Retail Shop
Demonstration and practice of the basic skills required in a flower shop: taping, wiring, vase arrangements, corsage, wedding and funeral designs. Fresh and dried flowers will be used. (Pass/Fail Grade Only.) Lab 2. Prerequisite: permission. Cr 1.

LHC 131 Floral Design: Home
Design labs will emphasize the use of flowers in the home. Introduces the basic elements and principles in flower design, the care and storage of cut flowers. Fresh, silk and dried materials will be used. (Pass/Fail Grade Only.) Lab 2. Prerequisite: permission. Cr 1.

LHC 219 Herbaceous Landscape Plants
The study of fundamental principles and practices of identifying growing and using perennial herbaceous ornamental plants in the landscape. Emphasis of identification, selection, landscapes use and plant culture. Rec 2, Lab 2. Prerequisite: LHC 110. Cr 3.

LHC 221 Woody Landscape Plants I
The study of conifers, small flowering trees and evergreen shrubs suitable for landscape use in New England. Emphasis on plant identification, cultural characteristics and use in the landscape. Extensive outdoor labs. Lec 2, Lab 2. Prerequisite: LHC 110 or permission for non-LHC majors. Cr 3.

LHC 222 Woody Landscape Plants II
The study of deciduous trees and shrubs suitable for landscape use in New England. Emphasis on plant identification, cultural characteristics and use in the landscape. Extensive outdoor labs. Lec 2, Lab 2. Prerequisite: LHC 110 or permission for non-LHC majors. Cr 3.

LHC 225 Landscape Graphic Communication
A study of landscape graphics as communication. Two 3 hour studios with up to one hour of studio work devoted to group presentation meetings, instructions and review of new techniques such as drafting, lettering, free hand drawing, section and elevations, concept diagramming, plan graphics and three-dimensional drawing techniques. Satisfies the General Education Artistic and Creative Expression Requirement. Studio 6. Prerequisite: permission for non-LHC majors. Cr 3.

LHC 227 Landscape Construction
An introduction to the physical properties, functional uses and aesthetic values of landscape construction materials, as independent items and as designed elements within the landscape. Lec 2, Studio 4. Prerequisite: LHC 225 or permission for non-LHC majors. Cr 4.

LHC 230 The Art and Science of Pruning
Introduces basic concepts of pruning woody landscape plants. Students learn by doing, pruning a wide variety of woody plants including small flowering trees, deciduous shrubs and evergreens. Emphasis is placed on pruning to enhance the natural beauty of plants and to improve the health of plants. Lab 4. Cr 1.

LHC 305 Problems in Horticulture
Opportunity is provided for specialization in specific areas of horticulture. Prerequisite: permission. Cr Ar.

LHC 325 Turfgrass Management
Study of the scientific principles of turfgrass culture. Includes identification, soil requirements, establishment, fertilization, mowing and pest control of grass species used on home lawns, golf courses, athletic fields, parks and low maintenance areas. Rec 2, Lab 2. Prerequisite: LHC 110 and PSE 140. Cr 3.

LHC 328 Landscape Design
The planning and design of residential sites. Based on balancing the "hands-on" experience with formal design education, by furnishing an overview of the fundamentals of the residential site design process. The students will integrate previous experience and course work in plant material, landscape construction, graphic communication, and general horticultural experiences. Lec 2, Studio 4. Prerequisite: LHC 219, LHC 221, LHC 222, LHC 227 and LHC 325. Cr 4.

LHC 370 Seminar in Landscape Horticulture
Designed to familiarize the student with the process of preparing a seminar. Activities include selecting a topic related to horticulture, developing the approach, researching the topic, preparing an outline, preparing graphics, practicing the seminar and presenting a final 15-minute seminar to the class. Prerequisite: permission. Cr 2.

LHC 396 Field Experience/Internship in Horticulture
An approved program of work experience which relates to the field of horticulture and for which academic credit is given. Students must complete 480 hours either on a part-time or full-time basis in a job related to their professional career goals. A written proposal outlining the proposed experience and/or internship and a final written and oral report is required. (Pass/Fail Grade Only.) Prerequisite: permission. Cr 1-16.

LHC 410 Plant Propagation
Principles and methods involved in the propagation of herbaceous and woody plants by seeds, division, layering, cutting, budding, grafting, and tissue culture. Rec 2, Lab 2. Prerequisite: LHC 110 and PSE 140 or permission. Cr 3.

LHC 423 Plant Production
Covers the basic techniques for production of woody and herbaceous ornamental plants in the greenhouse and outdoor nursery settings. Specific areas of study will include greenhouse structure design and operation, plant propagation, irrigation, fertilization, lighting, pruning, harvest, etc. Extensive greenhouse and field lab work. Lec 3, Lab 1. Prerequisite: LHC 219, LHC 221, LHC 222, PSE 140. Cr 4.

LHC 425 Landscape Management
Designed to provide the senior landscape horticulture student with the opportunity to bring together all aspects of theoretical and applied training. Develops an understanding of professional practice in horticulture, from site management to office management. Accomplished through interacting with a variety of professionals, field trips, real life hands-on situations and numerous related projects. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Lec 2, Lab 2. Prerequisite: LHC 328. Cr 3.

LHC 428 Professional Practices in Landscape Horticulture
A senior level capstone course integrating three years of landscape horticultural coursework, expanding the theoretical base and practical applications of Landscape Horticulture. Satisfies the General Education Capstone Experience Requirement. Lec 2, Rec 1, Lab 2. Prerequisite: LHC 425. Cr 4.

LHC 430 Environmental Horticulture
Examines best management practices for ornamental plants growing in sustainable landscapes. Topics covered include: biotic and abiotic stresses associated with man-made landscapes, plant selection, proper planting procedures, nutrient management, integrated pest management, irrigation, proper pruning of landscape plants and ethical practices will be considered. Satisfies the General Education Ethics, Writing Intensive and Capstone Experience Requirements. Lec 3. Prerequisite: LHC 423 or permission for non-LHC majors. Cr 3.

LHC 503 Post-Harvest Physiology
Biochemical and physiological processes associated with ripening and retaining quality of harvested plant products. Includes temperature, humidity, growth regulators, types of storage, handling and physiological disorders. Lec 3. (Spring - odd.) Prerequisite: BIO 452 and BIO 453 or permission. Cr 3.

LHC 580 Graduate Seminar in Horticulture
Student presentations of their research proposal before a critical audience of peers and faculty. Cr 1.

LHC 597 Special Topics in Horticulture
Advanced study of topics in horticulture. Prerequisite: permission. Cr Ar.

Liberal Studies (LIB)

LIB 500 Graduate Seminar in Liberal Studies
Interdisciplinary exploration of selected topics both within and across the areas of humanities, social sciences and the nature sciences. Topic varies from semester to semester. May be taken more than once for credit if topic varies. Prerequisite: permission of instructor. Cr 3.

Mathematics and Statistics (MAT)

MAT 101 The Nature and Language of Mathematics
An opportunity for non-science majors to experience the nature of mathematics and to explore the connections between mathematics and other areas of human understanding. Satisfies the General Education Mathematics Requirement. Cr 3.

MAT 103 Elementary Algebraic Models in Our World
An introduction to the applications of algebra with a focus on data analysis and model building. Topics include: graphs, algebraic equations and functions. Primary attention will be given to using linear, quadratic and exponential functions to represent and interpret real world applications. Satisfies the General Education Mathematics Requirement. Prerequisite: MAT 101 or 2 years of high school algebra. Cr 3.

MAT 107 Elementary Descriptive Geometry
Designed to prepare students to teach the geometry included in a modern NCTM STANDARDS based K-8 curriculum. Emphasis will be on geometric exploration activities, problem solving and informal deductive reasoning using many of the manipulatives used to teach geometric concepts in grades K-8. Satisfies the General Education Mathematics Requirement. Prerequisite: High school geometry. Cr 3.

MAT 108 Elementary Numerical Mathematics From A Modern Perspective
Designed to prepare students to teach the non-geometric mathematics included in a modern NCTM STANDARDS based K-8 curriculum. Emphasis will be on the structure of arithmetic, development of good number sense, basic number theory, understanding probability and the use of descriptive statistics. Focuses on problem solving, and the development of arithmetic and algebraic reasoning skills. Satisfies the General Education Mathematics Requirement. Cr 3.

MAT 111 College Algebra
A basic course in college algebra emphasizing linear, polynomial, rational, quadratic, exponential and logarithmic expressions, equations, functions and graphs. Satisfies the General Education Mathematics Requirement. Prerequisite: adequate performance on a departmental qualifying examination given during summer orientation and the first week of classes. Cr 3.

MAT 114 Calculus for Business and Economics
Introduction to differential and integral calculus with applications to business and economics. Note: Because of overlapping subject matter, no more than four (4) degree credits will be allowed for successful completion of more than one of MAT 114, MAT 126 and MAT 151. Satisfies the General Education Mathematics Requirement. Prerequisite: A recent grade of C or better in MAT 111 or MAT 122 or a passing grade on a departmental qualifying examination given during summer orientation and the first week of classes. Cr 3.

MAT 115 Applied Mathematics for Business and Economics
Topics in discrete mathematics and finite mathematics with applications to business and economics. Topics include matrices, linear programming, probability, the mathematics of finance, and an introduction to statistics. Satisfies the General Education Mathematics Requirement. Prerequisite: A grade of C or better in MAT 111 or MAT 122 or adequate performance on a qualifying examination. Cr 3.

MAT 121 Applied Algebra and Trigonometry
An introduction to the applications of algebra and trigonometry, with a focus on data analysis and model building. Topics include an introduction to data analysis and modeling; functions and graphs; matrices; polynomial, exponential and logarithmic equations; the basic trigonometric functions. All topics will be treated with an emphasis on how the associated functions are used in real world applications. (Note: Students who intend to go on the calculus should opt for MAT 122 instead of MAT 121. A maximum of four credits will be allowed for successful completion of both MAT 121 and MAT 122.) Prerequisite: A grade of C or better in MAT 111 or adequate performance on a qualifying examination. Cr 3.

MAT 122 Pre-Calculus
Designed as a transitional course between high school algebra and college mathematics, particularly MAT 126. A quick review of high school algebra is followed by a detailed study of polynomial, exponential, logarithmic and trigonometric functions, bearing in mind the needs of those who subsequently take calculus. (Note: Students who intend to go on to calculus should opt for MAT 122, Precalculus, instead of MAT 121. A maximum of four credits will be allowed for successful completion of both MAT 121 and MAT 122.) Satisfies the General Education Mathematics Requirement. Prerequisite: Adequate performance on a departmental qualifying examination given during summer orientation and the first week of classes. Cr 4.

MAT 126 Calculus I
An introduction to calculus for students in mathematics, engineering, and the sciences. Covers the differential calculus of the algebraic, trigonometric, exponential and logarithmic functions, concluding with the definite integral and the fundamental theorem of calculus. The approach is intuitive and geometric, with emphasis on understanding the basic concepts of function, limit, derivative and integral. Note: Because of overlapping subject matter, no more than four (4) degree credits will be allowed for successful completion of more than one of MAT 114, MAT 126 and MAT 151. Satisfies the General Education Mathematics Requirement. Prerequisite: a grade of C or better in MAT 122, or adequate performance on a departmental qualifying examination given during summer orientation and the first week of classes. Cr 4.

MAT 127 Calculus II
Completes the study of single-variable calculus. Topics covered include inverse trigonometric functions, hyperbolic functions, methods of integration, improper integrals, indeterminate forms, parametric equations, polar coordinates and infinite series. Satisfies the General Education Mathematics Requirement. Prerequisite: A grade of C or better in MAT 126. Cr 4.

MAT 151 Calculus for the Life Sciences
An introduction to differential and integral calculus and its applications to the life sciences. Note: Because of overlapping subject matter, no more than four (4) degree credits will be allowed for successful completion of more than one of MAT 114, MAT 126 and MAT 151. Satisfies the General Education Mathematics Requirement. Prerequisite: A grade of C or better in MAT 122 or successful performance on qualifying examination given during summer orientation and the first week of classes. Cr 4.

MAT 200 Topics in Elementary Mathematics
Topics in mathematics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: departmental permission. Cr 1-3.

MAT 215 Introduction to Statistics for Business and Economics
For students in the College of Business, Public Policy and Health and for others concentrating in business or economics. A limited introduction to probability theory leading to discussion of distributions of random variables, in particular the normal and binomial families; a brief treatment of descriptive methods; an introduction to inferential statistics, including one- and two-sample procedures for estimation of parameters and for hypothesis testing; fundamentals of regression analysis or contingency table analysis or contingency table analysis as time permits. (Note: because of overlap, MAT 232 and MAT 215 cannot both be taken for degree credit.) Satisfies the General Education Mathematics Requirement. Prerequisite: A grade of C or better in MAT 115. Cr 3.

MAT 228 Calculus III
For students of mathematics, engineering and the sciences. Vector algebra, geometry and calculus; multivariable differential and integral calculus, including the theorems of Gauss, Green and Stokes. Prerequisite: A grade of C or better in MAT 127. Cr 4.

MAT 232 Principles of Statistical Inference
Intended for students who will use statistics as an aid to the comprehension of quantitative work done by others and for students who will follow this course by an intermediate level applied statistics course. An introduction to the language and methods of statistical analysis, probability, graphic and numeric descriptive methods and inference from sample data. Note: because of overlap, MAT 232 and MAT 215 cannot both be taken for degree credit.) Satisfies the General Education Mathematics Requirement. Prerequisite: Two years of high school math or MAT 111. Cr 3.

MAT 258 Introduction to Differential Equations with Linear Algebra
An introduction to elementary linear algebra and ordinary differential equations including applications. (Not open to students who have already taken MAT 262 or MAT 259.) Prerequisite: A grade of C or better in MAT 228. Cr 4.

MAT 259 Differential Equations
The theory and applications of ordinary differential equations for science and mathematics students intending to take further courses in applied mathematics. (Note: Students planning to take MAT 262 or MAT 451 or MAT 453 should choose MAT 259 instead of MAT 258. Because of overlap, MAT 258 and MAT 259 cannot both be taken for degree credit. Prerequisite: A grade of C or better in MAT 228. Cr 3.

MAT 261 Introduction to Abstract Mathematics
Topics covered typically include logic, basic set theory, relations and functions, sequences, limits, cardinality, and algebraic and geometric structures, but may vary somewhat with the instructor. Class size will remain small, not to exceed 20 students. The goal is to enable students to read, critique, construct,

and write mathematical proofs. At least 40% of the student's grade will be based on the quality of written work. Written assignments must present mathematical arguments in a clear, logical manner, using standard mathematical notation as well as correct English grammar, spelling, and punctuation. Students will be given considerable coaching and feedback with preliminary drafts so that submitted final versions of their work will be of acceptable quality. Satisfies the General Education Writing Intensive Requirement. Prerequisite: A grade of C or better in MAT 127 or permission. Cr 3.

MAT 262 Linear Algebra
An introduction to matrices, systems of linear equations, linear transformations, determinants, vector spaces, orthogonality, eigenvalues and eigenvectors, with applications. Some use will be made of mathematical software. Because of overlap, MAT 258 and MAT 262 cannot both be taken for degree credit. Cr 3.

MAT 300 Topics in Mathematics
Topics in mathematics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: departmental permission. Cr 1-3.

MAT 301 Foundations of College Math I
Surveys great ideas of modern math, covering logic and set theory, which serves as a foundation for MAT 302. Satisfies the General Education Mathematics Requirement. Prerequisite: High school geometry and algebra; junior standing. Cr 3.

MAT 302 Foundations of College Math II
Surveys great ideas of modern mathematics, covering Dedekind and Peano arithmetics, Turing computability theory and Goedel's incompleteness theorems. Satisfies the General Education Mathematics Requirement. Prerequisite: MAT 301 or permission; junior standing. Cr 3.

MAT 305 Mathematics for Secondary School Teachers
Intended for prospective teachers of secondary school mathematics. MAT 305 satisfies the state certification requirements for a methods course. Topics covered include issues and problems in mathematics education, classroom management and selected topics in mathematics pertinent to the secondary curriculum. Prerequisite: permission of the instructor; open to prospective secondary teachers only. Cr 3.

MAT 329 Problems Seminar II
Problem-solving in selected areas of mathematics. Material will be taken from various problem books, competitions and mathematical periodicals. Recommended for students who wish to participate in the annual Putnam competition. May be repeated for credit. Prerequisite: Successful completion of MAT 261 or permission. Cr 1.

MAT 332 Statistics for Engineers
Statistical methods applicable to engineering including theory and application of classical and nonparametric methods. Prerequisite: MAT 228. Cr 3.

MAT 351 Introduction to Vector and Tensor Analysis
Scalar and vector fields; Newtonian kinematics and Kepler's laws of planetary motion. Gradient, divergence, and curl; the theorems of Green, Stokes, and Gauss; curvilinear coordinates; contravariant and covariant tensors; absolute derivative of a tensor field; geodesics; Riemannian curvature. Prerequisite: MAT 228. Cr 3.

MAT 400 Topics in Mathematics
Topics in mathematics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: permission. Cr 1-3.

MAT 401 Capstone Seminar in Mathematics
Required of all mathematics and statistics majors. Students will be asked to draw upon and integrate their mathematics course work by exploring mathematical topics in their historical and scientific context. Students are expected to exhibit innovative problem-solving and thoughtful writing. Each student will be required to write a paper on the topic under investigation and to present the results talk to the class. Satisfies the General Education Capstone Experience Requirement. Prerequisite: MAT 261, MAT 262 and senior standing. Cr 3.

MAT 425 Introduction to Real Analysis I
A study of functions of a real variable and the related topology of the real line. Concepts of limit, convergence, continuity and differentiability are studied. Prerequisite: MAT 228 and MAT 261. Cr 3.

MAT 426 Introduction to Real Analysis II
A continuation of MAT 425 emphasizing integration and sequences and series of functions. Contents may vary from year to year. Prerequisite: MAT 425. Cr 3.

MAT 434 Introduction to Statistics
Topics include probability, random variables, continuous and discrete distributions, point and interval estimation, tests of hypotheses, linear regression and correlation, analysis of variance. Prerequisite: MAT 228. Cr 4.

MAT 435 Introduction to Mathematical Statistics
Topics include moment generating functions, distribution of functions of random variables, sampling distributions, principles of estimation and hypothesis testing, limit theorems and order statistics. Prerequisite: MAT 434. Cr 3.

MAT 436 Nonparametric Statistics
Surveys nonparametric alternatives to standard parametric techniques. Emphasis on situations in which the use of a parametric technique is incorrect or, at best, marginal. Prerequisite: MAT 434 or MAT 437. Cr 3.

MAT 437 Statistical Methods in Research
An introduction to analysis of variance and regression analysis using a unifying approach to theory; application and illustrations from many fields. Prerequisite: MAT 232 or MAT 434 or permission. Cr 3.

MAT 445 History of Mathematics
Deals with the lives and times of mathematicians, while focusing on mathematical ideas. Designed to acquaint the student with the evolution of various mathematical disciplines and to develop an appreciation of the problems faced by and often solved by mathematicians. Prerequisite: MAT 127 or permission. Cr 3.

MAT 451 Differential Equations and Dynamical Systems
A study of the nature and behavior of solutions of linear and nonlinear systems of differential and difference equations through mathematical analysis and the use of available menu-driven PC software. For students in mathematics and the sciences. Some knowledge of vectors and matrices and some familiarity with personal computers is recommended. Prerequisite: A grade of C or better in MAT 259 or MAT 453 or permission. Cr 3.

MAT 452 Complex Analysis
An introduction to functions of complex variables including differentiation, integration, series, mappings and applications. Prerequisite: MAT 228. Cr 3.

MAT 453 Partial Differential Equations I
Introduction to general properties of partial differential equations followed by solutions of specific equations. Techniques include eigen function expansions, operational methods, and Green's functions. Prerequisite: MAT 259 or permission. Cr 3.

MAT 454 Partial Differential Equations II
A continuation of MAT 453. Prerequisite: MAT 453. Cr 3.

MAT 456 Network Optimization
Graphs and networks, minimal spanning trees, shortest path problems, trans-shipment problems, matching and covering problems, the traveling salesperson problem, maximum flow problems, branch and bound methods,

introduction to integer programming. Prerequisite: MAT 262. Cr 3.

MAT 457 Introduction to Mathematical Modeling
A hands-on approach. Students formulate, analyze and criticize mathematical models chosen from biological and managerial sciences and the physical sciences. Students report on particular models of their choosing. Satisfies the General Education Capstone Experience Requirement. Prerequisite: MAT 215 or MAT 127. Cr 3.

MAT 463 Introduction to Abstract Algebra I
A study of algebraic systems characterized by specific axiom systems. Begins with a study of sets theory, functions, and operations, and continues with topics selected from group theory, ring theory, and linear algebra. Prerequisite: MAT 261 and MAT 262. Cr 3.

MAT 464 Introduction to Abstract Algebra II
A continuation of MAT 463, with emphasis on properties of rings and fields and culminating in Galsis Theory. Prerequisite: MAT 463. Cr 3.

MAT 465 Theory of Numbers
Elementary properties of integers including divisibility, prime and composite numbers, uniqueness of prime factorization, Diophantine equations, congruences and continued fractions. Prerequisite: One year of college mathematics or permission. Cr 3.

MAT 471 Differential Geometry
The application of multivariable calculus to the study of curves, surfaces and their higher-dimensional analogues. Prerequisite: MAT 228. Some knowledge of linear algebra is helpful. Cr 3.

MAT 475 Higher Geometry
Topics include: constructions, Euclidean properties, Ceva's and Menelaus' theorems with applications—Desargues', Pappus' and Pascal's theorems, isometries, axiometric approach to one of the geometries, algebraic models for geometry, Klein's Erlanger program, classical construction problems. Prerequisite: MAT 228 or permission. Cr 3.

MAT 481 Discrete Mathematics
Primarily designed for both mathematics and computer science majors. While the calculus-based mathematics of classical engineering and physical science is essentially "continuous," the finite mathematics of computer science and some social sciences is essentially "discrete" or "combinatorial. " MAT 481 is an introductory course offered in this spirit. Topics covered typically include graphs and networks, analysis of algorithms, generating functions and recurrence relations, graph coloring, satisfiability, computational complexity, automata and languages, Turing machines and computability, and a brief introduction to the theory of NP-completeness. Prerequisite: MAT 261 or MAT 262 or permission. Cr 3.

MAT 487 Numerical Analysis
Covers computational methods for electronic computers. Includes exercises for interpolation, simultaneous linear algebraic equations, non-linear and polynomial equations, numerical integration, ordinary and partial differential equations. Prerequisite: MAT 228 and COS 220. Cr 3.

MAT 500 Topics in Graduate Mathematics
Topics in mathematics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: departmental permission. Cr 1-3.

MAT 523 Functions of a Real Variable I
Topics include construction of Lebesgue measure and Lebesgue integral on the Euclidean Space, convergence, differentiation, general measure and integration, the Radon-Nikodym Theorem, the Daniell integral, topics in functional analysis. Prerequisite: MAT 426 or permission. Cr 3.

MAT 524 Functions of a Real Variable II
A continuation of MAT 523. Prerequisite: MAT 523. Cr 3.

MAT 527 Functions of a Complex Variable I
Elementary properties of holomorphic functions including the classification of isolated singularities, Laurent expansion and infinite product representations. Introduction to conformal mapping and the Riemann Mapping Theorem. Prerequisite: MAT 426 or permission. Cr 3.

MAT 528 Functions of a Complex Variable II
Continuation of MAT 527. Prerequisite: MAT 527. Cr 3.

MAT 531 Mathematical Statistics I
Covers axioms of probability, random variables, continuous and discrete distributions, moment generating functions, distributions of functions of random variables, sampling distributions. Prerequisite: MAT 425, MAT 434 or permission. Cr 3.

MAT 532 Mathematical Statistics II
Topics include principles and methods of parametric point estimation, interval estimation and hypothesis testing, non-parametric inference. Prerequisite: MAT 531. Cr 3.

MAT 533 Stochastic Systems
The study of mathematical models which involve random processes. Topics include Poisson process, waiting-line models, Markov chains, decision analysis and reliability theory. Some emphasis on modeling problems encountered in business and industry. Prerequisite: MAT 434. Cr 3.

MAT 562 Advanced Linear Algebra
Topics covered include vector spaces, homomorphisms, bilinear forms, multilinear maps and tensor products, Jordan canonical forms of matrices, normed linear spaces, real and complex inner product spaces, basic ideas of functional analysis, applications. Offered alternate fall semesters. Prerequisite: MAT 262 and MAT 425 and MAT 463 or their equivalent. Cr 3.

MAT 563 Abstract Algebra
A study of basic structure theorems for groups, rings, fields and modules. Prerequisite: Two courses from among MAT 262, MAT 463 and MAT 464. Cr 3.

MAT 577 Topology I
Fundamental concepts of topology, including cardinal and ordinal numbers, topological spaces, cartesian products, connectedness, compactness, continuity, separation axioms and metric spaces. Prerequisite: MAT 426 or permission. Cr 3.

MAT 578 Topology II
A continuation of MAT 577. Prerequisite: MAT 577. Cr 3.

MAT 590 Graduate Research Seminar
Current topics of mathematical interest are studied under faculty supervision. May be repeated for credit to a maximum of four times. Cr 1.

Mechanical Engineering (MEE)

MEE 101 Introduction to Mechanical Engineering
Introduces first-year and transfer students to the Mechanical Engineering Department. Topics include the curriculum, the faculty, the department's resources and the profession in general. Students will be introduced to typical problems in Mechanical Engineering whose solution may require experimental, analytical or numerical techniques. A teamwork approach will be emphasized. (Pass/Fail Grade Only.) Lec 1. (Fall.) Prerequisite: MEE majors only or permission. Cr 1.

MEE 150 Applied Mechanics: Statics
A study of force systems and equilibrium, structural models, friction, distributed forces. Designed to develop the ability to analyze and solve engineering problems. Rec 3. (Fall and Spring.) Prerequisite: MAT 126. Cr 3.

MEE 230 Thermodynamics I
Covers energy and energy transformations, the First and Second Laws applied to systems and to control volumes, thermodynamic properties of systems, availability of energy. Rec 3. (Fall and Spring.) Prerequisite: MAT 127. Cr 3.

MEE 231 Thermodynamics II
A continuation of MEE 230 and includes thermodynamics of mixtures, chemical thermodynamics, thermodynamics of fluid flow, vapor and gas cycles, applicable to compressors, internal combustion engines and turbines. Computers used. Rec 3 (Spring.) Prerequisite: MEE 230, COS 215 or equivalent. Cr 3.

MEE 251 Strength of Materials
The principles of solid mechanics and their applications to practical problems, stresses and deflections in axial loading, torsion, beams, columns, combined stresses. Rec 3. (Fall and Spring.) Prerequisite: MEE 150, MAT 127. Cr 3.

MEE 252 Statics and Strength of Materials
The basic principles of statics and their applications in strength of materials. Emphasis on equilibrium of various systems, stresses and deformations of axially loaded members, connections, circular shafts, beams and columns. Rec 3 (Fall and Summer.) Prerequisite: MAT 127. Cr 3.

MEE 270 Applied Mechanics: Dynamics
Motion of particles and rigid bodies, impulse and momentum, work and energy and simple harmonic motion, force, mass and acceleration. Rec 3. (Fall and Spring.) Prerequisite MEE 150 or MEE 252. Corequisite: MAT 228. Cr 3.

MEE 320 Materials Engineering and Science
The principles of material science with emphasis on the relationship between structure and properties and their control through composition, mechanical working and thermal treatment. Rec 3. (Spring.) Prerequisite: MEE 230 and MEE 251. Cr 3.

MEE 341 Mechanical Laboratory I
An introduction to experiment design, data analysis, laboratory techniques, instrumentation, and calibration of equipment. Application to thermodynamics, mechanics of materials, fluid mechanics and metallurgy. Satisfies the General Education Writing Intensive Requirement. Rec 1, Lab 3. (Spring.) Prerequisite: MAT 258, MEE 251 and MEE 360. Cr 3.

MEE 360 Fluid Mechanics
An introduction to fluid mechanics including fluid statics, kinematics, Bernoulli equation, viscous flows, dimensional analysis and similitude and external flows. Rec 3. (Fall.) Prerequisites: MEE 230 and MEE 270. Corequisite: MAT 258. Cr 3.

MEE 370 Modeling, Analysis and Control of Mechanical Systems
Introduces the student to a unified approach to abstracting real mechanical, thermal and hydraulic systems into proper models to meet design and control system objectives. Topics include modeling of lumped mechanical, thermal and fluid systems, Laplace transforms and transfer function representation, free and forced response of second order linear time-invariant systems, frequency response, actuators and sensors, compensation and design of feedback control systems with emphasis on mechanical engineering applications. Includes laboratory experimentation. (Fall.) Rec 3. Prerequisite: MAT 258. Cr 3.

MEE 380 Design I
Kinematical design of machines. Rec 3. (Fall.) Prerequisite: MEE 270. Cr 3.

MEE 381 Design II
Advanced concepts in mechanics of materials, stress concentration. Design of mechanical components subjected to static and fatigue loads. Synthesis and selection of various machine components including shafts, bearing, gears and gear trains, screws, fasteners and springs. Exposure to computer-aided design. Topics include solid modeling of machine components, creation of assemblies and engineering drawings, application of the finite element methods as a design tool. Design project. Rec 3, Lab 1. (Spring.) Prerequisite: MEE 251. Cr 4.

MEE 394 Mechanical Engineering Practice
Full-time engineering work with companies participating in the Mechanical Engineering Department Cooperative Education Program. (Pass/Fail Grade Only.) (Fall, Spring and Summer.) Cr 3.

MEE 432 Heat Transfer
The fundamental laws of heat transfer by conduction, convection and radiation. Applied to the study of engineering problems via analytical, numerical, and graphical techniques. Rec 3. (Fall.) Prerequisite: MAT 258 and MEE 360. Cr 3.

MEE 433 Solar-Thermal Engineering
Introduces solar energy collection and use as process thermal energy. Includes performance analysis of solar collectors and thermal energy storage devices both separately and as a combined system. Rec 3. Prerequisite: MEE 230. Cr 3.

MEE 442 Mechanical Laboratory II
A continuation of MEE 341. Mechanical engineering problems in a laboratory setting. (Fall) Lab 3. Prerequisite: MEE 231, MEE 241 or permission. Cr 2.

MEE 443 Mechanical Laboratory III
A continuation of MEE 442. Mechanical engineering problems in a laboratory setting (Spring). Lab 3. Prerequisite: MEE 231, MEE 341, MEE 442 or permission. Cr 3.

MEE 450 Introduction to the Mechanics of Composite Materials
Covers polymer matrix composites from the applied mechanics, design and manufacturing aspects. Includes recent developments in modeling and analysis techniques and fabrication methods. Rec 3. Prerequisite: MEE 251. Cr 3.

MEE 453 Experimental Mechanics
Experimental methods and techniques for analysis of stress and displacement. Also covers electric strain gages, brittle lacquers, mechanical and optical strain gages, and introduction to photoelasticity. Rec 2, Lab 2. Prerequisite: MEE 251. Cr 3.

MEE 455 Advanced Strength of Materials
Considers limitations of elementary stress formulas, theories of failure, unsymmetrical bending, beams, plates, torsion of non-circular bars, thick-walled cylinders, stress concentrations, energy methods. Introduces theory of elasticity. Rec 3. Prerequisite: MEE 251. Cr 3.

MEE 456 Introduction to the Finite Element Method
An introduction to the finite element methods including matrix operations, interpolation functions, basic element types, and implementation to problems in mechanical engineering including simple structures, plane stress, heat transfer and fluid mechanics. Rec 3. (Spring.) Prerequisite: MAT 258 and MEE 251. Cr 3.

MEE 462 Fluid Mechanics II
A continuation of MEE 360 including boundary-layer flows, inviscid incompressible flows, compressible flows and selected topics. Rec 3. Prerequisite: MEE 360. Cr 3.

MEE 471 Mechanical Vibrations
Examines free and forced vibrations with viscous damping for discrete and continuous mass systems as well as derivation and application of energy methods. (Spring.) Rec 3. Prerequisite: MEE 270 and MAT 258. Cr 3.

MEE 483 Turbomachine Design
Topics include: the theory and design of turbomachinery flow passages, control and performance of turbomachinery, gas-turbine engine processes. Rec 3. Prerequisite: MEE 230, MEE 360 Cr 3.

MEE 484 Power Plant Design and Engineering
A study of power station engineering and economy, including design, construction and operation theory of steam, internal-combustion, and hydroelectric power plants. Introduction to nuclear power plants, solar energy, fuel cells, and associated problems. Prerequisite: MEE 230, MEE 231. Rec 3. Cr 3.

MEE 485 Heating and Ventilating Systems Design
Topics include determination of heating and ventilating requirements for buildings and industrial processes, analysis of heat transfer devices and their applications, heating and ventilating systems design, layout and control. Prerequisite: MEE 230. Cr 3.

MEE 486 Refrigeration and Air Conditioning System Design
Examines methods of producing artificial low temperatures including refrigeration for controlled-temperature applications in comfort air conditioning and for industrial manufacturing processes. Prerequisite: MEE 230. Rec 3. Cr 3.

MEE 487 Design III
Design of mechanical engineering systems components, including problem definition, analysis, synthesis and optimization. Satisfies the General Education Capstone Experience Requirement. Must be taken in series with MEE 488 to meet the Capstone Experience requirement. Neither course alone satisfies the requirement. Prerequisite: MEE 231, MEE 381; MEE 432 concurrently or permission. Cr 4.

MEE 488 Design IV
Design of mechanical engineering systems, including problem definition, analysis, synthesis and optimization. (Spring.) Satisfies the General Education Capstone Experience Requirement. Must be taken in series with MEE 487 to meet Capstone Experience requirement. Neither course alone satisfies the requirement. Prerequisite: MEE 231, MEE 381, MEE 432 Cr 4.

MEE 498 Selected Topics in Mechanical Engineering
Topics in mechanical engineering not regularly covered in other courses. Content varies to suit needs. May be repeated for credit, with departmental permission. Prerequisite: permission. Cr 1-3.

MEE 500 Research Methods
Focuses on the development of critical research skills that are broadly applicable to mechanical engineering research through the development of a research proposal with the guidance of the course instructor and the student's research advisor. Emphasis placed on the role of peer review on original research. Prerequisite: Graduate standing. Cr 3.

MEE 501 Macroscopic Thermodynamics
Concepts of energy transfer, internal energy and entropy are used to formulate the first and second laws of thermodynamics for a system. The equivalent entropy maximum and energy minimum principles are introduced. Emphasis on mechanical engineering problems including air conditioning applications, steam and gas turbine power plants, solar power, and thermoelectric phenomena. Prerequisite: MEE 231, MAT 258 or permission. Cr 3.

MEE 536 Advanced Heat Transfer I
A study of transfer of heat by conduction including use of approximate, exact analytical, and numerical techniques for the prediction of temperature distributions in both the steady and unsteady state. Prerequisite: MEE 432. Cr 3.

MEE 546 Finite Elements in Solid Mechanics
Basics of the finite element method with emphasis placed on solid mechanics applications. Fundamentals of the development of beam, plain strain, plate bending, asisymmetric and solid elements using the variation/isoparametric formulations. Solutions to composite structures and to eigenvalue problems included. Prerequisite: MEE 456. Cr 3.

MEE 550 Mechanics of Laminated Composite Structures
3-D anisotropic constitutive relations. Classical lamination theory and boundary conditions for composite beams, plates and shells. Boundary value problems and solutions for static loads, buckling and vibrations. Higher order theories incorporating shearing deformation and layerwise theories. Interlaminar stresses and edge effects. Prerequisite: MEE 450 or permission. Cr 3.

MEE 554 Theory of Elasticity
Includes plane stress and plane strain, stress function; problems in Cartesian and polar coordinates; photoelasticity, strain energy; three-dimensional problems. Rec 3. Prerequisites: MEE 251 and MAT 258. Cr 3.

MEE 557 Introduction to Continuum Mechanics
Includes general formulation of classical field theories; fundamental concepts of motion, stress and energy for a continuum; general nature of constitutive equations for a continuum. Prerequisite: MEE 251, MEE 360. Cr 3.

MEE 562 Advanced Fluid Mechanics
Development of the differential and integral equations of mass, momentum, and energy conservation for viscous fluids and application of these to internal, external, and boundary layer flows of incompressible, viscous fluids. Prerequisite: MEE 360. Cr 3.

MEE 573 Advanced Vibrations I
Advanced vibration theory and applications including multi-degree of freedom systems, transient and random vibrations, Lagrange's equation, Laplace transformation and matrix iteration, computer techniques. Prerequisite: MEE 471. Cr 3.

MEE 574 Advanced Vibrations II
Covers theory of vibrations with continuously varying mass and stiffness; solutions of wave equations for strings, longitudinal and torsional systems, vibration of beams, methods of Rayleigh, Ritz and Stodola. Introduction to nonlinear vibrations. Prerequisite: MEE 471, MEE 573 or permission. Cr 3.

MEE 588 Advanced Thermodynamics II
A continuation of MEE 434, including the study of chemical equilibrium in systems of reacting gases, with applications to the design of propulsion systems, particularly rockets. Prerequisite: MEE 231, MEE 432 or permission. Cr 3.

Mechanical Engineering Technology (MET)

MET 100 Introduction to Mechanical Engineering Technology
Students will cover topics relevant to succeeding as a MET student and graduate. Lec 1, Lab 2. (Fall.) Cr 2.

MET 107 Machine Tool Laboratory I
Theory and application of fundamental metal removing processes and basic metrology and tool nomenclature. Light machine work using drill presses, lathes, milling machines and surface grinders. Lec 1, Lab 3. (Spring.) Prerequisite: BMT and EPS majors or permission. Cr 2.

MET 121 Technical Drawing
An introduction to graphic symbols utilizing both manual and CADD skills applied to engineering drawings. Topics include: lettering, geometric construction, multiview drawing, sections, graphs, dimensioning, and pictorial drawing. Lec 2, Lab 2. (Fall and Spring.) Cr 3.

MET 126 Machine Drawing
Preparation of complete working drawings of a project for INT 211. Topics include: pictorial drawings, descriptive geometry, CADD, design process, dimensioning, tolerancing, fasteners, details, and assembly drawings. Lec and Lab 4. (Spring.) Prerequisite: MET 121. Cr 3.

MET 150 Statics
The study of forces acting on particles and rigid bodies in equilibrium, trusses, centroids and centers of gravity, properties of area, friction. Lec 3. (Spring.) Prerequisite: MET 121, PHY 107, TME 151. Cr 3.

MET 219 Strength of Materials
An introduction to machine design. A study of stress and strain in materials and bodies subjected to tension, compression, torsion and flexure as well as deflection of prismatic members, columns, combined stresses. Lec 4. (Fall.) Prerequisite: MET 150. Corequisite: TME 253. Cr 4.

MET 220 Selected Topics in Mechanical Engineering Technology I
Topics in engineering technology not regularly covered in other courses. Content varies to suit the needs of individuals. May be repeated for credit. (Fall and Spring.) Prerequisite: permission. Cr 1-3.

MET 221 3D Computer Modeling and Design
An introduction to 3D graphic modeling using the latest in CAD software. Lec 2, Lab 2. (Fall.) Cr 3.

MET 233 Thermal Science
A study of elementary thermodynamics including engineering calculations relative to heat, power, work and mechanical and electrical energy. Rec 3. (Fall.) Prerequisite: PHY 108 or PHY 112. Cr 3.

MET 234 Mechanical Technology Laboratory I
Experimental application of solid and fluid mechanics, and thermodynamics. Covers calibration of laboratory instruments. Satisfies the General Education Writing Intensive Requirement. Rec 1, Lab 2. (Spring.) Prerequisite: MET 233 and MET 219. Cr 2.

MET 236 Thermal Applications
Applications of fundamentals studied in MET 233 including steam and gas cycles, analysis of cycle components, steam generators, pumps, turbines, compressors, heat transfer and refrigeration systems. Rec 3. (Spring.) Prerequisite: MET 233. Cr 3.

MET 270 Manufacturing Technology
Examines production processes and problems including process planning, automation, numerical control, quality control, specialized machine tools and current advances in the field of metal working. Rec 3. (Fall.) Prerequisite: MET 107, MET 150 and sophomore standing. Cr 3.

MET 312 Machine Tool Processing II
Manufacture and evaluation of prototype assembly, including redesign of components as needed. Lec 1, Lab 3. (Fall.) Prerequisite: MET 107, MET 126. Cr 3.

MET 317 Dynamics
A study of kinematics and kinetics of particles, including conservation of energy, conservation of momentum and impulse. Also kinematics of rigid bodies including linkages, gears and gear trains. Lec 4. (Fall.) Prerequisite: MET 150 or CET 211 and TME 152. Cr 4.

MET 320 Selected Topics in Mechanical Engineering Technology II
Topics in engineering technology not regularly covered in other courses. Content varies to suit the needs of individuals. May be repeated for credit. (Fall and Spring.) Prerequisite: permission. Cr 1-3.

MET 321 Industrial Vibrations
An introduction to applications of vibration theory in industrial design, measurement of vibrations in industrial settings, and industrial noise control principles. Lec and Lab 3. Corequisite: MET 317. Cr 3.

MET 325 Fluid Flow Technology
Examines fluid statics, dynamics and energy as well as flow measuring devices, fluid components and systems. Rec 3. (Spring.) Prerequisite: TME 253, MET 317, MET 236. Cr 3.

MET 327 Automotive Engineering
An introduction to the analysis of automotive powertrains and related vehicle systems. The theory and design of internal combustion engines, as well as contemporary automotive power delivery systems are covered. Lec and Lab 3. Prerequisite: MET 236 or MET 433 and BET and BMT junior or senior standing or permission. Cr 3.

MET 355 Engineering Materials
The study of the composition and behavior of materials used in engineering. Materials covered include metals, plastics, wood, ceram-ics, and concrete. The laboratory demonstrates the effect of heat treatment on the mechanical properties of steels. Rec 2, Lab 2. (Spring.) Prerequisite: CHY 121, MET 219, MET 234, BMT major and junior standing. Cr 3.

MET 362 Fluid Power Technology
Examines basic fluid power systems, component installation and function analysis, basic system design, troubleshooting testing techniques. Lec 2, Lab 3. Prerequisite: PHY 107 and PHY 108 or permission. Cr 3.

MET 391 Heating, Ventilating and Air Conditioning
Determination of heating, ventilating and air conditioning loads for buildings and industrial processes. Heat transfer devices and applications to systems. Refrigeration for controlled-temperature applications. Heating, ventilating and air conditioning system layout and control systems. Rec 3. (Fall.) Prerequisite: MET 236. Cr 3.

MET 394 Mechanical Engineering Technology Practice
Cooperative work experience in mechanical engineering technology at full-time employment for at least a ten-week period. (Pass/Fail Grade Only.) (Fall, Spring and Summer.) Prerequisite: MET 234, MET 236; junior standing or permission. Cr 3.

MET 433 Thermodynamics
A study of thermodynamic concepts, properties and applications, including work, heat, energy, entropy, First and Second Laws, processes, cycles and systems. Rec 3. (Fall) Prerequisite: PHY 108 or PHY 112, TME 253. Cr 3.

MET 462 Design I
Analysis of mechanical elements as well as applications of mechanics of materials, stress concentration, combined stresses, fatigue, and factor of safety to the design of machine components. Design of capstone design project. Satisfies the General Education Capstone Experience Requirement. Lec 4. (Fall.) Prerequisite: MET 219, BMT majors; senior standing or permission. Cr 4.

MET 463 Design II
Continuation of MET 462 including drive components, welded connections, lubrication, bearings, gearing, miscellaneous machine elements and engineering materials. Completion of capstone design project. Satisfies the General Education Capstone Experience Requirement. Lec 4. (Spring.) Prerequisite: MET 462. Cr 4.

MET 484 Engineering Economics
A study of economic theory and applications in engineering and industrial organizations including capitalization, amortization, time value of money, cost comparison analysis and breakeven value. Also included are personal finance topics as applied to engineering situations and case study. (This course is identical to GEE 284.) Lec 3. (Fall and Spring.) Prerequisite: senior standing in SET and permission. Cr 3.

Military Science (MIS)

MIS 100 Leadership Laboratory
Available only to students enrolled/contracted in the ROTC program. Cadets develop and improve military leadership skills. Includes

continuous counseling and periodic evaluations of cadet performance. In case of class conflicts, an alternate leadership lab can be arranged with the permission of the Military Science Department Chairperson. (Pass/Fail Grade Only.) Cr 0.

MIS 101 Introduction to Leadership I
Initially focuses on time management skills, goal setting skills, good study habit skills and understanding the basics of physical fitness. Students learn how to apply leadership doctrine to resolve ethical problems. Introduces the organizational structure of the Army, customs and traditions. Students will learn how to rappel and administer first aid. There is no military obligation associated with this course. Corequisite:: MIS 100. Cr 1.

MIS 102 Introduction to Leadership II
Builds on material presented in MIS 101. Students learn how to apply leadership doctrine to resolve problems and communicate in difficult situations. Also, they learn land navigation skills and how to rappel. There is no military obligation associated with this course. Corequisite: MIS 100. Cr 1.

MIS 105 Military Physical Fitness
A study of the United States Army physical fitness program, including aerobic exercises and strength-building programs which provide actual leadership and fitness opportunities. Emphasis on the importance of exercise and fitness to the individual and development of a personalized training program. Cr 1.

MIS 201 Ethical Decision Making
Learn and apply ethics-based leadership skills that develop individual abilities and contribute to the building of effective teams. Includes developing skills in oral presentation, writing effectively, planning of events using the Five Paragraph Operations Order, and identifying values that affect leader obligations. There is no military obligation associated with this course. Corequisite: MIS 100. Cr 1.

MIS 202 Basic Leadership and Land Navigation
A study of basic leadership and team-building techniques, along with detailed instruction in map reading and land navigation skills. Classes build on information learned in MIS 201 and focus on decision making and supervision using the Military Decision Making Process and steps of the Troop Leading Procedure. Includes extensive instruction on the use of topographic maps and compasses, terrain analysis and practical application of land navigation skills. No military obligation associated with this course. Corequisite: MIS 100. Cr 2.

MIS 290 ROTC Basic Camp
A five week summer camp conducted at Fort Knox, Kentucky. The student receives pay, and travel costs are borne by the Army. No military obligation is incurred. Includes the role and mission of the U.S. Army, map reading and land navigation, first aid, marksmanship, leadership, physical training, parades, and tactics. Candidates are accepted during the entire spring semester. Participation in a physical fitness program during the spring semester is required. Students apply for enrollment to the Professor of Military Science. Selection is based on qualifications and merit. Satisfies all Basic Course requirements. Cr 6.

MIS 310 Advanced Leadership I
One of two courses designed to prepare cadets for the ROTC Advanced Camp/Nurse Summer Training Program. Focuses on leadership development through multiple, small unit leadership opportunities and counseling. Fine tunes skills learned in the two previous years of Military Science, ROTC Basic Camp or prior military service. Participation in Leadership Laboratory and field training exercises is required for all contracted cadets. Students not contracted as ROTC cadets may take the course with the permission of the Military Science Department Chairperson. Corequisite: MIS 100. Cr 3.

MIS 320 Applied Leadership II
Continues to build on the basics of MIS 310. Completes student preparation or Advanced Camp/Nurse Summer Training. Program focuses on leadership at the platoon and company level. Small unit tactics and training are emphasized and information is provided to help the student to make wise decisions about military service options. Participation in Leadership Laboratory and field training exercises is required for all contracted cadets. Students not contracted as ROTC cadets may take the course with the permission of the Military Science Department Chairperson. Corequisite: MIS 310. Cr 3.

MIS 410 Advanced Leadership and Ethics I
This senior leadership and ethics seminar focuses on preparing senior military science cadets for commissioning as U.S. Army officers. Introduces senior cadets to DoD/ Army policies, the Army training systems and the Army supply and maintenance systems. There are writing requirements to familiarize the cadets with the Army writing style. Additionally, cadets are trained on implementing the Army's Leadership Development Program. Participation in Leadership Laboratory and field training exercises is required for all contracted cadets. Students not contracted as ROTC cadets may take the course with the permission of the Military Science Department Chairperson. Corequisite: MIS 100. Cr 3.

MIS 420 Advanced Leadership and Ethics II
This senior leadership and ethics seminar focuses on the continued preparation of senior military science cadets for commissioning as U.S. Army officers. Introduces senior cadets to DoD ethics, regulations, values and obligations; resolving ethical problems; and creating the proper ethical climate within an organization. Additionally, cadets are introduced to the Military Justice System; basic military tactics; and cadets continue with Army writing style familiarization. Participation in Leadership Laboratory and field training exercises are required for all contracted cadets. Students not contracted as ROTC cadets may take the course with the permission of the Military Science Department Chairperson. Satisfies the General Education Ethics and Writing Intensive Requirements. Corequisite: MIS 100. Cr 3.

Modern Language and Classics (MLC)

MLC 175 Multiculturalism in America
A multidisciplinary course that investigates the nature of "American" identity through readings and essay writing, video and debate. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3.

MLC 190 Topics in Modern Languages
Prerequisite: permission. Cr Ar.

MLC 231 Western Tradition in Literature: Homer Through the Renaissance
Survey of the major writers in the Western literary tradition. The development of our cultural heritage and the evolution of major literary forms. Recommended for English majors. (This course is identical to ENG 231.) Cr 3.

MLC 276 Indo-European Folktales
Introduces students to various folktale genres and examines the aesthetic, social, historical and psychological values they reflect. Students will analyze the continuing influence of folktales on the literature and culture of French, German and Spanish speaking countries. Focuses on form, style, structure and meaning of such stories as well as various approaches to literary analysis and cultural criticism. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Cr 3.

MLC 293 Study Abroad
Permits the granting of foreign language credit for courses taken abroad with no exact

University of Maine catalog equivalent. May be repeated for credit. Cr 1-6.

MLC 430 Topics in European Literature
Varies in content from generic studies (the novel, the drama) to period studies (the Renaissance, Neo-Classicism.) (This course is identical to ENG 430.) Prerequisite: 6 hours of literature or permission. Cr 3.

MLC 445 Cervantes in English
Don Quixote and other major works of Cervantes in English. Cr 3.

MLC 466 The Teaching of Modern Languages
Includes analysis of current trends and methods, application of language learning principles to classroom procedures, theory and practice of language methodologies at different learning levels, use of technologies such as video and computers in the instructional process. For students seeking certification in foreign language teaching. Cr 3.

MLC 475 Contributions of European Linguistic Groups to the American Cultural Heritage
A study of the cultural contributions of European language groups to the development of America. Examines the roots of many American traditions, traces origins of characteristic (place) names and words to early immigrants and investigates ways in which groups or individuals dealt with the new environment in accordance with their own heritage. A reading knowledge of a foreign language is recommended. Cr 3.

MLC 490 Topics in Modern Languages
Specific topics vary from semester to semester. May be repeated for credit. Prerequisite: permission. Cr 3.

MLC 493 Study Abroad
Permits the granting of foreign language credit for courses taken abroad with no exact University of Maine catalog equivalent. May be repeated for credit. Cr 1-6.

MLC 496 Field Work in Modern Languages
Supervised work in either the public or the private sector which is relevant to the study and use of a modern language. Requirements include an initial proposal which shows the relevance of the work experience to the student's program in modern languages and a final report or paper. Prerequisite: an appropriate level of fluency as determined by the department. Cr 1-12.

MLC 499 Senior Project in Modern Languages and Classics
Capstone Experience in which majors in French, German, Latin, Spanish, Modern Languages and Romance Languages and majors in International Affairs in Foreign Languages (French, German, Spanish) apply language skills and knowledge gained from all prior language study. Students work closely with faculty advisor on approved project, practicum, research, study abroad. Students present project in major language at student colloquium. Can be taken for less than 3 credits only in conjunction with MLC 493. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Capstone Experience Requirements. Prerequisite: senior standing and permission. Cr 1-3.

MLC 520 Methods of Teaching English as a Second Language
Prepares the student to teach English to speakers of other languages. Emphasis on linguistic theory and language pedagogy, cognitive strategies of language teaching and techniques and procedures of teaching specific skills. Prerequisite: permission. Cr 3.

MLC 598 Topics in Modern Languages
Cr 3.

Museum Studies (MSE)

MSE 200 Introduction to Museums
An introduction to the history, theory and practice of Museum Studies. Conceptual investigations of museological issues are balanced with practical information. Students engage in hands-on participation in museum practices such as registration procedures and grant applications. Students gain a working theoretical knowledge of museology and vital, marketable museum and gallery skills. This course is the preliminary requirement for all other Museum Studies courses, although students with commensurate museum/gallery experience can wave the course with the instructor's consent. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

MSE 300 Curatorship, Collections Management and Museum Research
An examination of museum administration and research practices. Students will learn about the archival nature of museum collections, including collections management, storage, registration and computer-based cataloguing systems. Museum research techniques will also be studied and other skills utilized in curatorial activities. Prerequisite: MSE 200 or permission of instructor. : Cr 3.

MSE 310 Exhibition Design and Theory
A consideration of the theoretical and practical issues involved in the design of an exhibition. Students will work together to conceive, organize, curate, install and promote an exhibition. Student will publish a show catalogue, organize gallery talks and educational outreach and develop a budget for the exhibition. Prerequisite: MSE 200 or permission of instructor. Cr 3.

MSE 311 Regional Exhibition Survey
Engages students in a comparative study of exhibitions at a variety of local museums and galleries. The class will make field trips and individual students will give tours in conjunction with their own research. Prerequisite: MSE 200 or by permission. Cr 3.

MSE 370 Introduction to Museum Education
Students will explore how museums function as educational institutions, including issues relating to the cultural, historical and political contexts of museums and museum practice. Includes a critical examination and exploration of the theories and practices of museum education, as well as hands-on experiences in an art museum setting. Prerequisite: MSE 200 or permission. Cr 3.

MSE 395 Practicum in Museum Education
Field experience in a museum setting. Provides an opportunity for students to further develop and apply their knowledge of museum education theory and practice in a museum setting. Prerequisite: MSE 200 or permission. Cr 3-6.

MSE 396 Internship
Students do a semester internship at a local or regional institution. Institutions are matched to the individual student's specific interests and field of study. May be repeated for credit. Prerequisite: MSE 200 or permission of the instructor. Cr 3.

MSE 397 Gallery Practicum
Building on the ideology of the Capstone course, this offers the student preparing for graduation an opportunity to conceive, organize, curate, install and exhibit his or her own Senior Show. Students from disciplines other than studio art would be involved in matters of conception, organization, Curatorship and installation as related to their own majors or fields of study. May be repeated for credit. Prerequisite: MSE 200 or permission of instructor. Cr 3.

MSE 497 Independent Study in Museum Studies/Museum Education
Advanced independent study or research and writing projects in Museum Studies, Museum Education or related areas. May be repeated for credit. Prerequisite: MSE 200 or permission of instructor. Cr 1-3.

MSE 498 Directed Study in Museum Studies/ Museum Education
Advanced directed study or research and writing projects in Museum Studies, Museum Education or related areas. May be repeated

for credit. Prerequisite: MSE 200 or permission of the instructor. Cr 1-3.

MSE 597 Independent Graduate Study in Museum Studies/Museum Education
Advanced independent research and writing projects in Museum Studies, Museum Education or related areas. Prerequisite: Graduate standing and permission of instructor. Cr 1-3.

MSE 598 Directed Graduate Study in Museum Studies/Museum Education
Advanced directed research and writing projects in Museum Studies, Museum Education or related areas. Prerequisite: Graduate standing and permission of instructor. Cr 1-3.

Music Education (MUE)

MUE 207 Voice Class
The systematic development of the principles of good singing through class method approach. Lab 2. Prerequisite: MUY 101 or permission. Cr 1.

MUE 209 String Class
Basic performance and pedagogical skills pertaining to each of the four string instruments. Lab 4. Prerequisite: MUY 101 or permission. Cr 2.

MUE 210 Introduction to Music Education
Provides exposure to music classrooms, primary and secondary. Covers philosophies of music education, programming and evaluation. Prerequisite: Open to all music majors. Cr 2.

MUE 213 Woodwinds I
First semester of a required two-semester course dealing with woodwind pedagogy. Covers oboe, bassoon and saxophone. Lab 2. Cr 1.

MUE 214 Woodwinds II
Second semester of a required two-semester course dealing with woodwind instrument pedagogy. Covers flute and clarinet. Lab 2. Prerequisite: MUE 213. Cr 1.

MUE 215 Early Music Teaching Field Experience
Provides observation and teaching experience through field work in public school classrooms. Observation time will be spent in each of three areas: elementary, junior high and high school. Prerequisite: Open to first-year or sophomore music education majors. Cr 2.

MUE 217 Brass Class
Basic performance and pedagogical skills pertaining to the brass instruments. Lab 4. Prerequisite: MUY 101 or permission. Cr 2.

MUE 222 Percussion Class
Basic performance and pedagogical skills pertaining to the percussion instruments. Lab 4. Prerequisite: MUY 101 or permission. Cr 2.

MUE 320 Teaching of General Music: Elementary
Methods, materials, organization and administration of the K-6 classroom music curriculum. Includes classroom instruments, field experiences, materials and methods for gifted and talented and the special learner. Prerequisite: MUY 212 and MUL 202. Cr 3.

MUE 321 Teaching of General Music: Secondary
Methods, materials, organization and administration of the 6-12 classroom music curriculum. Includes classroom instruments, field experiences, materials and methods for gifted and talented and the special learner. Prerequisite: MUY 212, MUL 202 and MUE 320. Cr 3.

MUE 400 Choral Music Education
The organization and development of techniques requisite to a successful choral program. Prerequisite: Open to all music majors. Cr 3.

MUE 401 Organization and Development of the Instrumental Music Program
Covers instrumental organizations, review and application of instrumental pedagogy skills in laboratory settings. Prerequisite: MUP 345, MUE 209, MUE 213, MUE 217, MUE 222. Cr 3.

MUE 403 Instrumental Laboratory
Performance on secondary instruments in a heterogeneous setting. Required for those enrolled in MUE 401 but may be taken separately. Instrumental majors must attend Instrumental Laboratory for two of the three fall semesters following their first-year student year. Lab 1. Offered every fall. Prerequisite: Open to sophomore, junior and senior music education majors. Cr 1.

Music-History (MUH)

MUH 201 History of Western Music I
The history of music from antiquity to approximately 1750 with a technical study of the significant musical trends. Prerequisite: For the major MUL 202 or sophomore standing; for the general student, permission of instructor. Cr 3.

MUH 202 History of Western Music II
The history of music from 1750 to the present day with a technical study of the significant musical trends. Prerequisite: MUL 200 and MUL 202 or permission. Cr 3.

MUH 517 Music of the Baroque Period
A study of music in the 17th and first-half of the 18th centuries from Monteverdi and Schutz to Bach and Handel. Prerequisite: MUH 202 or permission. Cr 3.

MUH 519 Music of the Classical Period
The changing style in form and content as evolved by Haydn, Mozart and Beethoven viewed in historical content. Prerequisite: MUH 202 or permission of the instructor. Cr 3.

MUH 521 Music of the Romantic Period
Study of musical expression during the 19th century with emphasis on the intellectual foundations of the romantic movement. Detailed analysis of representative works from Beethoven through Debussy. Prerequisite: MUH 202 or permission. Cr 3.

MUH 523 Music of the Twentieth Century
Trends in contemporary music and their relationship to the cultural and political life of our time. Prerequisite: MUH 202 or permission. Cr 3.

MUL 101 The Art of Listening to Music: Elements
Designed for the student with no previous experience in music. Provides a working vocabulary of terms and listening experiences intended to expand the basic understanding of the art form. Music listening assignments to be completed in Fogler Library. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: Open to all university students. Cr 3.

Music-Literature (MUL)

MUL 120 World Music
Survey of the music cultures of the non-Western world considered as an integral part of their respective cultures, as reflected in history, religion, philosophy, theater and dance. No previous training in music is required. Satisfies the General Education Cultural Diversity and International Perspectives Requirements. Cr 3.

MUL 200 The Art of Listening to Music: Historical Survey-Laboratory
Introduction to musicology, music, research, academic writing in music and world music. Extensive use of electronic information retrieval systems. Usually taken in first year to develop writing competency. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Music majors. Cr 1.

MUL 202 The Art of Listening to Music: Historical Survey
Designed for the student with some previous

experience in music. Primarily an historical survey of music from 1600 to the present, with some attention to musical terms and listening experiences. Music listening assignments to be completed in Fogler Library. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: MUL 101 or permission. Cr 3.

MUL 531 Choral Literature and Performance Practice
Survey of choral literature from the Renaissance to the present. Cr 3.

MUL 541 Instrumental Ensemble Literature and Performance Practice
Survey of selected instrumental ensemble literature from the standard repertory. Prerequisite: permission. Cr 3.

Music-Organizations and Ensembles (MUO)

MUO 101 University Singers
Rehearsal and performance of choral concert repertoire. Extended concert tours. Five hours of rehearsal a week. Attendance at all rehearsals and public performances required. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 5. Prerequisite: audition (requires sight reading ability) Cr 1.

MUO 103 Oratorio Society
Rehearsal and performance of major choral works. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 2. Prerequisite: audition. Cr 1.

MUO 109 Collegiate Chorale
Rehearsal and performance of choral music appropriate for choral singers with limited background and training. No audition required; open to all students. Attendance at all rehearsals and public performances required. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 2. Cr 1.

MUO 111 Marching Band
Performs at home and occasional off-campus football games. Course begins four days prior to opening of classes. Rehearsal of concert music on limited schedule during final weeks of semester. Attendance required at rehearsals and performances. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 4. (Fall semester only.) Prerequisite: permission. Cr 1.

MUO 112 Concert Band
Rehearsal and performance (on and off campus) of a variety of concert band literature appropriate for the general University instrumentalist. Attendance required at rehearsals and performances. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 3. (Spring semester only.) Prerequisite: permission. Cr 1.

MUO 113 Pep Band
Rehearsal and performance of band music appropriate for athletic events including current marching band selections. Attendance required at rehearsals and performances. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 2. Prerequisite: permission. Cr 1.

MUO 114 Symphonic Band
Rehearsal and performance of the most challenging and significant band literature. Attendance required at rehearsals and performances. Occasional touring on class days. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 3. Prerequisite: audition. Cr 1.

MUO 121 University Orchestra
Rehearsal and performance of standard orchestral repertoire. Attendance at all rehearsals and public performances required. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 4. Prerequisite: audition. Cr 1.

MUO 132 Opera Workshop
Rehearsal and performance of standard opera repertory. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 3. Prerequisite: audition. Cr 1.

MUO 143 UMAINE Jazz Ensemble
Rehearsal and performance of music for the large (16-24) jazz ensemble. Membership through audition. Attendance at all rehearsals and performances required. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 3. Cr 1.

MUO 149 Chamber Music
The study and performance of chamber music. May be repeated for credit. Satisfies the General Education Artistic and Creative Expression Requirement. Lab 2. Prerequisite: permission of instructor. Cr 1.

MUO 150 Percussion Ensemble
Performs chamber music composed primarily for percussion instruments. May be repeated for credit. Lab 2. percussion performance experience (i.e., snare drum or keyboard percussion or timpani) and the ability to read music. Prerequisite: permission of instructor. Cr 1.

MUO 502 University Singers
Performance of choral concert repertoire. Public performance and extended concert tours. Five rehearsals per week. May be repeated for credit. Prerequisite: audition. Cr 1-2.

MUO 503 Oratorio Society
Participation and a leadership role in the rehearsal and performance of choral concert repertoire. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 2. Prerequisite: audition. Cr 1-2.

MUO 504 Collegiate Chorale
Participation and a leadership role in the rehearsal and performance of choral music appropriate for choral singers with limited background and training. No audition required; open to all students. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 2. Cr 1-2.

MUO 505 Marching Band
Participation and a leadership role in the rehearsal and performance of marching band repertoire beginning four days prior to opening of classes. Rehearsal of concert music on limited schedule during final weeks of semester. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 4. Prerequisite: permission. Cr 1-2.

MUO 506 Concert Band
Participation and a leadership role in the rehearsal and performance (on and off campus) of a variety of concert band literature appropriate for the general University instrumentalist. Attendance at rehearsals and public performances required. May be repeated for credit. Lab 3. Prerequisite: permission. Cr 1-2.

MUO 507 Pep Band
Participation and a leadership role in the rehearsal and performance of band music appropriate for athletic events including current marching band selections. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 2. Prerequisite: permission. Cr 1-2.

MUO 508 Symphonic Band
Participation and a leadership role in the rehearsal and performance of the most challenging and significant band literature. Attendance at all rehearsals and public performances required. Occasional touring on class days. May be repeated for credit. Lab 3. Prerequisite: audition. Cr 1-2.

MUO 509 University Orchestra
Participation and a leadership role in the rehearsal and performance of standard orchestral repertoire. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 4. Prerequisite: audition. Cr 1-2.

MUO 511 Opera Workshop
Participation and a leadership role in the study and performance of standard opera repertory. May be repeated for credit. Lab 3. Prerequisite: audition. Cr 1-2.

MUO 514 UM Jazz Ensemble
Participation and a leadership role in the rehearsal and performance of music for the large (16-24 member) jazz ensemble. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 5. Prerequisite: audition. Cr 1-2.

MUO 518 Percussion Ensemble
Participation and a leadership role in the rehearsal and performance of percussion ensemble repertoire. Attendance at all rehearsals required. May be repeated for credit. Lab 2. Prerequisite: permission of instructor. Cr 1-2.

Music-Performance (MUP)

MUP 205 Piano Class I
Designed to provide a basic command of the keyboard. Recommended especially for students preparing to take the proficiency examination in secondary piano. May be taken as an introduction to piano performance for the beginning student. Lab 2. Prerequisite: Music majors only. Cr 1.

MUP 206 Piano Class II
A continuation of MUP 205, designed to provide basic command of the keyboard. Lab 2. Prerequisite: Music majors only. Cr 1.

MUP 215 Piano Class I
A continuation of MUP 205, MUP 206 designed to complete the proficiency examination in secondary piano. Lab 2. Prerequisite: MUP 205, MUP 206 or permission. Music majors only. Cr 1.

MUP 216 Piano Class II
A continuation of MUP 205, MUP 206 designed to complete the proficiency examination in secondary piano. Lab 2. Prerequisite: MUP 205, MUP 206 or permission. Music majors only. Cr 1.

MUP 251 Accompanying I
The study of Piano accompanying techniques, stressing sight reading. Lab 2. Prerequisite: Required of all piano majors and open to other advanced pianists, by permission. Cr 1.

MUP 252 Accompanying II
A continuation of MUP 251 with emphasis on learning repertoire. Includes lab work with soloists. Lab 2. Prerequisite: MUP 251. Required of all piano majors and open to other advanced pianists, by permission. Cr 1.

MUP 340 Basic Conducting
Introduction to conducting techniques with emphasis on practical application to vocal and instrumental groups. Lab 3. Prerequisite: MUY 212. Cr 2.

MUP 341 Choral Conducting and Literature
Introduces basic choral conducting and studies of problems in the organization and training of choral groups. Prerequisite: MUP 340. Cr 3.

MUP 345 Instrumental Conducting and Literature
Introduces basic instrumental conducting, and study of problems in the organization and training of bands and orchestras. Prerequisite: MUP 340. Cr 3.

MUP 401 Performance-Secondary Instrument I
Applied study in voice, keyboard, strings, winds and percussion instruments as a secondary applied area for the graduate student. May be repeated for credit. Prerequisite: permission. Cr 2.

MUP 402 Performance-Secondary Instrument II
A continuation of MUP 401. May be repeated for credit. Prerequisite: MUP 401 or permission. Cr 2.

MUP 405 Keyboard Musicianship
A comprehensive application of the study of harmony to the keyboard, directed towards the development of sight-reading and accompanying skills, keyboard score-reading, transposition, harmonization at sight, improvisation and the realization of figured bass or other chording schemes. Prerequisite: MUY 212, MUY 214, MUP 216 or equivalent level, including completion of Piano Proficiency requirements. Cr 2.

MUP 511 Advanced Chamber Music I
The study and performance of the standard ensemble literature for string instruments, wind instruments, and piano. Prerequisite: Audition. Cr 2.

MUP 512 Advanced Chamber Music II
A continuation of MUP 511. Prerequisite: MUP 511 or permission. Cr 2.

MUP 530 Advanced Choral Conducting
Application of choral conducting in laboratory setting including works from the Renaissance through the present. Prerequisite: MUP 341 or permission. Cr 3.

MUP 540 Advanced Instrumental Conducting
Survey of literature for symphonic, concert, and marching bands. A study of performance problems and conducting techniques as related to these ensembles. Prerequisite: MUP 345 or permission. Cr 3.

Music-General (MUS)

MUS 100 Recital Lab
Experience in recital performance and in listening to performances of one's peers. May be repeated. Lab 1. Prerequisite: Required of music majors enrolled in applied music. Cr 0.

MUS 121 Principles of Singing I
Emphasizes diction in the standard languages (French, German, Italian and English.) Introduces the international phonetic alphabet and classical vocal literature, technique and performance practice. Weekly private instruction arranged through the class. Prerequisite: Required for first-year voice majors in B. M. Ed. and B. M. programs; open to others by permission. Cr 3.

MUS 122 Principles of Singing II
Continuation of MUS 121. Weekly private instruction arranged through the class. Prerequisite: Required for first-year voice majors in B. M. Ed. and B. M. programs; open to others by permission. Cr 3.

MUS 201 Applied Music Lessons
Individual applied instrumental lessons or voice lessons after completing MUS 121, MUS 122. May be repeated for credit. Note: section number designates instrument or voice. MUS 122 for voice majors; no prerequisite for instrumental majors. Bachelor of Arts in Music and Music minors. Cr 1.

MUS 210 Applied Music Lessons
Individual applied instrumental music lessons for the first four semesters. For voice majors this course number is for the third and fourth semesters of applied study. May be repeated for credit until Junior Standing Exam is passed. Note: section number designates instrument or voice. MUS 122 for voice majors; no prerequisite for instrumental majors. Music Education or Music Performance Majors. Cr 2.

MUS 250 Digital Music
Survey of the principal forms of digital music in use today: MIDI, multi-track digital recording, sampling, digital sound synthesis, digital sound editing and digital music notation. (This course is identical to NMD 250.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: MUY 101 or permission. Cr 3.

MUS 298 Special Subjects in Music
Specific topics and approaches will be chosen jointly by interested students and the staff. This offering is designed to address advanced issues not covered in regular offerings. 01-Italian Diction; 02-French Diction; 03-German Diction; 04-Harp-sichord; 14-Field Practicum in Music Education; 20-Studies in European Culture; 21- Beginning Guitar; 25-Independent Study in Music History; 40-Athena Consort; 44-Recording Arts; 45-Black Bear Chorus. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: permission. Cr 1-3.

MUS 310 Voice Pedagogy/Literature
A presentation of literature and/or pedagogical materials for voice. Intended to prepare the professional performer who maintains adjunct activities as a studio teacher. Prerequisite: Required of performance majors in voice and others admitted by permission. Cr 1-2.

MUS 312 Piano Pedagogy I
Survey of current and historical teaching materials and methods for students of all ages and ability levels. Classes will include observation of various private piano teachers from the local communities. Prerequisite: permission. Cr 1.

MUS 314 Piano Pedagogy II
Emphasizing "hands on" experience, students will work with piano pupils in lab and one-to-one settings. Issues such as teaching techniques, creative use of materials, attention span, concentration and the various psychological aspects of teaching will be addressed. Emphasis on interacting with students in a positive manner so that the result is a beneficial learning experience. Prerequisite: MUS 312. Cr 1.

MUS 316 Piano Literature I
Survey of the major works of the keyboard repertoire from the Baroque and Classical periods. Prerequisite: permission. Cr 1.

MUS 318 Piano Literature II
Survey of major works of the piano repertoire from the Romantic and Contemporary periods. Prerequisite: MUS 316. Cr 1.

MUS 350 Applied Music Lessons
Individual applied instrumental or voice music lessons after having passed the Junior Standing Exam. . May be repeated for credit. Note: section number designates instrument or voice. Prerequisite: Music Education Majors Cr 2.

MUS 450 Applied Music Lessons
Individual applied instrumental or voice music lessons after having passed the Junior Standing Exam. . May be repeated for credit. Note: section number designates instrument or voice. Prerequisite: Junior Standing Exam. Music Performance Majors Cr 4.

MUS 498 Senior Project
A significant research paper, original composition, or by special permission, a lecture-recital presented in lieu of a recital. Accomplished under the guidance of an assigned faculty member during the senior year. Satisfies the General Education Capstone Experience Requirement for the Bachelor of Arts degree in Music. Prerequisite: 3 years of Bachelor of Arts work. Required of all music majors in the Bachelor of Arts degree program. Cr 3.

MUS 510 Special Topics in Music
Specific topics and approaches will be chosen jointly by interested students and the staff. Designed to address the undergraduate course issues not covered in regular offerings. 01-Piano Pedagogy and Literature; 06-Seminar in Contemporary Music; 11-Harpsichord; Prerequisite: permission. Cr 1-3.

Music-Theory (MUY)

MUY 101 Fundamentals of Music
An elemental study of the dimensions and basic characteristics of musical sounds, with primary emphasis upon the development of skills and concepts through creating, performing and analysis. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: For the general student. Cr 3.

MUY 111 Elementary Harmony I
Diatonic chordal relationships through written work, analysis, and keyboard application. Prerequisite: Music major and permission. Primarily for music majors. Cr 2.

MUY 112 Elementary Harmony II
A continued study of chordal relationships. Prerequisite: MUY 111 and permission. Primarily for music majors. Cr 2.

MUY 113 Elementary Sight Singing and Ear Training I
Sight singing, ear training and dictation. To be taken concurrently with MUY 111. Prerequisite: MUY 101 or permission. Cr 2.

MUY 114 Elementary Sight Singing and Ear Training II
Sight singing, ear training and dictation. Prerequisite: MUY 113. Cr 2.

MUY 211 Advanced Harmony I
A continuation of MUY 112. Chromatic chordal relationships and 20th century harmonic practice. Prerequisite: MUY 112. Cr 2.

MUY 212 Advanced Harmony II
A continuation of MUY 112. Chromatic chordal relationships and 20th century harmonic practice. Prerequisite: MUY 211. Cr 2.

MUY 213 Advanced Sight Singing and Ear Training I
A continuation of MUY 114. Prerequisite: MUY 114. Cr 2.

MUY 214 Advanced Sight Singing and Ear Training II
A continuation of MUY 114. Prerequisite: MUY 213. Cr 2.

MUY 310 Jazz Improvisation
Music theory as it pertains to jazz improvisation, with emphasis on the development of skills and knowledge through creating, performing, writing and analysis. Instrumental participation required (pitched). Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: MUY 212. Cr 2.

MUY 315 Twentieth Century Musical Techniques
Techniques for structural analysis of post-impressionist through contemporary music. Prerequisite: MUY 212 or permission. Cr 2.

MUY 422 Tonal Counterpoint
A study of contrapuntal techniques as practiced by composers of the 18th and 19th centuries. Prerequisite: MUY 112 or permission. Cr 2.

MUY 451 Form and Analysis
Analysis of the structure of musical compositions of various historical periods, including the study of common forms found in the standard concert repertoire. Prerequisite: MUY 212. Cr 3.

MUY 452 Orchestration
Study and practical application of scoring techniques for various instrumental groups, including orchestral and band transcriptions and reductions. Prerequisite: MUY 212. Cr 3.

MUY 461 Composition I (Small Forms)
Composition in the Variation Forms, including ostinato, ground motive, passacaglia, chaconne and theme with variations. Prerequisite: MUY 451, MUY 452 or permission. Cr 2.

Native American Studies (NAS)

NAS 101 Introduction to Native American Studies
Introduces the interdisciplinary perspective of Native American Studies. Examines the experience of Native Americans, past and present, focusing on diverse and distinct cultural areas and historical events. Explores Native Americans' integral part in the development of the Americas and the European impact on traditional Native societies, historically and currently. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Lec 3. Cr 3.

NAS 102 Introduction to Wabanaki Culture, History and Contemporary Issues
Examines the world view, way of life, history, art, literature and contemporary issues of the Native nations that make up the Wabanaki Confederacy. The culture, philosophy and creation stories of the individual tribes, including the Penobscot, Passamaquoddy, Maliseet and Micmac tribes are explored. In addition, concepts such as sovereignty, treaty rights and tribal government are discussed. NAS 101 is recommended. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

NAS 201 Topics in Native American Studies
Provides an interdisciplinary, intermediate level of study of selected topics regarding American Indians in more detail and complexity. Prerequisite: NAS 101 or permission. Cr 1-3.

NAS 298 Directed Study in Native American Studies
Individual study, research, field experience and writing projects in Native American Studies. May be repeated for credit. Arranged upon request. Prerequisite: NAS 101 and permission. Cr 1-6.

NAS 401 Advanced Topics in Native American Studies
Provides an advanced level of study of selected topics regarding American Indians in great detail and specificity. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: NAS 101, junior standing and permission. Cr 3.

NAS 490 Theory and Research Methods in Native American Studies
An advanced seminar that serves as the culmination of the Native American Studies minor. Focuses on the theory and research methods appropriate to the discipline. Emphasizes research paradigms and techniques useful for interpreting materials and collections dealing with Native American Studies. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: NAS 101, NAS 102 and 6 additional credits in the Native American Studies minor. Cr 3.

NAS 498 Directed Study in Native American Studies
Advanced individual study, research, field experiences and writing projects in Native American Studies. May be repeated for credit. Arranged upon request. Prerequisites: NAS 101, one additional course approved for the minor in Native American Studies, junior or senior standing and permission. Cr 1-6.

Naval Science (NAV)

NAV 100 Naval Leadership Laboratory
(Pass/Fail Grade Only.) Prerequisite: permission of instructor. Cr 0.

NAV 101 Introduction to Naval Science
Emphasizes organizational structure, warfare components, and assigned roles/missions of the U.S. Navy/USMC. Covers all aspects of Naval Service from its relative position within DoD, to the specific warfare communities/career paths. Also includes basic elements of leadership/Navy Core Values. Designed to give student initial exposure to many elements of Naval culture. Also provides conceptual framework/working vocabulary for student to use on summer cruise. Laboratories are also provided to include alcohol and drug abuse prevention, detection and control, tobacco use cessation/prevention, suicide and HIV/AIDs prevention. Cr 2.

NAV 102 Naval Ships Systems I (Engineering)
Detailed study of ship characteristics and types including ship design, hydrodynamic forces, stability, compartmentation, propulsion, electrical and auxiliary systems, interior communications, ship control and damage control. Included are basic concepts of theory/design of steam, gas turbine, diesel and nuclear propulsion. Case studies on leadership/ethical issues in the engineering area are also covered. Cr 3.

NAV 201 Naval Ships Systems II (Weapons)
Outlines theory and employment of weapons systems. Student explores the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance and explosives. Fire control systems and major weapons types are discussed including capabilities and limitations. The physical aspects of radar and underwater sound are described. Facets of command, control, communications, computers and intelligence are explored as means of weapons system integration. The tactical and strategic significance of command and control warfare and information warfare is discussed. Supplemented with review/analysis of case studies involving the moral and ethical responsibilities of leaders in the employment of weapons. Other major themes in leadership include honor, courage, integrity, loyalty, responsibility, authority, accountability, character development, crisis decision making, and conflict resolution. Cr 3.

NAV 202 Sea Power and Maritime Affairs
The history of navies in the modern period (c. 1500 to the present) including use of naval forces in the achievement of national goals, development of naval technology and tactics, effects of naval construction and manning upon society, sociology of navies, comparison of naval policies in various states, the current balance sheet of navies. (Additional work will be required for Navy ROTC students.) (This course is identical to HTY 280.) Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

NAV 301 Navigation and Naval Operations I
In-depth study of the theory, principles, procedures and application of plotting, piloting and celestial navigation. Students learn piloting techniques, the use of charts, the use of visual and electronic aids, and theory of operation of both magnetic and gyro compasses. Celestial navigation topics include celestial coordinate system, the navigation triangle and an overview of the sight reduction process. Students develop practical skills in plotting and celestial navigation. Other topics include tides, currents, effects of wind/weather, voyage planning and application and understanding of international/inland rules of navigation. Supplemented with review/analysis of case studies involving actual navigation. Cr 3.

NAV 302 Navigation and Naval Operations II
Study of relative motion, vector-analysis theory, formation tactics and ship employment. Also included are introductions to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of shiphandling, afloat communications, and command and control. Supplemented with a review/analysis of case studies involving moral/ethical/leadership issues pertaining to the concepts listed above. Prerequisite: NAV 301 and permission of instructor. Cr 3.

NAV 303 Leadership and Management
Comprehensive study of organizational behavior and management. Topics include survey of management functions of planning,

organizing and controlling; an introduction to individual/group behavior in organizations; and extensive study of motivation/leadership. Major behavior theories explored in detail. Practical applications explored through using experiential exercises, case studies and laboratory discussions. Other topics include decision making, communication, responsibility, authority, accountability and total quality leadership. Cr 3.

NAV 304 Naval Leadership and Ethics
Final preparations of NROTC ensings/2nd Lieutenants. Topics include: military leadership, values and professional ethics; the Uniform Code of Military Justices and Navy regulations; personnel policies and practices relating to the roles of enlisted members/ junior officers/senior officers, personnel counseling and evaluation, advancement, career planning, personal finances, drug and alcohol abuse, fraternization and sexual harassment. Satisfies the General Education Ethics Requirement. Prerequisite: permission of instructor. Cr 3.

NAV 310 Evolution of Warfare
Traces development of warfare from dawn of recorded history to the present, focusing on the impact of major military theorists, strategists, tacticians and technological developments. Students acquire a basic sense of strategy, develop an understanding of military alternatives, and see the impact of historical precedence on military thought and actions. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspective Requirements. Prerequisite: permission of instructor. Cr 3.

NAV 410 Amphibious Warfare
A historical survey of the development of amphibious doctrine and the conduct of amphibious operations. Emphasis is placed on the evolution of amphibious warfare in the 20th century, especially during World War II. Present day potential and limitations on amphibious operations, including the rapid deployment force concept, are explored. Prerequisite: permission of instructor. Cr 3.

Natural Sciences, Forestry, and Agriculture (NFA)

NFA 117 Issues and Opportunities
Consists of weekly small group sessions (usually of 15 or fewer students) conducted by the students' first-year advisor. Not offered in all programs. (Pass/Fail Grade Only.) Cr 1.

New Media (NMD)

NMD 100 Introduction to New Media
An introduction to the historical contexts, concepts, technical concerns and production processes fundamental to New Media. Topics include history of new media/desktop computing, communication theory, issues for design and interactivity, hardware and computer science foundations of new media and basic software parameters related to digital art, Web design, video and sound production. Lecture and discussion format. Cr 3.

NMD 102 Fundamentals of Information Systems
Students develop the fundamental knowledge of information systems, including formal systems and models. Covers use of data, information, and knowledge in organizations, information lifecycle; collection, storage, processing, retrieval, delivery; and overview of the various components of an information infrastructure including computing platforms, software architectures, and telecommunications networks. Types of information systems, client server architectures, and emerging information systems. (This course is identical to ISE 102.) Lec 3. Prerequisite: A grade of C or better in NMD 100 and permission. Cr 3.

NMD 103 Introduction to New Media History and Theory
Surveys current and historical scholarship and criticism of New Media and its antecedents. Course challenges assumptions, present ideas, examines ethical issues and stimulates critical thinking through readings, journal entries, discussions and projects. Although much of the class is text-based, students will explore other media-rich sources and forms of presentation. Prerequisite: a grade of C or better in NMD 100 and permission. Cr 3.

NMD 104 Design Basics for New Media
Introduction to principles and theories of visual design, in traditional and electronic media; processes, methods and technologies relative to the creative production of two-dimensional visual imagery; use of the computer as a creative tool for the development of expressive and professional images. Focus on the creative process in visual design. (This course is identical to ISE 104.) Studio 3. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

NMD 112 Using Geographic Information Systems
Review of major elements of geographic information systems (GIS); uses in society; hands-on analysis, modeling and display of spatial data; study of collection and analytical methods for geographic data sets; focus on Census Bureau population data and its use for market research, health care, crime analysis and environmental applications; exposure to Internet mapping and GIS analysis on the Web. (This course is identical to ISE 112.) Lec 3. Cr 3.

NMD 202 Dynamic Web Site Development
Explores issues that arise when designing a World Wide Web interface for an existing database, or when developing a database for presenting information on the Web. Basic database concepts will be presented, but the majority of the course will focus on discussion and development of database design, interface issues specific to Web databases, and the technologies for linking a database to a Web server for delivery of information. Various Web-database applications, case studies, and industry trends will be examined. Prerequisite: COS 120 and NMD 102. Cr 3.

NMD 204 Design Synectics
Explores the use of design principles and theory relative to the complex problems posed by converged and distributable information structures. Examines and applies principles of sense perception to the practice of communication as well as synectic principles relative to information design. Students investigate problems of convergence and apply principles of design in the creation of complex information architecture and/or interactive systems. Prerequisite: ART 100 or ART 110 and NMD 104 or permission. Cr 3.

NMD 206 Project Design Lab: I
Introduces theories of sign and visual communication as applied to interactive information design. Explores how signs and symbols influence meaning and facilitate expression and perception of ideas and information. Provides a general knowledge of the history of visual theory and the interpretation of icons, symbols and indexes, including the unspoken "language" of design structures. Visual culture, semiology, and cultural/information artifacts as manifested by such designed items as Web sites, interactive media and databases are studied. Prerequisite: NMD 102 or NMD 104 or permission. Cr 3.

NMD 213 Information Ethics
Ethical and social issues associated with information system design and use. Morality and law in cyberspace. Values, ethical theories and their relation to information professionals. Free speech, intellectual property, privacy and security. Access to government information and government surveillance. Western values and norms compared to developing world perspectives. (This course is identical to ISE 213.) Lec 3. Satisfies the General Education Ethics and

Cultural Diversity and International Perspectives Requirements. Cr 3.

NMD 240 Introduction to Web Concepts and Design
Introduces the concepts, technical requirements and production processes needed for basic Web site development and construction. Topics include site design, image processing, visual Web editors, html and layout, interface design and basic behaviors. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: a grade of C or better in NMD 100, NMD 206 and permission. Cr 3.

NMD 250 Digital Music
Survey of the principal forms of digital music in use today: MIDI, multi-track digital recording, sampling, digital sound synthesis, digital sound editing and digital music notation. (This course is identical to MUS 250.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: MUY 101, a grade of C or better in NMD 100 and permission. Cr 3.

NMD 270 Digital Art I
An introduction to two-dimensional digital art. Includes professional 2D and related software, input/output options and image creation and editing. Emphasizes using the tools for the production of fine art. (This course is identical to ART 270.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: NMD 206 or permission. Cr 3.

NMD 295 Topics in New Media
Topics not regularly covered in other new media courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: A grade of C or better in NMD 100 and permission. Cr 1-3.

NMD 300 Seminar in Information Culture and Theory
Examines the cultural and theoretical implications of emerging digital artifacts, networks, and technologies. Focuses on a particular digital practice and its impact on who we are, how we interact with others (family, communities, cultures, nations, global networks), and how we configure and are configured by the transformation from a commodity-based society to an information-based society. Prerequisite: NMD 206 and a 200 or 300 level critical reading/writing course in student's concentration area. Cr 3.

NMD 302 Interactive Web Development
Offers hands-on instruction in scripting interactive, kinetic, and participatory Web site development. Students explore the fundamentals of a client-side language, such as JavaScript or ActionScript, by building navigation tools, layer-based animations, and other interactive components. As a culminating project, students build upon their experience of server-side development in NMD 202 to realize a fully functional online resource with an interactive interface and dynamic content. Prerequisite: NMD 202. Cr 3.

NMD 304 Explorations In Time Based Design
Advanced level exploration of the principles of design and the creative process relative to time-based media. Focus is on the design of imaginative, and/or metaphorical structures combining text, image and sound into self-contained digital works. Students experiment with the transmission of creative and expressive information through sequential and time-based formats, including fixed-image sequence, digital video, and animation. Prerequisite: ART 100 or ART 110, NMD 204, NMD 206 or permission. Cr 3.

NMD 306 Project Design Lab: II
A seminar on new media project design, with emphasis on team-based research and development. Assignments may require students to think across a variety of platforms, from analog tools to standalone devices to online applications. In each case, students will be challenged to think creatively and rigorously about the objective, structure, and form of their projects; the work of each team will culminate in a new media proposal and/or prototype. Prerequisite: NMD 206 or permission. Cr 3.

NMD 340 Intermediate Web Concepts and Desisgn
An intermediate level consideration of the concepts, technical requirements and production processes needed for Web site development and construction. Topics covered will include DHTML and Cascading Style Sheets, interface design, Web animation and interactivity, CGI scripting, video and audio for the Web and Web database fundamentals. Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: a grade of C or better in NMD 100, NMD 240 or permission. Cr 3.

NMD 360 Perceptual Applications and Connections
Basic principles and application of visual perception. Connections with art, design, animation, scientific visualization and new media will be explored. Topics include: color theory, form perception, depth perception, motion and illusions. (This course is identical to PSY 360.) Prerequisite: COS 101, COS 102, COS 103 or COS 110 or permission. Cr 3.

NMD 362 Photographic Reporting and Storytelling
An overview of photojournalism history, theory and ethics. Exercises teach skills and strategies used by newspaper, magazine and on-line photographers and editors and challenge students to deal responsibly with issues of invasion of privacy, subject representation, copyright and fair use and image manipulation. (This course is identical to CMJ 362.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: one of the following: CMJ 236 or ART 270 or ART 280 or NMD 111; familiarity with Photoshop; or permission. Cr 3.

NMD 370 Digital Art IIA: 3D Modeling and Animation
An introduction to the concepts and tools of 3D modeling and animation on the computer. Includes techniques to create narratives and provides hands-on experience with appropriate hardware and software. (This course is identical to ART 370.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: ART 270 or NMD 270 or permission. Cr 3.

NMD 371 Digital Art IIB: Digital Video
An introduction to digital, non-linear video editing. Use of professional-level equipment to create short, time-based artworks. (This course is identical to ART 371.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: ART 270 or NMD 270 or permission. Cr 3.

NMD 372 Digital Art IIC: Interactivity
An introduction to the concepts and tools of interactivity in digital art. Students will create interactive pieces and consider issues of interactivity. (This course is identical to ART 372.) Satisfies the General Education Artistic and Creative Expression Requirement. Prerequisite: ART 270 or NMD 270 or permission. Cr 3.

NMD 398 Topics in New Media
Topics not regularly covered in other new media courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: A grade of C or better in NMD 206 and permission. Cr 1-3.

NMD 417 Advanced Professional Writing
Advanced strategies for researching and analyzing communication problems in the workplace and for adapting documents to a multiple audience. Each student will undertake a major communication project resulting in a professional document. (This course is identical to ENG 417.) Satisfies the General Education Writing Intensive Requirement. Prerequisite: 6 credits in writing, including ENG 317, and permission. Cr 3.

NMD 430 Topics in New Media
An exploration of intermediate and advanced topics in multimedia production and design, including, among others, digital video production, software and hardware design or, electronic publishing. Designed to provide students with a deeper and more sophisticated experience with a multimedia issue, tool, or skill—or combination of all three. Prerequisite: NMD 206, NMD 295; permission of instructor. Cr 1-3.

NMD 490 Independent Study in New Media
Topics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: permission of instructor. Cr 3.

NMD 498 Practicum in New Media I
Part one of a two-part capstone experience on campus or in a commercial or other institutional environment with faculty supervision. Students meet in a weekly seminar to discuss progress. Each defines and researches his or her own individual project and prepares to bring it to fruition as a new media publication, such as a Web site; animated, feature or documentary video; or other digital production. May be taken concurrently with NMD 499. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: a grade of C or better in NMD 207 and senior standing. Cr 3.

NMD 499 Practicum in New Media II
Part two of a two-part capstone experience on campus or in a commercial or other institutional environment with faculty supervision. Students meet in a weekly seminar to discuss progress. Each defines and researches his or her own individual project, presents it within the format of the seminar and brings it to fruition as a new media publication, such as a Web site; animated, feature or documentary video; or other digital projection. Prerequisite: NMD 498. May be taken concurrently with NMD 498 Cr 3.

NUR 101 Issues and Opportunities in Nursing
Introduces first-year Nursing students to issues in nursing education and University resources. Assists with the development of writing and critical thinking skills. Seeks to enhance cultural growth and understanding and to influence the establishment of self-care and wellness as a priority for nursing students. Discussion of legal and ethical aspects and professional organizations in nursing. Students meet clinical faculty in order to explore their education and experiences in nursing. Cr 1.

Nursing (NUR)

NUR 200 Professional Concepts in Nursing
Introduces the profession of nursing and nursing theory by building on knowledge of humanities and social and physical sciences. Student acquire knowledge and beginning skills fundamental to nursing and to the application of nursing science within the health care system. Satisfies the General Education Writing Intensive Requirement. Nursing majors can satisfy three credits of the General Education Mathematics requirement by successfully completing NUR 200, NUR 201 and NUR 301. Lec 2, Lab 3. Prerequisite: Sophomore standing or by permission. Cr 2-3.

NUR 201 Fundamentals of Nursing Care Management
Clinical seminar and practicum which provides an opportunity for students to implement the health care concepts introduced in NUR 200. Nursing majors can satisfy three credits of the General Education Mathematics requirement, by successfully completing NUR 200, NUR 201 and NUR 301. (Offered Summers Only.) Prerequisite: NUR 200 or by permission. Cr 2.

NUR 300 Health Assessment Through the Lifespan
Develops the knowledge and skills necessary to conduct an individual assessment. Emphasis on data collection through the development of communication, interviewing, history-taking and physical examination skills. Lec 3, Lab 3. Prerequisite BIO 208, CHF 201 or permission. Prerequisite or corequisite: NUR 200. Cr 4.

NUR 301 Nursing Care Management of Adults I
Presents scientific knowledge as the basis for professional practice of nursing. Functional health patterns are the basis of course organization. Students demonstrate psychomotor skills in the learning resource laboratory and begin clinical application of the nursing process in varied inpatient settings. A clinical case study approach is used to foster acquisition of critical thinking and professional role skills. Satisfies the General Education Writing Intensive Requirement. Nursing majors can satisfy three credits of the General Education Mathematics requirement by successfully completing NUR 200, NUR 201 and NUR 301. Lec 3, Lab 3, Clin 6. Prerequisite: Junior standing. NUR 200, BIO 208, BMB 300, BMB 305 and permission. Prerequisite or corequisite: NUR 303, NUR 300. Cr 3-6.

NUR 303 Pathophysiology
A study of the physiological, genetic and biochemical basis of disease. Prerequisite: BIO 208. Cr 3.

NUR 304 Concepts in Nursing for the Practitioner
Focuses on the historical foundations of the nursing profession and important issues affecting nursing practice today. Students utilize critical thinking and nursing and other theories to reflect upon clinical practice. Emphasis is placed on oral and written communication skills. Lec 3. Satisfies the General Education Writing Intensive Requirement. Prerequisite: Registered Nurse and by permission. Cr 3.

NUR 308 Nursing Care Management of Individuals and Families Across the Lifespan
Students develop a comprehensive approach to caring for infants, children, women from menarche through childbearing years and their families. Utilize functional health patterns to achieve a holistic assessment. Provides clinical experience in inpatient and outpatient settings. Lec 6, Clin 9. Prerequisites: NUR 200, NUR 300, NUR 301, CHF 201, NUR 303, FSN 280; permission. Corequisite: NUR 404. Cr 9.

NUR 310 Health Related Research
Presents qualitative and quantitative research methods. Students evaluate research studies and consider the implications of research for nursing practice. Prerequisite: Basic statistics and NUR 200 or by permission. Cr 1-3.

NUR 357 Experience in Community Health
Exposes RN's to the role of the community health nurse and the community as client. Focuses on the health of aggregates providing students with opportunities to develop expertise in health promotion, disease prevention health maintenance and restoration. (Offered for Pass/Fail Grade Only.) NUR 300, NUR 304. Prerequisite or Corequisite: NUR 442. Cr 2.

NUR 404 Fundamentals of Pharmacology
The basic concepts of pharmacology for health professionals, introducing pharmacodynamics and kinetics. Emphasis on clinical pharmacology of major drug categories and major drug interactions. Prerequisite: A course in physiology (BIO 208 or BIO 377) and either two semesters of organic chemistry (CHY 251, CHY 252) or one semester of organic and one semester of biochemistry (BMB 207 and BMB 208 or BMB 221 and BMB 322.) Nursing majors must have completed NUR 301 and NUR 303. Cr 3.

NUR 409 Professional Issues: Leadership and Organization
Addresses health care policy within the framework of leadership and organizational theory, role and change theories. Students will have the opportunity to explore professional and ethical issues which affect

the delivery of health care. Prerequisite: NUR 304. Licensure as a registered nurse. Cr 3.

NUR 411 RN Senior Seminar
A senior synthesis seminar and clinical course for RN students, building on concepts from NUR 304 and NUR 410, as well as clinical experience and general education of the participants. Independent clinical experience and seminars provide an opportunity to synthesize clinical judgement skills, discuss critical reasoning, apply ethical decision making and integrate concepts of health promotion throughout the lifespan. Lec 2, Proj 3. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: NUR 304, NUR 310; permission. Cr 4.

NUR 415 Socio-Cultural Issues in Health and Health Care
Examines the importance of the influence of culture, ethnicity, gender, age and lifestyle on health definition and behavior by both the provider and the client. Future successful health care delivery, whether in a hospital, clinic, or home setting, will depend upon both the provider's technical knowledge and cultural understanding to meet the needs of clients. MAINE ACCESS is used for enhanced communication among students and between students and faculty. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: junior level in nursing or permission. Cr 4.

NUR 420 Women's Health
Explores political, economic and social factors influencing women's health from a feminist perspective. Philosophic emphasis on concepts of creativity, humanistic care, the autonomy and unique individuality of each participant, and the growth and development of all participants. Prerequisite: Junior standing or permission. Cr 3.

NUR 423 Ethical Issues in Health Care
Major ethical theories and principles are introduced and framework provided for discussion of ethical issues. Satisfies the General Education Social Contexts and Institutions, Cultural Diversity and International Perspectives and Western Cultural Tradition Requirements. Prerequisite: permission. Cr 3.

NUR 440 Nursing Care Management of Adults II
One of two senior level courses focusing on acute and chronic complex health problems with emphasis on major life threatening illnesses. Functional health patterns provide the basis for course organization. The role of the nurse in health promotion, illness management, independent and collaborative decision making, and professional issues encountered in practice are discussed in class. Lec 2. Prerequisite: NUR 308, NUR 404. Senior standing in School of Nursing and permission. Cr 3.

NUR 441 Nursing Care Management of Adults III
A continuation of NUR 440. Content is organized on the basis of functional health patterns. The role of the nurse in regard to levels of illness prevention is presented. Nursing strategies relating to health promotion, maintenance and restoration are discussed. Lec 2. Prerequisite: NUR 440. Senior standing in the School of Nursing and permission. Cr 2.

NUR 442 Mental Health and Community Nursing Care Management Concepts I
Introduces the student to the concepts and principles of mental health and community health nursing. The student is introduced to the role of the community health nurse and the community as a client. Students will use the functional health patterns framework for nursing diagnoses of individuals, families and communities. Current issues influencing the health of communities are examined. The clinical focus includes health promotion, disease prevention, health maintenance and restoration. A variety of clinical experiences are offered in community based settings. Students will have the opportunity to do a community assessment. Lec 2, Clin 2. Prerequisite: NUR 308 and NUR 404. Senior standing in the School of Nursing and permission. Cr 2-5.

NUR 443 Mental Health and Community Nursing Care Management Concepts II
Builds on NUR 442. Concepts and principles of mental health/psychiatric nursing and community health nursing will be further analyzed. The community as the client will be a primary focus of the semester. Lec 2. Prerequisite: NUR 442; Senior standing in the School of Nursing and permission. Corequisite: NUR 444. Cr 2.

NUR 444 Management and Leadership in Health Care System
Provides the student with content focusing on knowledge and skills essential to the professional role of nursing. Organizational and leadership theories are presented as they relate to the practitioner as a member of a group. Theoretical concepts of group structure and interactions in groups are discussed. Change and role theories are introduced as tools for understanding group and organizational dynamics. Lec 2. Prerequisites: NUR 308 and NUR 404; Senior standing in the School of Nursing and permission. Corequisites: NUR 440, NUR 442, NUR 446. Cr 2.

NUR 447 Clinical Reflection Seminar
Utilizes discourse to foster interpersonal and group communication skills, group role-taking, critical thinking, reflection upon clinical practice and integration of theory with practice. Satisfies the General Education Capstone Experience Requirement. Sem 3. Prerequisite: Senior standing in the School of Nursing. Corequisite: NUR 455. Cr 1.

NUR 455 Senior Clinical Practicum
A capstone experience in which students apply knowledge gained from all prior semesters. Students are partnered with nurses providing acute and chronic health care services in a variety of settings. Satisfies the General Education Capstone Experience and Ethics Requirements. Clin 16. Prerequisite: Senior standing in the School of Nursing and permission. Corequisite: NUR 445. Cr 4.

NUR 495 Independent Study in Nursing
Individualized study with permission of the instructor. May or may not have an experiential component. Prerequisite: permission of instructor. Cr 1-3.

NUR 497 Projects in Nursing
Individualized project with permission of the instructor. May or may not have an experiential component. Prerequisite: permission. Cr 1-3.

NUR 502 Family in Health and Illness
Foundation course focusing on the family as client. Prepares the student to integrate the role of the family in relation to the development of concepts which affect health. Prerequisite: permission. Cr 3.

NUR 503 Advanced Health Appraisal and Physical Assessment: Nurse Practitioner
Health appraisal, health promotion and illness prevention throughout the lifespan. Covers nurse practitioner interviewing, history taking, physical assessment and health risk appraisal. Prerequisite: permission. Cr 1-4.

NUR 504 Theory Development in Nursing
Historical development of nursing theories and the generation of scientific knowledge. Selected theories from other disciplines useful for understanding nursing phenomena are also presented. Prerequisite: permission. Cr 3.

NUR 505 Nursing Research
Explore inductive and deductive approaches to generating research emphasizing internal and external validity. Students will review and critique nursing studies and carry out an analysis project. Prerequisite: NUR 410 or permission. Cr 3.

NUR 506 Professional Issues in Advanced Practice Nursing
Issues of advanced practice nursing, including role change, health policy, health care delivery systems and ethical issues. Prerequisite: NUR 503. Cr 2.

NUR 507 Advanced Pathophysiology
Advanced study of normal and abnormal human physiology with a focus on the physiological, genetic and biochemical basis of human disease. Provides a framework for nurses to understand and integrate clinical findings, diagnostic and therapeutic regimens. Prerequisite: permission. Cr 3.

NUR 508 Advanced Pharmacology and Therapeutics: Nurse Practitioner
Prepares the nurse in advanced practice to understand drug therapy management for a variety of client populations with emphasis on rural practice. Prerequisite: permission. Cr 3.

NUR 509 Advanced Pharmacology and Therapeutics
Prepares the nurse educator to understand drug therapy management for a variety of client populations. Prerequisite: permission. Cr 3.

NUR 510 Advanced Health Appraisal and Physical Assessment
Prepares the nurse educator for health appraisal, health promotion and illness prevention throughout the lifespan. Covers interviewing, history taking, physical assessment and health risk appraisal. Prerequisite: permission. Cr 1-4.

NUR 511 Core Clinical Concepts
Prepares the nurse educator or clinical specialist to utilize core clinical concepts in nursing specialties within a specified theoretical framework under the direction of faculty prepared in the specialty. Seminar or directed study. Prerequisite or corequisite: NUR 507. Cr 3-6.

NUR 512 Curriculum and Course Development
Introduces the student to curriculum and course development with emphasis on organizational frameworks, legal implications of the syllabus, teaching-learning strategies and evaluation of learning. Seminar or directed study. Prerequisite: Matriculation or permission. Cr 3.

NUR 513 Teaching Practicum
Implements teaching and evaluation strategies in classroom, laboratory and clinical settings; participates as member of a curriculum committee and in overall program evaluation. Prerequisite: NUR 511, NUR 512. Cr 1-3.

NUR 520 Family Nurse Practitioner Care: Neonate to the Adolescent
The first of three primary care clinical courses for Family Nurse Practitioners. Emphasis on assessment, evaluation and nurse practitioner care for children, from the neonate to the adolescent, as commonly encountered in a rural family practice setting. Lec 1-3, Clin 1-3. Prerequisite: NUR 503 and NUR 507. Permission. Cr 1-6.

NUR 521 Nurse Practitioner Gynecologic and Reproductive Care of Women
Focuses on the nurse practitioner's clinical assessment and management of the female client's gynecologic, reproductive and sexual health. Prerequisite: NUR 503. Cr 1-3.

NUR 522 Family Nurse Practitioner Care of Adults I
Assessment and primary care management of well adults and adults with common health problems. Emphasis is placed on primary health care of rural and other underserved populations. Lec 1-3, Clin 1-3. Prerequisite: NUR 503, NUR 507, NUR 508, NUR 520 and NUR 521; permission. Cr 1-6.

NUR 523 Family Nurse Practitioner Care of Adults II
Continuation of NUR 522 with emphasis on health care needs of older adults and other underserved populations. Lec 1-3, Clin 1-3. Prerequisite: NUR 502, NUR 522; permission. Cr 1-6.

NUR 530 Mental Health Nursing I
Focuses on the role of the advanced practice mental health nurse in utilizing Diagnostic Statistical Manual (DSM) criteria to diagnose the various mental illnesses throughout the lifespan. Theories relevant to multi-cultural nursing will be examined. Cr 3.

NUR 540 Nurse Practitioner Care of Women I
Nurse practitioner assessment and management of well pre-menopausal women and women with common gynecologic and reproductive needs. Prerequisite: NUR 503 and permission. Cr 1-3.

NUR 541 Nurse Practitioner Care of Women II
Nurse practitioner assessment and management of well prenatal and postpartum clients and clients with common deviations from normal. Prerequisite: NUR 540 and permission. Cr 1-3.

NUR 542 Nurse Practitioner Care of Women III
Nurse practitioner assessment and management of well post-menopausal women and women with common gynecologic problems. Prerequisite: NUR 541 and permission. Cr 1-3.

NUR 544 Clinical Practicum
Supervised clinical practicum designed to accompany specialty courses. May be repeated for credit. Some sections may have prerequisites beyond the following. Prerequisite: Graduate student or permission. Cr 1-9.

NUR 550 Nursing Care of the Neonate to the Adolescent
Prepares the nurse educator or clinical specialist in the content area of clinical assessment nursing care for children, from the neonate to the adolescent. Prerequisite: NUR 507 and NUR 510 or permission. Cr 1-3.

NUR 551 Gynecologic and Reproductive Nursing Care
Prepares the nurse educator or clinical specialist in the content area of clinical assessment and care of the female client's gynecologic, reproductive and sexual health. Prerequisite: NUR 507 and NUR 510 or permission. Cr 1-3.

NUR 552 Care of Adults I
Prepares the nurse educator or clinical specialist in the content area of assessment and nursing care of commonly encountered adult health care problems. Attention is given to the complex socioeconomic and cultural issues that impact care of rural populations. Prerequisite: NUR 507 and NUR 510 or permission. Cr 1-3.

NUR 553 Care of Adults II
Prepares the nurse educator or clinical specialist in the content area of assessment and nursing care of older adults with commonly encountered health care problems. Focus on complex socioeconomic and cultural issues that impact care of rural populations. Prerequisite: NUR 507 and NUR 510 or permission. Cr 1-3.

Onward-English (ONE)

ONE 012 Onward Composition
Students write essays based on readings in American history. Each student drafts six or seven essays, revises each with the help of peers, and finally presents the paper in the class. A review of grammar, sentence structure and punctuation makes up the editing part of the course. Cr 3.

ONE 013 Advanced Onward Composition
This college-level course requires that students respond to reading by writing several essays and a research paper. Those students who earn a C in the course and pass the ENG 101 proficiency test will earn three university credits by examination. Prerequisite: ONE 012. Cr 3.

ONE 014 English Grammar Workshop
This course is designed to provide the background in English grammar that is necessary to a solid understanding of the English language and the study of other languages. Cr 2.

Onward-Mathematics (ONM)

ONM 011 Pre-Algebra
Operations including addition, subtraction, multiplication and division are reviewed and applied to fractions, decimals, percents and basic geometry. Briefly introduces signed numbers and simple linear equations. Prerequisite: permission. Cr 3.

ONM 012 Introductory Algebra
Topics include: graphing, writing and solving linear equations (including fractional equations), solving quadratic equations by factoring and by the quadratic formula, as well as practical applications. Prerequisite: ONM 011 or permission. Cr 3.

ONM 013 Intermediate Algebra
Solving radical and quadratic equations. An introduction to functions and their graphs, including conics. Logarithms and inequalities are introduced. Applications are stressed. Prerequisite: ONM 012 or permission. Cr 3.

Onward-Orientation (ONO)

ONO 011 Onward Orientation I
Assists the transition of students entering the University of Maine through the Onward Program. Topics include: Academic Requirements of the Onward Program and the University of Maine, Goal Setting, Learning Styles, Time Management, Note Taking, Test Taking, Stress Management, Self-esteem, Communication and Relationship Skills, Career Information, AIDS and Responsible Sexuality. (Pass/Fail Grade Only.) Prerequisite: permission of instructor. Cr 1.

ONO 100 Onward Orientation II
Exploration of campus resources relevant to academic course work, majors and career choices. Builds strategies of achieving success at UMaine including study skills, basic computer skills, and self-awareness as it relates to academic competency. (Pass/Fail Grade Only.) Prerequisite: ONO 011 or permission of instructor. Cr 1.

Onward-Reading (ONR)

ONR 012 Introduction to Academic Reading
For students who are already reasonably proficient readers, but who lack the critical skills required for university level courses. Introduces text analysis and methods of critical thinking. Activities include discussion of assigned readings, short papers, as well as some emphasis on effective reading skills, vocabulary building, and exam preparation. Prerequisite: ONR 011. Cr 3.

ONR 013 Critical Reading
For students who already have a beginning acquaintance with the methods of critical reading, but who need to refine and strengthen their skills in order to succeed in regular university courses. Activities include concentrated text analysis, oral and written presentations and independent library research. Prerequisite: ONR 012 or permission. Cr 3.

Onward-Science (ONS)

ONS 011 Onward Biology
Understanding life begins with ecological relationships, including energy, nutrients, animal behavior and the ecology of populations. Then attention shifts to the unity of life, involving basic cell chemistry, the genetic basis of life and evolution. Lec 3, Lab 2. Prerequisite: permission. Cr 3.

ONS 012 Onward Chemistry
Topics include measurements and calculations, matter and energy, chemical foundations and composition, nomenclature, reactions, quantities, modern atomic theory, bonding, gases, liquids and solids, solutions, acids and bases, equilibrium and oxidation-reduction. Prerequisite: ONS 011 or permission. Cr 3.

ONS 014 Onward Zoology
Introduces biological diversity and classification of living things. Plant systems are studied as a key part of the living fabric of the earth. Much emphasis is place on animal systems, including anatomy and physiology, embryology and reproduction. Prerequisite: ONS 011 or permission. Cr 3.

Public Administration (PAA)

PAA 100 Introduction to Public Administration
Origin and development of public administration as a discipline and profession. Citizen and the administrative state; rise of professionalism; growth of executive branch in federal government and the states. Public service within an environment of democratic, legal, ethical, political and economic considerations. Satisfies the General Education Social Contexts and Institutions and Ethics Requirements. Cr 3.

PAA 200 Public Management
An introduction to fundamental issues that underlie the field of public management. Topics include a history of the discipline, federalism, ethics and public service and public budgeting. Satisfies the General Education Social Contexts and Institutions and Ethics Requirements. Cr 3.

PAA 220 Introduction to Public Policy
Provides students with a basic understanding of the U.S. public policy process. Models of policy agenda setting, adoption, implementation and evaluation are considered with reference to specific substantive policy areas such as economic, energy, environmental, intergovernmental, social welfare, health and civil rights policy. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

PAA 233 American City
Urban environment and demographic change; interest groups and governing bodies; local legislative and executive leadership. Political forms and policies impacted by such trends as immigration, urbanization, race and ethnicity, suburbanization and metropolitan growth. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

PAA 315 Statistics in Public Administration
Introduces the student to the statistical procedures and computer skills that are used in policy and management settings. Covers descriptive statistics, measure of central tendency, measure of association and analysis of variance. Topics are presented with related computer techniques. Satisfies the General Education Mathematics Requirement. Prerequisite: PAA 200 and COS 101, COS 102, COS 103. Cr 3.

PAA 327 Environmental Policy, Management and Regulation
An introduction to environmental policy and management in the United States to include a review of environmental ethics; major substantive areas of air, water, land and hazardous waste policy; the political dynamics that frame environmental policy making a t the federal, state and local levels of government; and the management issues arising in the implementation of environ-mental policy within the intergovernmental context. Satisfies the General Education Ethics and Population and the Environment Requirements. Prerequisite: PAA 200 or permission. Cr 3.

PAA 340 Public Financial Management
Examines the various public financial management techniques used by all levels of government. Specific emphasis on understanding budgets and the budget process; capital budgeting; cash an debt

anagement; accounting; and auditing. erequisite: PAA 200 or permission. Cr 3.

A 350 Human Resources in Public Service
ompares modern techniques for effective rsonnel management with customary actices in the public, nonprofit and health ctors. Covers major laws that affect human sources such as the Americans with sabilities Act and the Civil Rights Act. udents complete a personnel project for a blic service agency. Prerequisite: PAA 200 permission. Cr 3.

A 370 Local Government Administration
analysis of the formation and plementation of policies at the local level. unicipal management concerns with human d financial resources, city and town anning and service delivery. In-depth cases e utilized throughout. Prerequisite: PAA 33 or PAA 200. Cr 3.

A 380 Police and the Community
overs police administrative practices cluding leadership, organization, anagement and human resources. ontroversies and issues such as under-forcement, brutality, impact of technology, aining, hiring and performance assessment, ability, community policing, crime and omestic violence. Best practices in unicipal, country and state settings. atisfies the General Education Social ontexts and Institutions Requirement. Cr 3.

AA 390 Technical Writing and ommunication in Public Service
evelops writing skills applied to public, onprofit and health organizations. Students rite memos, news releases, reports and osition papers (multiple submissions quired). Features communication skills to onvey results and ideas. Covers use of ferences. Satisfies the General Education Vriting Intensive Requirement. Prerequisite: AA 200 or permission. Cr 3.

AA 400 Issues in Public Administration
n examination of basic issues in Public dministration. Case studies in such areas as ublic policy implementation and public anagement at the international, national, tate, sub-state, and local levels in public and onprofit organizations. Prerequisite: PAA 00 or permission. Cr 3.

AA 405 Administrative Law
ntroduces students to the legal/constitutional ssues arising from the relationship between ublic administrative agencies, legislative odies and the courts. Through a review of ignificant court cases the course explores ssues concerning the separation of powers nd delegation, sovereign immunity and the cope and limits of administrative discretion in administrative rule making. Prerequisite: PAA 200. Cr 3.

PAA 409 Governmental and Nonprofit Accounting
Financial accounting, for not-for-profit and government entities and hospitals, voluntary health and welfare organizations. Includes fund accounting. GASB statements (This course is the identical to BUA 409. Students cannot receive credit for both PAA 409 and BUA 409.) Prerequisite: BUA 201 and junior standing. Cr 3.

PAA 410 Local Government Law
Fundamentals of law relating to local government, viewed from the perspective of the public administrator. Prerequisite: PAA 200. Cr 3.

PAA 425 Health Care System Management
Examines the development of the public/nonprofit/for-profit health care delivery system in the United States. Also examines current administrative practices in areas such as governance and organization, planning and marketing, human resources, facility management in mental health and hospital administration and ethics. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: PAA 200 or permission. . Cr 3.

PAA 430 Organizational Change in Public Service
Examines improvement methods such as flattening the organizational structure, teamwork, quality management, performance management, budgeting and re-engineering. Covers the role of leadership in transforming the culture to create high performance organizations. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: PAA 200 or permission. Cr 3.

PAA 493 Public Administration Internship
Professional experience in a state government, nonprofit agency, healthcare agency, etc. Some opportunities exist through the Maine State Government Internship Program. Open to selected students. Reports and readings required. No more than 6 credits of internship or field experience may be taken during a semester. No more than 6 credits may be used toward the departmental major and no more than 12 credits may be used toward graduation. Satisfies the General Education Capstone Experience Requirement. Cr Ar.

PAA 495 Municipal Government Internship
Professional experience in local government. Reports and readings required. Majors within the department may not receive more than a total of 12 credit hours toward graduation for any combination of internships and field experiences, and not more than 6 credit hours may be used toward the departmental major. Satisfies the General Education Capstone Experience Requirement. Cr Ar.

PAA 498 Independent Readings in Public Administration
Prerequisite: permission. Cr 1-3.

PAA 505 Intergovernmental Relations
Study of federalism in the United States, including federal-state, federal-local, state-local and interstate relationships. Emphasis on politics of present-day intergovernmental administrative arrangements. (Not offered every year.) Prerequisite: Graduate student or permission. Cr 3.

PAA 516 Information Technology and Public Policy
Impact and design of information systems in public and nonprofit organizations. (This course is identical to TSO 516.) Prerequisite: Graduate Students or permission. Cr 3.

PAA 520 Policy Studies
Examines approaches to the study of public policy such as public choice theory, implementation analysis, systems analysis, and impact analysis as they are applied to policy areas such as health, welfare, education, and criminal justice. Students participate in seminar discussions and complete a research project. (Not offered every year.) Prerequisite: PAA 200 or permission. Cr 3.

PAA 540 Seminar in Public Financial Management I
Examines governmental financial conditions, revenue collection and spending processes, and specialized topics such as cash management, risk management, debt management and capital budgeting. Special emphasis on financial management in state and local governments. Prerequisite: Graduate student or permission. Cr 3.

PAA 550 Seminar in Public Personnel Management
Consideration of selected problems in the public personnel management process. Emphasis on empirical theories of motivation, satisfaction, productivity, supervisory patterns, and organizational conditions. Prerequisite: Graduate student or permission. Cr 3.

PAA 560 State Administration
Analysis of the place of the state executive in the politics of the American states. Emphasis on the role of the governor and administration in policy formulation. (Not offered every year.) Prerequisite: PAA 200 or permission. Cr 3.

PAA 580 City and Regional Planning
Principles and practices of city and regional planning; including origins, community design, comprehensive plans, zoning and land use controls; court decisions, administrative organization and political concerns; sprawl, sustainable growth and economic development. (Not offered every year.) Prerequisite: Graduate students or permission. Cr 3.

PAA 585 Comparative Administrative Systems
Comparative study of administration systems across different cultures with emphasis on administrative practices, structures and processes. (Not offered every year.) Prerequisite: PAA 200 or permission. Cr 3.

Peace Studies (PAX)

PAX 201 Introduction to Peace Studies
Introduces students to various concepts in the field of peace studies. Topics include forms of violence and their relationship to social structure and cultural practices; global militarization and environmental destruction and their impact on human needs; and peace-making and conflict resolution at both micro and macro levels. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

PAX 350 Buddhism, Peace and Contemplative Traditions
An introduction to Buddhism and its relationship to Zen and Western contemplative traditions. Some philosophical aspects of Buddhism as well as stories, sutras, ethical precepts, relationship to ecological concerns and the embodying of the Way in our daily lives. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3.

PAX 351 This Sacred Earth: Ecology and Spirituality
Examines Eastern and Western views on the environment in terms of spiritual traditions. A major part of the course addresses a new approach to spirituality of nature, called Deep Ecology which includes ecotheology and ecofeminist spirituality. Satisfies the General Education Ethics Requirement. Cr 3.

PAX 360 Conflict Resolution: A Relational Approach To Working Through Conflict
Emphasis on alignment of premises, practices and policies that have shaped the field on the local, national and international levels. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

PAX 398 Topics in Peace Studies
Explores peace through more in-depth study of specific topics drawn from the introductory course, such as the roles of technology, religion, gender, ethnicity and social stratification in the establishment and maintenance of peace. May be repeated for credit. Cr 3.

PAX 410 Theories in Peace Studies
An exploration and critical discussion of various academic theories about conflict and peace. Prerequisite: PAX 201 or permission. Cr 3.

PAX 451 Mediation: Its Premises, Practices and Policies
Introduces students to the theory and practice of mediation. Participants will reflect together on the nature and origins of conflict and its impact on society and individuals. Students will acquire and practice the skills needed for effective conflict management. Cr 3.

PAX 452 Advanced Study in Transformative Mediation
Students will deepen their understanding of the premises and principles of the transformative orientation to mediation practice. Students will consider how values and belief systems impact the development of mediation models or schools of thought. Includes skills development through intensive coaching. Prerequisite: PAX 451 or permission. Cr 3.

PAX 491 Forgiveness: Creating a Culture of Peace and Reconciliation
How do we forgive those we consider enemies? Are there limits to forgiveness? Can we learn forgiveness? These questions form the core of the class journey as it explores forgiveness from academic, personal, historical and cultural perspectives. Through reading, writing, conversation and other forums, it looks at forgiveness as a tool for peace building. Satisfies the General Education Ethics and Cultural Diversity and International Perspectives Requirements. Prerequisite: PAX 201 or permission. Cr 3.

PAX 495 Advanced Topics in Peace Studies
An advanced, interdisciplinary study of topics such as "Peace Education," "Conflict Resolution in the Schools," "Diversity Education," etc. May be repeated for credit. Prerequisite: PAX 201 or permission. Cr 3.

PAX 498 Special Projects in Peace Studies
Advanced individual study, research and written projects in Peace Studies and related areas, conducted under the guidance of a faculty member associated with the Peace Studies Program. Arranged on request. May be repeated for credit. Prerequisite: PAX 201 or permission. Cr 1-6.

Philosophy (PHI)

PHI 100 Contemporary Moral Problems
Examines a variety of moral problems causing controversy in contemporary society. Focuses on evaluating arguments for and against competing solutions to these problems. Also discusses different philosophical strategies for thinking about moral obligations and relationships. Topics surveyed may include: abortion, affirmative action, euthanasia, feminism, the environment, capital punishment, welfare and aid to the needy, technology, war and racism, among others. Satisfies the General Education Ethics, Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

PHI 102 Introduction to Philosophy
An introduction to philosophical thought and critical thinking through a reading of works from the philosophical tradition. Readings might include works from philosophers such as Plato, Aristotle, Augustine, Descartes, Hume, Locke, Kant, Marx, Nietzche and/or other great works of philosophy. Questions will be asked about the nature of wisdom and knowledge, the essence of reality and of ideas, human nature, virtue and community, justice and political life. Satisfies the General Education Ethics and Western Cultural Tradition Requirements. Cr 3.

PHI 103 Methods of Reasoning
A study of principles used to distinguish correct from incorrect reasoning including the nature of thought, uses of language, recognition of arguments, informal fallacies, purposes and types of definition, deduction and induction. Emphasis on understanding and mastering through practice some fundamental techniques for testing the soundness of many different kinds of reasoning. Satisfies the General Education Western Cultural Tradition Requirement. Cr 3.

PHI 104 Existentialism and Literature
A critical study of philosophical significance of individual choices and actions involving questions of personal identity, responsibility and authenticity as these themes are developed in existentialist literature. Special attention will be given to existentialist literary techniques. Satisfies the General Education Ethics, Western Cultural Tradition and Artistic and Creative Expression Requirements. Cr 3.

PHI 105 Introduction to Religious Studies
An analysis of religion as an expression of human culture past and present. Considers institutional and non-institutional manifestations of religion as conveyed through myth and symbol, religious experience, struggle for societal change,

mysticism, and quests for the articulation of human values. Inquiry by various disciplines will be considered, e.g., anthropology, psychology, sociology, history, philosophy, and theology. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Cr 3.

PHI 200 Problems in Recent Philosophy
Study of recent philosophical work in ethics, social philosophy, philosophy of mind, philosophy of religion with an emphasis on epistemological and metaphysical issues that are raised in this work. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: One course in philosophy or permission. Cr 3.

PHI 210 History of Ancient Philosophy
An analysis of Hellenic philosophy with emphasis on Plato and Aristotle, including Presocratic philosophy, Platonism, Aristotelianism, Stoicism and Epicureanism. Satisfies the General Education Ethics, Western Cultural Tradition Requirements. Prerequisite: no first-year students or permission. Cr 3.

PHI 220 Introduction to the Jewish Bible
Surveys the major themes and religious ideas contained in the Jewish Bible. Approaches the Bible as a document reflecting the evolving theology of ancient Israel. The stories, laws, ethics, and poetry of the Bible will be examined against the backdrop of Israelite history, politics and culture. Students will read the Bible and consider scholarly views of its origins and meanings. Upon completion of the course, students can expect to have an enriched appreciation of the range of religious ideas presented in the Bible, and an understanding of prevailing theories regarding its authorship. Satisfies the General Education Ethics and Western Cultural Tra-`dition Requirements. Prerequisite: no first-year students except by permission. Cr 3.

PHI 223 Modern Jewish Thought
Modern trends in Jewish thought from the Enlightenment to the present. Primary attention is given to Jewish philosophers who formulated significant responses to modernity including neo-Kantian rationalism, Zionism, religious naturalism, existentialism, post-Holocaust theology, mysticism, postmodernism and feminist theology. Satisfies the General Education Ethics, Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: sophomore or higher or permission. Cr 3.

PHI 230 Ethics
Readings and discussions of works by Aristotle, Mill, Kant, Nietzsche and other moral philosophers. In each case, the nature of the system, its summum bonum and defense is examined, criticized, and tested for its applicability to personal and public ethical predicaments. Satisfies the General Education Ethics, Western Cultural Tradition Requirements. Prerequisite: no first-year students or one course in philosophy. Cr 3.

PHI 231 Topics in Applied Ethics
Deals with the ethical issues in various professions and practices such as business, law, agriculture, government, science, teaching and journalism. Different sections may focus on specific professions or problem areas (e.g., Business Ethics, Environmental Ethics, etc.) Satisfies the General Education Ethics, Western Cultural Tradition and Social Contexts and Institutions Requirements. Prerequisite: no first-year students or one course in philosophy. Cr 3.

PHI 232 Environmental Ethics
A critical survey of major contemporary discussions of human relationships to nature and the causes of the environmental crisis. Topics will include animal rights, biocentrism, deep ecology, ecofeminism, bio-regionalism, social ecology and sustainability. Special attention will be given to building an ethical vocabulary for interpreting the place of humans in relation to the non-human. Satisfies the General Education Ethics, Social Contexts and Institutions and Population and the Environment Requirements. Prerequisite: no first-year students or one course in philosophy. Cr 3.

PHI 233 Business Ethics
Corporations and commerce exert a powerful influence on contemporary societies. Examines ethical and political problems created by a commercial culture and discusses related ethical and political theories. Addresses such questions as: Is the only business of business to make a profit? What ethical obligations should corporations respect? Should business be expected to work for an environmentally sustainable society? Is our commercial culture just? What are the rights of employees and communities? What are the appropriate roles of business and politics in a just society? Case studies provide some real world examples for discussion. Prerequisite: no first-year students. Cr 3.

PHI 235 Biomedical Ethics
Investigates physician, nursing, and hospital codes of conduct, the physician/patient relationship, concepts of health/disease, procreation/abortion decisions, genetics/reproductive technologies, health resources/social justice allocations, and other ethical dimensions of medical practice. Satisfies the General Education Ethics, Western Cultural Tradition and Social Contexts and Institutions Requirements. Prerequisite: no first-year students. Cr 3.

PHI 236 Feminist Ethical, Social and Political Theory
A survey of the major feminist theoretical frameworks with emphasis on their respective practical implications in the areas of work, family life and sexuality. Satisfies the General Education Ethics, Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

PHI 240 Social and Political Philosophy
A critical study of major social and political philosophers from Plato to the present in light of their ethical and metaphysical systems. Topics include the problem of justice, the nature of the state and its relationship to other social institutions, and the individual. The primary focus will be on normative rather than descriptive theory. Satisfies the General Education Ethics, Western Cultural Tradition Requirements. Prerequisite: no first-year students or permission. Cr 3.

PHI 244 Philosophy of Law
Topics include the nature of law, the limits of law, and legal responsibility. Special emphasis on selected cases in American legal history, the law of contracts and torts, positivism, goal-based, rights-based and feminist jurisprudence. Satisfies the General Education Ethics, Western Cultural Tradition and Social Contexts and Institutions Requirements. Prerequisite: no first-year students or permission. Cr 3.

PHI 250 Formal Logic
An introductory course in modern symbolic logic. Techniques of deductive inference, including decision procedures and axiomatization, are studied in developing the propositional and predicative logics. Some attention is given to metalogic and the philosophy of logic. Satisfies the General Education Mathematics and Western Cultural Tradition Requirements. Prerequisite: no first-year students. Cr 3.

PHI 260 Philosophy of Language
A study of major contemporary theories of language. Topics include the nature of meaning, uses of language, conventions in language, the nature of grammar, syntax and semantics. Philosophers studied include Searle, Quine and Chomsky, among others. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: no first-year students or permission. Cr 3.

PHI 262 Philosophy of Art
An investigation of the nature and importance of aesthetic experience and its objects, the possibility of standards of art and taste, and the relation of art to other areas of experience. Topics include art and morality,

art and science, art and the environment. Readings from Tolstoy, Hume, Dewey, Langer, Bell, Danto, Dickie and Beardsley, among others. Satisfies the General Education Western Cultural Tradition and Artistic and Creative Expression Requirements. Prerequisite: no first-year students or permission. Cr 3.

PHI 265 Topics in Philosophy
A seminar relying on careful use of major philosophical resources, as well as attempts at fresh exploration of fundamental topics. Designed for students who have previously taken at least one course in philosophy. May be repeated for credit when different philosophers or problems are studied. Prerequisite: no first-year students or permission. Cr 3.

PHI 286 Religions and Philosophies of the East: Hinduism
The religious and philosophical foundations of Hinduism. Readings include the Vedas, the Bhagavad-Gita, the Upanishads, Yoga, and Vedanta. Satisfies the General Education Ethics and Cultural Diversity and International Perspectives Requirements. Prerequisite: no first-year students. Cr 3.

PHI 287 Religions and Philosophies of the East: Buddhism
The religious and philosophical foundations of Buddhism including the basic teachings of the Buddha (Four Noble Truths, Noble Eightfold Path, Dependent Origination, etc.), Buddhist ethics, Buddhist meditation, and some later religious and philosophical developments. Satisfies the General Education Ethics, Cultural Diversity and International Perspectives Requirements. Prerequisite: no first-year students. Cr 3.

PHI 312 History of Modern Philosophy
An interpretation of modern philosophy from Bacon and Descartes in the 17th century, developing through 18th century rationalism and empiricism and culminating in the system of Kant. Satisfies the General Education Ethics, Western Cultural Tradition Requirements. Prerequisite: One course in philosophy or permission. Cr 3.

PHI 317 Existentialism and Phenomenology
A critical study of the philosophical significance of individual choices and actions, including questions of personal identity, responsibility, authenticity and the ways in which those aspects of human experience are described. Readings include texts by Nietzsche, Heidegger, Sartre, Merleau-Ponty and contemporary authors, who conduct existential and phenomenological investigations of race, class and gender. Satisfies the General Education Ethics, Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Prerequisite: at least one course in philosophy, excluding PHI 103. Cr 3.

PHI 322 Philosophical Classics
A seminar dealing with an intensive study of the works of a major philosopher or school. Topics vary. May be repeated for credit. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 335 Contemporary Ethics
An analysis of current moral theories bearing on issues of gender equity, equality and ethical development. Included will be the contrasting ethics of care versus the ethics of right; virtue ethics versus principled ethics; pursuing moral relationships versus achieving moral autonomy; and other issues as they arise. Satisfies the General Education Ethics, Western Cultural Tradition Requirements. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 342 Marxist Philosophy I: The Philosophy of Karl Marx
Special attention is given to the Marxist theory of knowledge, ethics, political and social philosophy as formulated by Karl Marx in his theory of knowledge, ethics, economics and political philosophy. Additional readings from Friedrich Engels and Mao Zedong. Satisfies the General Education Ethics, Western Cultural Tradition Requirements. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 343 Marxist Philosophy II: Twentieth-Century Marxist Philosophy
An examination of major works in twentieth-century Marxist philosophy. Emphasized are the writings of Lenin, Luxemburg, Lukacs, Trotsky, Mao, Gramsci, Sartre, Habermas, and socialist feminists. Satisfies the General Education Ethics, Western Cultural Tradition, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 344 Theories of Justice
A critical study of recent theories of social justice including utilitarian, social contract, entitlement, communitarian, feminist and postmodern approaches, and spanning the political spectrum from libertarianism to socialism. Topics include distribution of wealth and power, affirmative action, censorship and pornography and international justice. Satisfies the General Education Ethics, Western Cultural Tradition and Writing Intensive Requirements. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 352 Philosophy of Natural Science
A critical study of scientific knowledge and how it is developed, with emphasis on relations between theory and experiment, the scientist and the scientific community, and contemporary science and its historical background. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 353 Philosophy of Mind
New developments in behavioral science such as Cognitive Science and Mind-Brain Identity Theory bring this science and philosophy even closer together than earlier developments such as S-R, Operant Conditioning or Cognitive Dissonance theories. The rise of Cognitive Science in philosophy, psychology, computer science, linguistics. Satisfies the General Education Western Cultural Tradition and Social Contexts and Institutions Requirements. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 364 Views of Self: East and West
An examination of major concepts of self: traditional views, both East and West; recent research from anthropology, sociology, psychology and other disciplines; Marxist, socialist, feminist and other critiques of dominant Western philosophical views; and comparative cultural studies. Satisfies the General Education Western Cultural Tradition and Writing Intensive Requirements. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 382 Theories of Myth
Examines theories of such interpreters of myth as Cassirer, Malinowski, Levi-Strauss, Jung and Eliade. Explores the renewed interest in myth in philosophy, religious studies, anthropology and other disciplines, as well as in the general culture. Satisfies the General Education Western Cultural Tradition, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: junior or senior standing or one course in philosophy or permission. Cr 3.

PHI 420 Topics in Recent Continental Philosophy
A critical study of topics addressed by major movements and thinkers in continental philosophy since the turn of the century. Readings include works by Husserl, Heidegger, Sartre, de Beauvoir, Merleau-Ponty, Levi-Strauss, Derrida, Lacan, Foucault, Habermas and Gadamer. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: one course in philosophy or permission. Cr 3.

PHI 432 Environmental Philosophy and Policy
A critical study of issues in environmental ethics and philosophy, with special emphasis on exploring ethical problems in areas such as technology, agriculture, economics, urban design and development, resource management, biodiversity or genetic engineering. Special attention will be given to discussion of environmental justice and the social and political implications of public policy. Satisfies the General Education Ethics, Social Contexts and Institutions, Population and the Environment and Writing Intensive Requirements. Prerequisite: junior, senior or graduate standing or PHI 232. Cr 3.

PHI 465 Advanced Topics in Philosophy
Individual and small group study of problems or systems of philosophical concern relying on careful use of major philosophical resources, as well as attempts at fresh exploration of fundamental topics. Topics vary. May be repeated for credit when different philosophers or problems are studied. Prerequisite: one course in philosophy or permission; junior or senior standing. Cr 3.

PHI 466 Readings in Philosophy
Individual study of a selected topic, agreed upon by the student and the instructor. Designed to address advanced issues not covered in normal offerings. Prerequisite: 9 hours in philosophy and permission of department and instructor. Cr 1-3.

PHI 475 Junior/Senior Philosophy Seminar
One semester of study is required for all philosophy majors. Normally offered each semester with topics of study varied depending upon the instructor and student interest. Provides upper-level philosophical study shared by philosophy majors and other students with an interest in advanced philosophical learning. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: 3 courses in philosophy; junior or senior standing. Cr 3.

PHI 566 Graduate Readings in Philosophy
Individual study of a selected topic, agreed upon by the student and the instructor. Designed to address advanced issues not covered in normal offerings or on a graduate level. Prerequisite: graduate standing and permission of department and instructor. Cr 1-3.

Physics (PHY)

PHY 101 Physics by Inquiry I
A basic "hands-on" inquiry course. Students make observations in the laboratory which provide a basis for constructing physical concepts and developing the reasoning skills necessary to apply them to simple phenomena. Each semester, two or three topics will be chosen from the following list: properties of matter, observational astronomy, heat and temperature, light and optics (including color), electricity and magnetism and kinematics. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Prerequisite: Education major or permission of instructor. Cr 4.

PHY 102 Physics by Inquiry II
A basic "hands-on" inquiry course. Students make observations in the laboratory which provide a basis for constructing physical concepts and developing the reasoning skills necessary to apply them to simple phenomena. Each semester, two or three topics will be chosen from the following list: properties of matter, observational astronomy, heat and temperature, light and optics (including color), electricity and magnetism and kinematics. (NOTE: PHY 101 is NOT a prerequisite for PHY 102. Different topics will be covered. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Prerequisite: Education majors or permission of instructor. Cr 4.

PHY 105 Descriptive Physics
A introduction to basic concepts of physics intended for the non-science major. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec w/dem 3, Lab 3. Cr 4.

PHY 107 Technical Physics I
An introduction to the basic concepts of mechanics and heat with illustrations taken from technical applications. Algebra and trigonometry are used. Intended for Engineering Technology students. NOTE: Because of overlapping subject matter, no more than four (4) degree credits are allowed for any combination of PHY 107, PHY 111 and PHY 121. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Rec 1, Workshop 1, Lab 2. Cr 4.

PHY 108 Technical Physics II
An introduction to the basic concepts of electricity, magnetism and light with illustrations taken from technical applications. Algebra and trigonometry are used. Intended for Engineering Technology students. NOTE: Because of overlapping subject matter, no more than four (4) degree credits are allowed for any combination of PHY 108, PHY 112 and PHY 122. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Rec 1, Workshop 1, Lab 2. Prerequisite: PHY 107. Cr 4.

PHY 111 General Physics I
An introduction to the principles of mechanics, energy, heat, sound and properties of matter. Designed for science majors as well as premedical and predental students. No calculus. A working knowledge of algebra and trigonometry is required. NOTE: Because of overlapping subject matter, no more than four (4) degree credits are allowed for any combination of PHY 107, PHY 111 and PHY 121. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec w/dem 2, Rec 1, Workshop 1, Lab 2. Cr 4.

PHY 112 General Physics II
A continuation of PHY 111. Introducing electricity, magnetism, optics and atomic, nuclear, and quantum physics. NOTE: Because of overlapping subject matter, no more than four (4) degree credits are allowed for any combination of PHY 108, PHY 112 and PHY 122. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec w/dem 2, Rec 1, Wkshp 1, Lab 2. Prerequisite: PHY 111. Cr 4.

PHY 121 Physics for Engineers and Physical Scientists I
An introductory calculus-based physics course, primarily serving students majoring in engineering or the physical sciences. Treats mechanics and acoustics. NOTE: Because of overlapping subject matter, no more than four (4) degree credits are allowed for any combination of PHY 107, PHY 111 and PHY 121. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec w/dem 2, Rec 1, Workshop 1, Lab 2. Corequisite: MAT 126. Cr 4.

PHY 122 Physics for Engineers and Physical Scientists II
A continuation of PHY 121 including electricity, magnetism, and optics. NOTE: Because of overlapping subject matter, no more than four (4) degree credits are allowed for any combination of PHY 108, PHY 112 and PHY 122. Satisfies the General Educa-tion Science Basic or Applied Sciences Requirement. Lec w/dem 2, Rec 1, Workshop 1, Lab 2. Prerequisite: PHY 121, MAT 126. Cr 4.

PHY 223 Special Relativity
The basic principles of special relativity with a primary emphasis on mechanics. Lec 1. Prerequisite: PHY 112 or PHY 122, MAT 126. Cr 1.

PHY 224 Special Relativity Laboratory
Experiments illustrating the major predictions of the Theory of Special Relativity. Prerequisite: PHY 229 and PHY 236 or permission of instructor. Cr 1 - 3.

PHY 229 Physical Measurements Laboratory I
Experiments primarily in modern physics. Normally taken with PHY 236. Lab 2. Prerequisite: PHY 112 or PHY 122, MAT 127. Cr 2.

PHY 230 Physical Measurements Laboratory II
Consists primarily of physical measurement techniques in mechanics. Normally taken with PHY 238. Lab 2. Prerequisite: PHY 112 or PHY 122, MAT 127. Cr 2.

PHY 236 Introductory Quantum Physics
The basic principles of quantum theory, atomic structure, nuclear structure, and some aspects of molecular, solid state, and elementary particle physics. Lec 3. Prerequisite: PHY 112 or PHY 122, MAT 127. Cr 3.

PHY 238 Mechanics
A detailed treatment of Newtonian mechanics. Newton's laws, work-energy theorem, impulse-momentum theorem, particle motion in a plane, linear oscillator, coupled oscillators, rigid body rotation, small oscillations and potential methods. Lec 3. Prerequisite PHY 111 or PHY 121. Corequisite: MAT 259 or MAT 258. Cr 3.

PHY 441 Physical Electronics Laboratory
Theories and practices in the measurement of physical quantities using both analog and digital techniques. Primarily for physics and engineering physics majors; others admitted by permission. Satisfies the General Education Writing Intensive Requirement. Lab 4. Cr 2.

PHY 442 Modern Experimental Physics
Experiments selected from various topics in physics including x-ray diffraction, microwaves, nuclear magnetic resonance, Hall effect, etc. Students develop their own experiments. Normally taken by junior physics and engineering physics majors. Satisfies the General Education Writing Intensive Requirement. Prerequisite: PHY 236, MAT 228. Cr 2.

PHY 447 Molecular Biophysics
An introduction to physical properties of biological macromolecules including proteins, nucleic acids and membranes. Solution thermodynamics developed as needed. Some statistical mechanics introduced. Topics include macromolecular structure, dynamics and functions, inter- and intra-molecular interactions, ligand binding equilibria, helix-coil transitions, physical techniques used in biophysics such as calorimetry, X-ray diffraction, optical and magnetic resonance spectroscopy. Four credit version contains additional term project to be arranged with instructor. Prerequisite: PHY 112 or PHY 122, MAT 126, CHY 121 or permission. Cr 3-4.

PHY 454 Electricity and Magnetism I
An intermediate level course in the fundamentals of the theory of electricity and magnetism. Treats electrostatics and magnetostatics, both in vacuum and in matter. Rec 3. Prerequisite PHY 112 or PHY 122. Corequisite: PHY 476. Cr 3.

PHY 455 Electricity and Magnetism II
A continuation of PHY 454. Treats electrodynamics by developing Maxwell's equations and applying them to systems of general interest. Rec 3. Prerequisite: PHY 454. Cr 3.

PHY 462 Physical Thermodynamics
A theoretical study of the structure and concepts of equilibrium thermodynamics including the thermodynamic descriptions of the properties and phases of matter, analysis of processes and practical applications. Normally taken as a junior or senior elective by students in the sciences or engineering. Four credit version contains additional term project to be arranged with instructor. Rec 3. Prerequisite: PHY 111 or PHY 121, MAT 228. Cr 3-4.

PHY 463 Statistical Mechanics
Introduces statistical mechanics and thermodynamics with examples chosen from magnetic systems, ideal gases, metals, superfluidity, chemical reactions, phase transformations, mixtures, semiconductors, kinetic theory or related topics. Normally taken as a junior or senior elective by students in the sciences or engineering. Rec 3. Prerequisite: PHY 236, MAT 258 or MAT 259. Cr 3.

PHY 469 Quantum and Atomic Physics
Introductory quantum mechanics applied to simple systems and molecules. Wavepackets, Schroedinger equation, operator methods and angular momentum. Rec 3. Prerequisite: PHY 236, PHY 476. Cr 3.

PHY 470 Nuclear Physics
Properties of the nucleus, nuclear reactions, radioactive decay, nuclear models, nuclear reactors and nuclear health physics. May be taken without the laboratory, PHY 471. Rec 2. Prerequisite: PHY 236, MAT 259. Cr 2.

PHY 471 Nuclear Physics Laboratory
Laboratory exercises to accompany PHY 470. Lab 2. Prerequisite Corequisite: PHY 470 or permission of instructor. Cr 1.

PHY 472 Geometrical and Fourier Optics
Covers geometrical optics, refraction and reflection at plane and spherical surfaces, optical instruments; Fourier optics, interference of waves and diffraction by a single and a double aperture; Lasers - theory of their operation, mode locking and pulse formation. Rec 3. Prerequisite PHY 112 or PHY 122; Corequisite: MAT 228. Cr 3.

PHY 473 Modern Optics Laboratory
Laboratory exercises to accompany PHY 472, Geometrical and Fourier Optics. Lab 2-4. Prerequisite Corequisite: PHY 472 or permission of instructor. Cr 1-2.

PHY 476 Mathematical Methods in Physics
Mathematical methods with applications to physics. Topics include: vector algebra volume and surface integral, Del operator, Gauss' and Stokes' theorems. Matrices and elgenvalue problems. Complex numbers, Laplace's equation and boundary value problems. Prerequisite: MAT 259 Cr 3.

PHY 480 Physics of Materials
A senior level introductory course in the physics of materials, primarily solid state physics. Structural, mechanical, electrical, magnetic, and optical properties of materials are discussed. Rec 3. Prerequisite: PHY 236, PHY 455 or permission of instructor. Cr 3.

PHY 481 Project Laboratory in Physics I
An individual project laboratory tailored to the student's particular interests. In consultation with a faculty sponsor, each student is expected to develop a suitable project, approved by the sponsor and the course coordinator. The project may or may not be related to the sponsor's research. Full written reports are required. Satisfies the General Education Capstone Experience Requirement. Lab 6. Prerequisite: Open to senior physics and engineering physics majors and others by permission of instructor. Cr 3.

PHY 482 Project Laboratory in Physics II
Completion of the project begun in PHY 481. Lab 6. Prerequisite: PHY 481. Cr 3.

PHY 488 Physics Seminar I
A senior level course required of all physics and engineering physics majors. Students prepare written reports on scientific topics of their own selection and give formal talks before an audience of classmates and faculty. Intended to develop the ability to discuss a scientific topic before a scientifically trained audience. Satisfies the General Education Capstone Experience Requirement. Cr 1.

PHY 489 Physics Seminar II
A continuation of PHY 488. Prerequisite: PHY 488. Cr 1.

PHY 495 Engineering Physics Practice
Supervised engineering practice in an industrial setting. Placement is off-campus and usually of several month's duration. Prior approval of department chairperson is

required. Completion of 16 hours of physics. Prerequisite: Sophomore standing (successful completion of 16 hours of physics courses) and a declared major in Engineering Physics. Cr 1-6.

PHY 496 Field Experience in Physics
Supervised research or development in an academic laboratory, government laboratory, or industrial environment. Placements are usually off-campus and of several month's duration. Prior approval of the department chairman is required. Prerequisite: Sophomore standing (successful completion of 16 hours of physics courses) and a declared major in Engineering Physics. Cr 1-6.

PHY 497 Topics in Physics
Selected topics in areas not already covered by regular course offerings in the department. Primarily for undergraduates. Cr Ar.

PHY 499 Problems in Physics
A thesis project primarily for undergraduates and ordinarily of an experimental nature. Cr 1-3.

PHY 500 Topics in Materials Science and Technology
Prerequisites: PHY 463, PHY 469, PHY 480 or their equivalents. Cr 1-3.

PHY 501 Mechanics
Covers kinematics and dynamics of particle and rigid body motion, Lagrange's equations, variational principles, Hamilton's equations, canonical transformations, Hamilton-Jacobi theory. Prerequisite: PHY 238 or equivalent. Cr 3.

PHY 502 Electrodynamics I
Topics include boundary-value problems in electrostatics, electrostatic energy, multipoles, dielectrics and magnetostatics. Prerequisite: PHY 455 or equivalent, partial differential equations or PHY 574. Cr 3.

PHY 503 Quantum Mechanics I
Topics include Dirac notation, state vectors and operators, one dimensional systems, angular momentum, central forces, perturbation theory, scattering. Prerequisite: PHY 501 or permission of instructor. Cr 3.

PHY 510 Graduate Laboratory
Experience with sophisticated techniques and specialized equipment acquaints students with different areas of experimental physics. For graduate students in physics and for scientists and engineers in allied studies or industry. Prerequisite: graduate standing in physics, chemistry, electrical engineering, or permission of instructor. Cr Ar.

PHY 512 Statistical Mechanics
A study of macroscopic behavior of matter derived from a statistical consideration of microscopic properties of systems, as well as relationships to Thermodynamics and Kinetic Theory. Prerequisite PHY 462 or equivalent. Corequisite: PHY 503. Cr 3.

PHY 513 Physical Measurement and Data Analysis With Microcomputers
Computer control of experiments and instrumentation, data acquisition and data analysis. Culminates in individualized final project. Open to non-physics students. Requires some programming and electronics background. Lec 2, Lab 2. Prerequisite: permission of instructor. Cr 3.

PHY 574 Methods of Theoretical Physics I
Topics may include linear algebra, complex analysis, theory of differential equations, special functions, Green's functions, integral transforms calculus of variations, with applications from physics. Prerequisite: permission of instructor. Cr 3.

PHY 575 Methods of Theoretical Physics II
Advanced topics in mathematical physics of special interest. May include chaos, complex analysis, theory of integral equations, tensor analysis, elements of group theory, Green's functions theory. Prerequisite: PHY 574 or equivalent. Cr 3.

PHY 588 Graduate Seminar
Report and discussion of recent developments in Physics and related fields based on the literature or results of current investigation. Cr Ar.

PHY 598 Special Topics in Theoretical or Experimental Physics
Specific topics determined by current interests of students and staff. Offered on demand with approval of the Department Chairperson. Cr Ar.

Political Science (POS)

POS 100 American Government
Introduces the major principles, structures, processes and policies of United States government. Covers the Constitution and its development, civil liberties, federalism, the role of political parties and interest groups, and the nature of the presidency, the bureaucracy, the Congress and the national courts. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

POS 120 Introduction to World Politics
A study of contemporary international politics focusing on the interaction of nation-states and including a review of the patterns of global politics from World War II to the present. Satisfies the General Education Western Cultural Tradition and Cultural Diversity and International Perspectives Requirements. Cr 3.

POS 201 Introduction to Political Theory
An introduction to the fundamental questions of political philosophy—what is justice? how ought we to live our lives? what is the best regime?—through detailed study of a few central books in the history of political thought, such as Plato's Republic and Machiavelli's Prince. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions and Ethics Requirements. Cr 3.

POS 203 American State and Local Government
Examines the structure and activities of subnational governments, with particular attention to state modernization, intergovernmental relations, and comparisons between Maine and other states. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

POS 241 Introduction to Comparative Politics
Provides an introduction to the major themes of comparative politics, including: comparative political legacies, processes of modernization, comparative governmental institutions, modern political parties and interest groups, comparative policymaking processes, and problems of establishing and maintaining democratic government. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Cr 3.

POS 243 Canadian Government and Politics
Provides a historical background to the development of the Canadian political system. Introduces the institutions and processes of Canadian government, federalism, political parties, and interest groups. Considers major public policy issues in contemporary Canada. Satisfies the General Education Cultural Diversity and International Perspectives, Social Contexts and Institutions and Western Cultural Tradition Requirements. Cr 3.

POS 273 International Relations
Issues and structures that shape contemporary international relations. Topics include philosophical schools of thought in international relations, instruments of national power, the role of international organizations and international political economy. Satisfies the General Education Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: POS 100 or POS 120. Cr 3.

POS 282 Introduction to American Law
Examines the nature and function of law in America, emphasizing its evolution and incorporation as a dynamic social instrument.

Prerequisite: sophomore, junior or senior standing. Cr 3.

POS 301 Classical Political Thought
A survey of ancient political philosophy through detailed study of selected writings of Plato, Xenophon, Aristotle, Thucydides and others. Satisfies the General Education Ethics, Western Cultural Tradition, Social Contexts and Institutions and Writing Intensive Requirements. Prerequisite: POS 201 or permission or junior or senior standing. Cr 3.

POS 302 Medieval Political Thought
A survey of medieval political thought during the European middle ages (5th to 15th centuries) through detailed study of selected writings of Augustine, John of Salisbury, Aquinas, Marsilius, Dante and others. Satisfies the General Education Ethics, Western Cultural Tradition, Social Contexts and Institutions, Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: junior or senior standing or permission. Cr 3.

POS 303 Early Modern Political Thought
A survey of early modern political philosophy from the Renaissance to the Enlightenment through detailed study of selected writings of Machiavelli, Descartes, F. Bacon, Hobbes, Locke and others. Satisfies the General Education Ethics, Western Cultural Tradition, Social Contexts and Institutions and Writing Intensive Requirements. Prerequisite: POS 201 or junior or senior standing. Cr 3.

POS 304 American Political Thought
The development of political ideas in America from the founding period to the present as expounded in the writings of American statesmen and political theorists, and foreign commentators such as Tocqueville. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: junior or senior standing or permission. Cr 3.

POS 305 Late Modern Political Thought
A survey of modern political philosophy from the French Revolution to the twentieth century through detailed study of selected writings of Rousseau, Hegel, Marx, Mill, Nietzsche, and contemporary authors. Satisfies the General Education Ethics, Western Cultural Tradition, Social Contexts and Institutions and Writing Intensive Requirements. Prerequisite: POS 201 or junior or senior standing. Cr 3.

POS 335 Major Governments of Western Europe
The political traditions, parties, governmental structures, and special political problems of Great Britain, France and Germany. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: POS 100. Junior or senior standing. Cr 3.

POS 336 Government and Politics in Russia
Examines the historical Russian political legacy, the experience of Soviet rule from 1917 until 1991, and explores in-depth current domestic and foreign politics in the Russian Federation. Focuses primarily on the development of the post-Soviet Russian political system. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: POS 100. Junior or senior standing. Cr 3.

POS 337 Government and Politics in Eurasia
Examines contemporary government and politics in Eurasia, the general region from Central Asia to the Balkan peninsula of Europe. Major themes will include the formation of independent nation-states in Central Asia, the Caucasus mountain region and Ukraine following the dissolution of the USSR in 1991; and government and politics in Turkey. Also considers patterns of international relations within Eurasia and relations between these countries and the larger world. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: Junior or senior standing or instructor's permission. Cr 3.

POS 344 Public Policy in Canada
An analysis of policy making structures with emphasis on the Prime Minister, the Prime Minister's Office, the Cabinet, the Privy Council Office, and other central agents. Relations between the federal and provincial executives are also discussed. Policy making in specific issues of current interest considered. Satisfies the General Education Cultural Diversity and International Perspectives, Social Contexts and Traditions and Western Cultural Tradition Requirements. Prerequisite: Six hours of political science. Cr 3.

POS 352 American Public Opinion
Covers the role of public opinion in shaping the American political system. It focuses on defining and measuring citizen opinion, the way citizens develop their political views and the linkages between public opinion and public policy. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 359 Topics in American Government
Offers a detailed examination of a selected topic in American politics. May be repeated for credit. Prerequisite: POS 100. Cr 3.

POS 362 Maine Government
Analyzes changes in the institutions and policies of the state of Maine in recent times. Covers the role of Maine in the federal system, the impact of institutional and organizational reform, and state policymaking. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 372 Canadian Foreign Policy
Canadian theory and practice of foreign policy, with emphasis on the major international problems which Canada faces today. Special attention is directed to Canada's relations with the United States and other Western Hemisphere countries. Satisfies the General Education Cultural Diversity and International Perspectives, Social Contexts and Institutions and Western Cultural Tradition Requirements. Prerequisite: POS 100 or POS 120 or permission of the instructor. Cr 3.

POS 374 American Foreign Policy
American foreign policy and the major international problems facing the United States today. Special focus will be on United States relations with Europe, Russia, Japan and the Third World. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: POS 100 or POS 120. Cr 3.

POS 375 United States and the Middle East
Survey of factors and forces that influence American foreign policy in the Middle East, with special emphasis on the Palestinian-Israeli conflict, relations with Iran and U.S. military presence in the Persian Gulf. Policies of various American presidents from Truman to present will be discussed and analyzed. Cr 3.

POS 377 International Law
Examines international legal principles relating to state territory and jurisdiction, the oceans, human rights and war. Prerequisite: POS 100 or POS 120 and junior or senior standing. Cr 3.

POS 381 Political Parties and Elections
Analyzes the development of, and current theories regarding, political parties and elections in American politics. Topics include theories of party realignment, voting behavior, party composition and behavior, and the relationship between parties, elections and democracy. Covers both presidential and congressional elections. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 383 American Constitutional Law
Examines the evolving nature of the U.S. Constitution through consideration of major Supreme Court decisions in areas such as federalism, legislative power, executive authority and judicial autonomy. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 384 American Civil Liberties
Examines the tension between individual rights and the social order through consideration of major Supreme Court decisions involving the Bill of Rights and the Fourteenth Amendment. Satisfies the General Education Ethics, Western Cultural Tradition, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 385 Women and Politics
Examines women as citizens and leaders and also examines movements to increase women's public role in U.S. politics. Considers racial, ethnic, partisan and class dimensions of those movements and political activities and the influence of government policies on
gender relations. Satisfies the General Education Social Contexts and Institutions and Writing Intensive Requirement. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 401 Seminar in Political Theory
Detailed examination of the text(s) of a classic thinker in the history of political theory. May be repeated for credit. Satisfies the General Education Ethics, Western Cultural Tradition, Social Contexts and Institutions and Writing Intensive Requirements. Prerequisite: One course in political theory or permission of the instructor. Cr 3.

POS 450 Mass Media in U.S. Politics
Analyzes the performance of the mass media in the United States in informing the public about politics. Topics include the factors influencing the content of news, the causes and effects of any systematic biases or deficiencies in the political information made available to the public and freedom of the press issues. Special attention given to current political news coverage in the media. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 451 The American Congress
Examines the legislative process and its components, with special attention to congressional elections, the committee structure, the impact of institutional reform and the influence of bicameralism. Satisfies the General Education Ethics and Social Contexts and Institutions Requirements. Prerequisite: POS 100 and junior or senior standing. Cr 3.

POS 454 The U.S. Presidency
Examines presidential leadership in contemporary American politics. Devotes special attention to institutional, constitutional, and historical influences on the presidency. Other topics include: presidential decision-making, psychological aspects of the presidency, and the sources of cooperation and conflict between the legislative, executive, and judicial branches of government. Analysis of the president's role in foreign and domestic policy. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: POS 100 or junior or senior standing. Cr 3.

POS 469 Politics of the Middle East
The politics of the Middle East from World War I to the present. Special attention to problems of Palestine and the creation of Israel, the interplay between the politics of the great powers and Middle East conflicts, and problems of nationalism, modernization, and revolution. Prerequisite: POS 100 or POS 120 and junior or senior standing. Cr 3.

POS 474 Instruments of American Foreign Policy Making
Examines the formulation and implementation of American foreign policy. Special focus will be placed on American Political culture; Presidential and congressional powers in foreign policy; government bureaucracies, such as the Departments of State, Defense and Treasury; and conceptual and theoretical approaches to policy making. Satisfies the General Education Social Contexts and Institutions Requirements. Prerequisite: POS 100 or POS 120 and junior or senior standing. Cr 3.

POS 475 International Security
Examines national and international factors affecting the survival and security of states. Topics include components and use of military power, arms control and proliferation, the cause and resolution of conflict, negotiation and decision-making processes and structures. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: POS 100 or POS 120 and junior or senior standing. Cr 3.

POS 476 Seminar in World Politics
A topical survey of conceptual and theoretical developments in the field of world politics. Examination of these developments in the context of contemporary issues and controversies will be emphasized. May be repeated for credit. Prerequisite: POS 100 or POS 120 and junior or senior standing. Cr 3.

POS 493 American Politics Internship
Provides students with the opportunity to gain experience in a department or agency at the national, state, or local level, or to conduct a major research project. Reports and a research paper are normally required for an agency internship. Prerequisite: permission. Cr 3 or 6.

POS 495 Congressional Internship
Assignment to the Washington, D. C. office of a member of Congress, normally from the Maine delegation, during the spring semester. Readings and reports are required in addition to performing staff work in a congressional office. The internship is open to juniors and seniors on a competitive basis; applications and interviews are conducted each fall to fill the spring internship positions. Prerequisite: permission. Cr 6 or 9.

POS 496 International Affairs Internship
Provides students the opportunity to gain experience in a department or agency, either in the United States or abroad, that deals with international affairs. Students may not receive more than 9 credit hours for this internship. Cr 6 or 9.

POS 498 Independent Study in Political Science
Provides students the opportunity to work closely with an individual member of the faculty, either as a research assistant or as the author of a major independent study paper. May be repeated for credit. Prerequisite: permission. Cr 3.

POS 499 Senior Seminar in Political Science
Examines selected theoretical and empirical topics in Political Science. Assumes a knowledge of, and builds upon, a body of knowledge developed by students in the major and represents the culmination of majors' concentration of study within the major. Students can write an Honors thesis instead of taking the capstone course. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: senior standing and political science/international affairs-political science majors. Cr 3.

POS 531 Topics in Comparative Politics
Examines various issues in comparative politics such as comparative democratization, regime types and conflict management, with emphasis on readings in the theoretical literature in the discipline of comparative politics through class discussions and individual research. May be repeated for credit. Cr 3.

POS 549 Seminar in American Politics
Examines theoretical and practical issues in American politics in a small group setting, with emphasis on individual research and class participation. Cr 3.

POS 596 Directed Research in Political Science
An individualized research course for graduate

students seeking to explore an advanced research topic in political science. May be repeated for credit. Prerequisite: graduate standing or permission of instructor. Cr 3.

Pulp and Paper (PPA)

PPA 264 Introduction to the Pulp and Paper Industry
Considers the manufacture of paper from fibrous raw materials to the processing of finished products. Emphasis on papers produced from wood, non-wood, and secondary fibers. Recommended for CHE/BLE students taking the cooperative work experience within the Pulp and Paper industry. Lec 3. (Spring.) Prerequisite: CHB 200. Cr 3.

PPA 465 Pulp Technology
The chemical and engineering principles of manufacturing various wood pulps. Rec 3. (Fall.) Prerequisite: Junior standing, CHB 200, or permission. Cr 3.

PPA 466 Paper Technology
The chemical and engineering principles of paper manufacturing from the preparation of fiber furnishes to the final stage of drying. Rec 3. (Spring.) Prerequisite: CHB 200 or permission. Cr 3.

PPA 473 Pulp Manufacture and Testing
Problem-oriented laboratory course involving the process design criteria for the production of mechanical, semi-chemical and chemical wood pulps. Lab 8. (Fall.) Prerequisite: PPA 465 (may be taken concurrently.) Cr 4.

PPA 474 Paper Manufacture and Testing
A problem-oriented laboratory course involving the process design of paper making and finishing systems. Lab 8. (Spring.) Prerequisite: PPA 466 (may be taken concurrently.) Cr 4.

PPA 499 Undergraduate Thesis
Original investigation of a pulp and paper problem and reporting of the results. (Offered by arrangement.) Prerequisite: permission. Cr Ar.

Parks, Recreation and Tourism (PRT)

PRT 225 Readings in Outdoor Recreation
Selected authors and literature will be studied and discussed to familiarize PRT majors with the breadth and complexity of the field. Satisfies the General Education Social Contexts and Institutions and Writing Intensive Requirements. Rec 3. Cr 3.

PRT 345 Special Problems
Original investigation in Recreation Resources, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

PRT 352 Forest Recreation Management
A broad yet comprehensive study of the theories, problems and techniques of managing recreation systems in both the public and private sectors. Emphasis given to current recreation management issues. Rec 3. Cr 3.

PRT 355 Visitor Behavior and Management
Study of outdoor recreation user behavior as it impacts the planning, design and management of outdoor recreation opportunities. Emphasis on social/psychological principles that alter behavior and satisfaction in recreation experiences. Rec. 3. Cr 3.

PRT 394 Cooperative Education
Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission. Cr 1-16.

PRT 395 Internship
A professional activity under the general supervision of an experienced professional with a high degree of responsibility placed on the student. Learning objectives are preestablished and agreed upon between the faculty coordinator and the placement supervisor. Not normally repeated. Cr Ar.

PRT 396 Field Experience
A field experience is a professional activity participated in by students under the supervision of a practicing professional in the field. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of a faculty member for academic credit for the learning involved. May be repeated. Cr Ar.

PRT 452 Environmental Interpretation
A mid-level course in the principles and techniques of environmental interpretation, with special reference to parkland settings. Interpretive planning, interpretation of complex subjects and controversy, ethics, special populations and research are discussed. Students are required to demonstrate their understanding and application of interpretive principles using examples from their field. Prerequisite: PRT 352. Junior or senior standing or permission of instructor. Cr 4.

PRT 470 Principles of Tourism Management and Planning
Focus is on the application of tourism management and planning principles to natural environments and creating sustainable tourism environments/economies; tourism impacts on sensitive environments; needs of tourists, developers, managers and the local residents; and trends in tourism, with emphasis on the Northeast. Rec 3. Prerequisite: PRT 352. Cr 3.

PRT 480 Wilderness and Wild and Scenic River Management
Development of a historical overview of wilderness and river management in the United States. Basic concepts of the unique management problems and opportunities associated with wilderness and wild and scenic river systems. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: PRT 352. Cr 3.

PRT 491 Senior Seminar: Issues and Ethics in Parks, Recreation and Tourism
Selected issues and trends facing the recreation and parks profession today. Serves as the capstone experience, integrating all of the course work for Parks, Recreation and Tourism students. Satisfies the General Education Ethics and Capstone Experience Requirements. Prerequisite: PRT 352, senior standing and permission. Cr 3.

Plant, Soil and Environmental Sciences (PSE)

PSE 100 Plant Science
Response of agricultural and horticultural plants to environmental factors such as moisture, temperature, light and soil fertility and pests. Manipulation of the environmental factors in order to improve plant growth is discusses. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 2. Cr 4.

PSE 101 Cropping Systems
Principles and practices of various cropping systems involving agricultural crops. Weekly guest lecturers discuss major species of the Northeast. Rec 4. (Spring-odd.) Satisfies the General Education Writing Intensive Requirement. Prerequisite: PSE 100 or permission. Cr 4.

PSE 105 Principles of Sustainable Agriculture
Basic design principles and examples of environmentally and economically sustainable agricultural systems. The course will describe the use of synthetic fertilizers and pesticides, but emphasis will be placed on identifying management practices that a) biologically improve soil structure, organic matter content, and fertility; and b) minimize

or eliminate the need for chemical interventions for control of insect pests, pathogens, and weeds. Satisfies the General Education Population and the Environment Requirement. Rec 3. Cr 3.

PSE 140 Soil Science
Considers the chemical, physical and biological properties of soil, as well as the origin, management and interrelationships of soils to plant growth. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Rec 3. Prerequisite: BMB 207 or CHY 121. Cr 3.

PSE 141 Soil Science Lab
A series of practical laboratory exercises providing hands-on experience with soil measurements and information use. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Prerequisite: BMB 207 or CHY 121. Cr 1.

PSE 203 Weed Identification
Aims to provide students with identification skills and knowledge of the basic biology of weedy plants common to agricultural, horticultural, turf and roadside environments. Lec 1, Lab 2. Cr 2.

PSE 250 Forest Soil Science
Fundamentals of soil science in the context of forest ecosystems including development, properties, and management. Linkages between soils and forest growth, surface and ground water, and the atmosphere are emphasized. Rec 3. Prerequisite: CHY 121. Cr 3.

PSE 305 Problems in Plant, Soil and Environmental Sciences
Opportunity is provided for specialization in specific areas of plant, soil and environmental sciences. Prerequisite: permission. Cr Ar.

PSE 320 Soil Organic Matter Management
Fundamental aspects of soil organic matter management. Principles of plant residue decomposition, tillage, use of organic soil amendments and environmental and agricultural implications of human soil management. Lec 3. (Spring - even.) Prerequisite: PSE 140, CHY 121 or BMB 207. Cr 3.

PSE 344 Soil and Water Quality
A consideration of the human-influenced and natural processes affecting soil quality and water quality. The linkages between soil and water quality will be emphasized. State and federal regulation of soil and water quality will be discussed. Class time will be spent primarily in lecture and group work. There will be weekly field trips and laboratory exercises. Prerequisite: PSE 140, PSE 141 or PSE 250 or permission. Cr 3.

PSE 396 Field Experience in Plant, Soil and Environmental Sciences
An approved program of work experience which contributes to the academic major and for which academic credit is given. Students may work part time or full time for a semester in a job related to their professional career goals. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission. Cr 1-16.

PSE 403 Weed Ecology and Management
Ecological principles and their application in non-chemical and reduced input weed management strategies. Lec 2, Lab 2. (Fall - odd.) Prerequisite: PSE 100, PSE 101 and BIO 319 or WLE 200; or equivalents. Cr 3.

PSE 413 Wetland Delineation and Mapping
Focuses on delineating and mapping wetlands using procedures accepted by the Army Corps of Engineers and the State of Maine. Students will learn to identify wetland boundaries using the 3-parameter approach; soils, vegetation and hydrology, currently required by federal and state laws regulating wetlands. Satisfies the General Education Applications of Scientific Knowledge Requirement. Lec 3, Lab 3. (Fall - odd.) Prerequisite: BIO 100, PSE 140 or PSE 250 or permission. Cr 4.

PSE 423 Wetland Ecology and Conservation
Focuses on major concepts in wetland ecology, classification, policy and regulation and issues in wetland conservation. Lecture material focuses on wetland communities associated with hydric soils (forested, shrub and emergent ecosystems). Lecture and field studies. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 3, Lab 3. (Fall - even.) Prerequisite: WLE 200 or equivalent or permission. Cr 4.

PSE 440 Soil Chemistry and Plant Nutrition
A study of the origin and nature of soil chemical properties and their effects on plant growth, the source and function of essential nutrients, the chemistry of fertilizer and lime reactions in soils. The environmental consequences of fertilization and other soil management practices are emphasized. Lec 3. Prerequisite: PSE 140 or PSE 250 and CHY 132 or BMB 208. Cr 3.

PSE 442 Soil Genesis, Morphology and Classification
The study of formation of soils and the categorization of soils as natural bodies. The factors of soil formation and biogeochemistry of soils will be presented using examples from around the world. Lec 3. (Fall - even.) Prerequisite: PSE 140 or PSE 250 or permission. Cr 3.

PSE 444 Field Soil Morphology and Classification Techniques
Soil profile description, classification and land use interpretation techniques taught in the field. The focus of this class is on soils of the state of Maine. One weekend field trip planned. On site lectures will include descriptions of the soil/geomorphology relationships. Course ends mid semester. Lab 6. (Fall - even.) Prerequisite PSE 140 or PSE 250 or permission. Corequisite: PSE 442. Cr 1.

PSE 457 Plant Pathology
Principles of plant disease. Lec 3, Lab 1. Prerequisite: BIO 100. Open to juniors and seniors. Cr 4.

PSE 469 Soil Microbiology
Soil microorganisms and their relevance to ecosystem processes (nutrient cycling, energy flow, etc.) Lec 3, Lab 3. Prerequisite: BIO 100 and BMB 207 or CHY 121/123 or permission. Cr 4.

PSE 479 Crop Ecology and Physiology
An examination of agricultural systems focusing on the physiological responses of plant communities and the critical role of nitrogen, water relations and photosynthesis within these communities. Extensive reading and a written project are required. Lec 3. (Spring - even.) Prerequisite: PSE 100, PSE 105 or permission. Cr 3.

PSE 509 Experimental Design
Principles of research in biological sciences, design of experiments, statistical analysis and interpretation of data. Lec 3, Lab 2. Cr 4.

PSE 510 Plant Population Ecology
Dispersal, dormancy, recruitment, competitive interactions, effects of herbivores and pathogens, ecotypic differentiation and micro-evolution, patterns of resource allocation toward vegetative growth and reproduction. (Fall - even.) Prerequisite: BIO 319 or permission. Cr 3.

PSE 530 Isotope Techniques for Ecosystem Studies
Presents the principles and techniques of stable isotope analysis in ecological disciplines, with examples from a variety of ecosystem ecologists, soil scientists and hydrologists who have used isotope analysis in their studies. (Spring - even.) Prerequisite: BIO 550 or permission. Cr 3.

PSE 533 Advanced Studies in Wetland Delineation and Mapping
Focuses on delineating and mapping wetlands using Army Corps of engineers and State of Maine procedures. Identification of wetland boundaries using the 3-parameter approach; soils, vegetation and hydrology, currently

required by federal and state laws regulating wetlands. Requires completion of a field-based wetland delineation project. Lec 3, Lab 3. (Fall - odd.) Cr 4.

PSE 546 Chemistry of Soils
Covers the chemistry of inorganic and organic components of soils, soil solution equilibria and sorption reactions, emphasizing laboratory exercises. Lec 1, Lab 6. (Spring - even.) Prerequisite: PSE 140, CHY 240 or permission. Cr 4.

PSE 549 Advanced soil Microbiology
Soil microorganisms and their relevance to ecosystem processes (nutrient cycling, energy flow, etc.) (Fall - even.) Prerequisite: BMB 322 or permission. Cr 4.

PSE 569 Techniques in Microbial Ecology
Laboratory exercises and concepts designed to introduce students to the activity, diversity and physiology of soil and aquatic microorganisms. Use of instrumentation and assays relevant to the ecology of microorganisms. Lec 3, Lab 1. (Spring - even.) Prerequisite: PSE 469, other undergraduate microbiology or permission. Cr 3.

PSE 580 Scientific Communications I
Presentations of research proposal to faculty and graduate student peers. Covers the use of scientific graphic and presentation software. Cr 1.

PSE 581 Scientific Communications II
Literature review and poster presentation of scientific ecological and environmental research topics. Prerequisite: permission. Cr 1.

PSE 597 Special Topics in Plant, Soil and Environmental Sciences
Advanced study of topics in plant, soil and environmental sciences. Prerequisite: permission. Cr Ar.

Psychology (PSY)

PSY 100 General Psychology
Lecture discussions of basic psychological processes, including learning, perception, motivation and emotion, higher mental processes, individual differences, personality and additional selected topics. Satisfies the General Education Social Context and Institutions Requirement. Cr 3.

PSY 305 Psychological Aesthetics
Topics include psychological factors related to the creation of art and to the perception and appreciation of aesthetic objects of all types. Also covers psychological bases of historical change in the content and style of the arts. Satisfies the General Education Western Cultural Tradition Requirement. Prerequisite: PSY 100. Cr 3.

PSY 308 Theories of Personality
Examines the chief contemporary approaches to the study of personality including critical issues in personality. Also considers assessment techniques and research methods. Prerequisite: PSY 100. Cr 3.

PSY 312 Abnormal Psychology
Examines the origin, development, and manifestations of abnormal behavior with emphasis on the biological, social, and psychological determinants of deviant behavior. Prerequisite: PSY 100. Cr 3.

PSY 323 Psychology of Childhood
A systematic study of childhood behavior and psychological development. Emphasis on principles underlying development, methods of child study and practical implications. Prerequisite: PSY 100. Cr 3.

PSY 324 Psychology of Adolescence
A study of adolescent development in the physical, intellectual, emotional, and social spheres. Adolescent personality and problems of adjustment considered in relation to the family, the school and the community, and the world of work. Covers delinquency and abnormality in adolescents. Prerequisite: PSY 100. Cr 3.

PSY 325 Psychology of Infant Development
Surveys current concepts and findings in infancy research. Focus will address perinatal behavioral adaptations, development of motor and sensory systems, early parent-infant interactions, cognition and language acquisition and assessment methods for evaluating developmental delay. Prerequisite: PSY 323. Cr 3.

PSY 330 Social Psychology
An introduction to the study of social behavior from a psychological perspective. Representative topics include culture and personality, attitude formation and change, conformity, leadership and prejudice. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: PSY 100. Cr 3.

PSY 332 Environmental Psychology
The study of the transactions between people and their physical environments. Representative topics include territoriality, crowding, personal space, privacy, architectural design of space and self-control and development phenomena. Prerequisite: PSY 100. Cr 3.

PSY 341 Statistics in Psychology I
A survey of techniques used to obtain, display, analyze, and interpret data in psychology. The lecture section will emphasize the theoretical bases of the topics, while the recitation section will allow students to focus upon the computational procedures involved in the various statistical techniques. Satisfies the General Education Mathematics Requirement. Lec 3, Rec 2. Prerequisite: PSY 100. Cr 4.

PSY 345 Principles of Psychological Research
Discussion of various research methods used in the scientific approach to the study of behavior. Laboratory will demonstrate these methods and develop skills in statistically analyzing data using computers. Students will learn to interpret the statistical analyses and write papers discussing the results of the experiments. Lec 2, Lab 2. Prerequisite: PSY 341, COS 101, COS 102, COS 103 or COS 100 or COS 110. Cr 3.

PSY 350 Cognition
An introduction to the psychological study of human information processing and thinking. Representative topics included attention, pattern recognition, short and long-term memory, semantic memory, visual memory, mental imagery, problem solving and creativity. Prerequisite: PSY 100. Cr 3.

PSY 351 Psychology of Motivation
A survey of theory, research methodology and experimentally obtained facts related to the activation and direction of behavior. Prerequisite: PSY 100. Cr 3.

PSY 352 Learning Across Species
Principles and theories of learning and adaptation in different species. Relations to behavioral ecology as well as quantitative issues will be covered. Prerequisite: PSY 100 and PSY 341 or permission. Cr 3.

PSY 358 Decision Making and Risk Taking
A discussion of the process of choosing between alternative actions in the pursuit of goals, with an emphasis on risky decision making, where the outcome is uncertain and there is a possibility of loss or injury. We will consider normative principles of rational decision making, and research on human judgment, decision making and risk taking, including factors leading to biased or irrational decisions. Recommended: a college-level course in mathematics or statistics. Cr 3.

PSY 360 Perceptual Applications and Connections
Basic principles and application of visual perception. Connections with art, design, animation, scientific visualization and new media will be explored. Topics include: color theory, form perception, depth perception, motion and illusions. (This course is identical

to NMD 360.) Prerequisite: COS 101, COS 102, COS 103 or COS 110 or permission. Cr 3.

PSY 361 Sensation and Perception
Principles and theories of the ways we make contact with our environment by seeing, hearing, smelling, tasting and feeling. Psychophysics is covered. Prerequisite: PSY 341 or permission. Cr 3.

PSY 365 Physiological Psychology
Explores the physiological bases of behavior with emphasis on the function of the nervous system and the relation between physiological and psychological processes. Prerequisite: PSY 100 and a basic course in zoology. Cr 3.

PSY 366 Evolutionary Psychology
Examines the impact of evolved behavioral adaptations on the thinking and behavior of contemporary humans. Evolutionary psychology is an interdisciplinary topic that links psychology, anthropology and biology. Begins with a brief overview of heredity and evolutionary theory and then discusses theory and research on evolutionary factors that influence human learning and thinking motivation and emotion, and social behavior such as cooperation and competition, mate-selection and parenting behavior. Prerequisite: PSY 100. Cr 3.

PSY 401 Health Psychology
Presents a biopsychosocial approach to the study of lifestyles, behaviors, response styles and personality factors that may impact an individual's health. Research comes from the areas of psychology, neuroscience, public health and medicine. Topics will include the relationship of psychological and social factors on physical conditions and recent research in these areas. Prerequisite: PSY 312 and junior or senior standing. Cr 3.

PSY 412 Foundations of Clinical Psychology
Provides an overview of clinical psychology. Topics include the helping professions, historical development of clinical psychology, approaches to psychological assessment and psychotherapy, controversies in the field, and new directions in the field. Prerequisite: PSY 312 and junior or senior standing. Cr 3.

PSY 420 Child Study Laboratory I
Observation and study of preschool children, as well as participation in guiding activities. Students undertake individual projects, supplemented by reading and class discussion. Emphasis on social development in early childhood. PSY 323 recommended. Rec 2, Lab 3. Cr 3.

PSY 421 Child Study Laboratory II
Observation and study of preschool children. Individual projects, supplemented by reading and class discussions. Opportunity to assist in guiding the children's activities. Emphasis on cognitive development. It is recommended that student take PSY 323 before enrolling. Rec 2, Lab 3. Prerequisite: PSY 100. Cr 3.

PSY 425 Social Issues in Developmental Psychology
An introduction to the research on current social issues in developmental psychology. Topic areas may include sex-role development, maternal employment, day care, mass media effects, the role of fathers, compensatory education, the effects of poverty, teacher expectancy effects. Prerequisite: PSY 323. Cr 3.

PSY 427 Emotional Development
Examines normative growth and individual differences in emotional development from birth through adolescence, integrating research on biological, cognitive and cultural aspects. Within each major developmental period, advances in the expression, regulation and understanding of emotions is explored. Prerequisite: PSY 323. Cr 3.

PSY 465 Hormones, Brain and Behavior
An introduction to behavioral neuroendocrinology: the study of hormonal effects on brain and behavior in both humans and animals. Topics include the role of hormones in behavioral gender differences; sexual, parental and aggressive behaviors; and various non-sexual behaviors. Prerequisite: PSY 100, BIO 100; recommended: PSY 363 or PSY 365. Cr 3.

PSY 470 History and Systems of Psychology
Surveys the development of psychology as an experimental science. Beginning with Greek views of human nature through Christian theology, the Renaissance and British Associationism. Considers Scottish and German Faculty Psychology and the 19th century developments in physiology that led directly to the birth of experimental psychology. Brief consideration of Gestalt Psychology and Behaviorism, vitalism in the life sciences and the mind-body problem in psychology. Prerequisite: PSY 100, Junior or Senior. Cr 3.

PSY 486 Psychological Skills for Performance Enhancement in Sport
Examines theoretical concepts, available research and practice issues underlying the implementation of selected psychological performance enhancement skills in sport. Topics include anxiety management, concentration skills, confidence building, goal setting, imagery, injury rehabilitation. Prerequisite: PSY 100 or KPE 485. Cr 3.

PSY 490 Seminar in Issues in Contemporary Psychology
A review of the current theoretical issues and research findings in the general areas of psychology. Prerequisite: PSY 100. Cr 3.

PSY 491 Senior Seminar in Psychology
One or more current topics in psychology, chosen by the instructor, will be discussed. Students will conduct library research, make oral presentations and write a comprehensive review paper on each topic. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: PSY 341 and PSY 345; seniors only. Cr 3.

PSY 492 Problems in Psychology
Provides the opportunity to carry out a particular research problem under supervision. Only 6 hours of credit will count toward the psychology major. Prerequisite: PSY 345 and permission. Cr Ar.

PSY 493 Field Experience in Psychology
Practical experiences in a wide variety of applied settings such as schools, psychological clinics, hospitals, and government and private agencies. Requirements include a written proposal outlining the experience planned, goals of the plan, relationship of the course to the student's program, periodic conferences with the faculty supervisor and a final written report. Three credit hours may fulfill major requirements and only 6 hours may count toward graduation. Prerequisite: Nine hours in psychology and permission. Cr 1-3.

PSY 494 Senior Research Project
The student will develop a research project in consultation with the instructor. The student will do an extensive library search of background material, write a proposal, conduct the research and write an APA style report. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: PSY 341, PSY 345 and permission. Cr 3.

PSY 503 Behavior Therapy
The study of behavior therapy as an approach to the treatment or management of undesired or dysfunctional behavior, thoughts, and feelings. Includes description and origins of therapeutic techniques, and the results of experimental studies. Prerequisite: permission. Cr 3.

PSY 520 Biological Bases of Infancy and Development
Advanced review of psychobiological research and theory on infancy. Physiological, perceptual, cognitive, linguistic and social-emotional topics. Prerequisite: PSY 323. Cr 3.

PSY 521 Emotion Development and Adaptation
Critical review of theory and research on

emotional development and social adaptation/maladaptation. Biological, cognitive, behavioral and developmental aspects of emotion systems will be discussed. Prerequisite: PSY 323. Cr 3.

PSY 522 Social Development in Children
An advanced survey of current theories and research. Topics include the development of parent-child attachments, prosocial behavior, peer competence, self control, sex-role stereotypes and moral behavior. Prerequisite: permission. Cr 3.

PSY 524 Cognitive Development in Children
An advanced survey of theories and research. Topics include perceptual development, children's learning and memory functioning, and language acquisition. Prerequisite: PSY 323, PSY 345 or equivalent. Cr 3.

PSY 540 Advanced Psychological Statistics and Methods I
A two semester advanced-level course. Topics include control, reliability of measurement, and validity in relation to both experimental and nonexperimental approaches. Prerequisite: PSY 341 or equivalent. Cr 3.

PSY 541 Advanced Psychological Statistics and Methods II
A two semester advanced-level course. Topics include control, reliability of measurement, and validity in relation to both experimental and nonexperimental approaches. Prerequisite: PSY 341 or equivalent. Cr 3.

PSY 546 Multivariate Methods for Behavioral Sciences
Examines the use of multivariate regression in the context of behavioral investigations in which more than one dependent variable is used. Multivariate analysis used in behavioral studies as a protection scheme and as a method for deriving a meaningful composite of behavioral scores, will be discussed. Prerequisite: PSY 540 and PSY 541. Cr 3.

PSY 551 Advanced Physiological Psychology
Reading and discussion on topics of current interest including memory, brain stimulation, neurotransmitter systems and neuronal plasticity. Prerequisite: permission. Cr 3.

PSY 561 Advanced Social Psychology
Consideration of current theoretical and methodological issues in social psychology including interpersonal perception, attitude and attitude change, communication and persuasion, language and cognition. Prerequisite: permission. Cr 3.

PSY 567 Advanced Cognitive Psychology
Representative topics include a comparison of the cognitive or information processing paradigm with behavioristic and psychodynamic paradigms, feature analysis and pattern recognition, memory storage and retrieval, attention, psycholinguistics, problem solving and neuropsychological bases of cognitive processes. Prerequisite: permission. Cr 3.

PSY 592 Directed Readings:(area)
Opportunity to read in a particular area of psychology under faculty direction. Prerequisite: permission. Cr 1-6.

Resource Economics and Policy (REP)

REP 254 Introduction to Production Economics
Theory and tools of production economics including economic theory of the firm and microcomputer analysis of firm costs. Cr 3.

REP 286 Resource Policy Analysis
Introduction to the economics of public policies with a particular emphasis on resource issues. Topics to be covered include the efficiency of market mechanisms, sources of market failure, the tools of public policy and the political process of instituting policies. Each semester a special topic or topics will offer a focal point for applications of the subject matter. Prerequisite: ECO 120 or INT 110. Cr 3.

REP 330 Waste Management
The study of the history and current problems of society's municipal solid waste. Waste generation, recycling and disposal are covered for both Maine and the nation. Social, economic and engineering aspects are examined. Satisfies the General Education Population and the Environment Requirement. (Fall.) Cr 3.

REP 371 Introduction to Natural Resource Economics and Policy
Economic aspects of natural resource management and policy are presented. Both consumptive and nonconsumptive uses of natural resources are discussed along with the socially optimal use of renewable and nonrenewable resources. Contemporary environmental problems and policies are presented. Satisfies the General Education Social Contexts and Institutions and Population and the Environment Requirements. Prerequisite: INT 110 or ECO 120. Cr 3.

REP 381 Sustainable Development Principles and Policy
The principles of sustainable development are investigated and considered against a number of ethical and philosophical concepts. Possible ecological, economic and social criteria for evaluating development proposals against those principles are surveyed. Selected issues relevant to Maine are evaluated by sustainable development criteria. Satisfies the General Education Population and the Environment and Ethics Requirements. Prerequisite: Sophomore standing. Cr 3.

REP 396 Field Experience in Resource Economics and Policy
An approved program of work experience which contributes to the academic major and for which academic credit is given. Students may work part time or full time for a semester in a job related to their professional career goals. (Pass/Fail Grade Only.) Prerequisite: junior standing and permission. Cr 1-16.

REP 397 FFA Career Development Experience
An approved program providing career development in agriculture, agribusiness or agricultural education. Work can include working toward State or National FFA degree, Supervised Agricultural Experience, internships or other approved professional development experience. May be repeated for credit. (Pass/Fail Grade Only.) Prerequisite: permission. Cr 1-9.

REP 422 Rural Economic Development
The principles of economic and social development as applied to communities are examined with emphasis on the roles, goals and tools of community development practitioners and the economics of the community. Prerequisite: INT 110 or ECO 120. Cr 3.

REP 458 Principles of Resource Business Management
Fundamental economic concepts and tools related to the management of resource based businesses. Managerial decision making in the food production and processing, marine and similar resource-based business is emphasized. Rec 3. Prerequisite: ECO 420, MAT 114 or permission of instructor. Cr 3.

REP 459 Resource Based Business Finance
Designed to assist students to develop skills necessary to deal with financial aspects of resource-based businesses. Topics include analysis of financial statements, working capital management, capital budgeting, capital structure, security valuation and security markets. Rec 3. Prerequisite: BUA 201 or equivalent. Cr 3.

REP 465 Food and Fiber Marketing
A study of economic principles applied to marketing structures, services and agencies, including analysis of costs and efficiencies and the impact of industry organization and government. Rec 3. Prerequisite: INT 110 or ECO 120. Cr 3.

REP 466 Internet Marketing: Food and Fiber Products
An introduction to electronic commerce with specific applications to business marketing food and fiber products. Focuses on the functioning of the Internet as a marketing medium, the special characteristics and issues of electronic commerce and developing effective strategies for Internet marketing. Web-based. Lec 0. Prerequisite: Introductory marketing course or permission. Cr 3.

REP 468 Quantitative Analysis and Forecasting
An examination of quantitative techniques for managerial decision making in resource-based industries. Cr 3.

REP 471 Economics of Environmental and Resource Management
A study of the major problems in environmental and resource economics. Examines sources of market failure and centralized and decentralized regulatory responses, techniques for valuing non-market goods and optimal management of renewable and nonrenewable natural resources. Satisfies the General Education Population and the Environment Requirement. Rec 3. Prerequisite: ECO 420 or permission of the instructor. Cr 3.

REP 474 Land Use Planning
Principles of planning for coordinated use and development of the land resource base. Survey of emerging concepts and problems that relate to land use policies and control measures. Emphasis on economics, legal, institutional, and social issues. Cr 3.

REP 489 Senior Seminar
A writing intensive and discussion based course focusing on current economic, social and environmental problems. Students are required to prepare a major research paper and presentation in conjunction with the instructor. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Rec 3. Prerequisite: seniors and graduate students. Cr 3.

REP 497 Independent Studies
Analysis of current problems in resource economics and policy, and community development. May be repeated for additional credit. Prerequisite: permission of instructor. Cr 1-3.

REP 511 Applications of Microeconomic Theory
Combines the use of economic theory and research methods to study public policy issues relating to agricultural economics, resource and environmental economics and community economic development. Focuses on the use of economic theory and research methods to analyze policy issues and to make policy recommendations. Prerequisite: INT 514. Cr 3.

REP 527 Community Development-Principles
Analysis of the principles of community economic development in rural settings, with emphasis on social analysis, strategy planning and policy formulation. Cr 3.

REP 554 Production Economics
The principles of optimum resource allocation applied to the agribusiness firm including advanced techniques for attaining optimum resource allocation. Cr 3.

REP 565 Marketing Theory and Concepts in Agri-Business
Examines the economic theory underlying the policies of agricultural marketing firms as well as current marketing problems and market practices for selected commodities and segments of the agribusiness sector of the U.S. economy. Prerequisite: REP 465, ECO 420. Cr 3.

REP 571 Advanced Environmental and Resource Economics I
Benefit-cost analysis of public projects and valuation of non-market benefits and costs. Prerequisite: INT 514. Cr 3.

REP 572 Advanced Environmental and Resource Economics II
Economic analysis of centralized and decentralized regulation of markets with externalities and public goods. Optimal management of renewable and nonrenewable natural resources. Prerequisite: INT 514. Cr 3.

REP 581 Sustainable Resource Systems and Public Policy
Surveys current management protocols of agricultural, energy, fisheries and forest resources in context of principles of sustainable development, considering ethical and socio-cultural as well as economic and environmental values; evaluates influences of public policy on management strategies. Seminar requires active student participation. Prerequisite: permission. Cr 3.

REP 582 The Human Dimensions of Global Change
Examines human activities that alter the earth's environment, the driving forces of those activities and the human responses and expectations of global change. Helps students describe and understand the human role in causing environmental change, the consequences of these changes for society and possible policy options for society. Cr 3.

REP 593 Graduate Seminar
Analysis of current problems in community development, resource use, management. Emphasis on economic and social effects. Problem areas vary from semester to semester. May be repeated for a total of 6 credits. Cr 1-3.

REP 597 Independent Studies
Analysis of current problems in resource economics and policy and community development. May be repeated for a total of 6 credits. Cr 1-3.

REP 599 Special Topics in Resource Economics and Policy
Exploration and analysis of new trends and topics in resource economics and policy. Cr 3.

Education-Special Education (SED)

SED 401 Introduction to Students with Severe Disabilities
Provides an overview of issues, practices and strategies for educating students with severe and multiple disabilities in today's public schools. Prerequisite: SED 402 or permission. Cr 3.

SED 402 Adapting Instruction for Students with Disabilities
Develops knowledge and understanding of students with disabilities. Topics include: adaptation of instruction, legal and ethical issues, family and social relationships and collaboration between school and community agencies. Prerequisite: EDB 204 and EDB 221. Cr 3.

SED 509 Curriculum Development for Students with Severe Disabilities
In-depth study of curriculum for students with severe disabilities. Emphasizes the development, implementation and evaluation of curriculum designs as well as co-teaching and peer-mediated strategies. Prerequisite: SED 401, SED 402, SED 536 or permission. Cr 3.

SED 515 Organization and Management of Special Education Services
Explores the rationale, history, and current status of public school efforts to meet the needs of students with mild-to-moderate disabilities. Various models of service delivery in special education are examined. Prerequisite: SED 402. Cr 3.

SED 520 Law and Policy Affecting Individuals
Examines state and federal laws and policies that affect individuals with disabilities in both school and the community. Prerequisite: SED 402. Cr 3.

SED 532 Behavior Management and Intervention
Approaches to behavior management and behavior change in educational settings. Examines principles of cognitive behavior modification, social skills training and crisis intervention. Prerequisite: SED 402 or equivalent. Cr 3.

SED 533 Learning Disability - Theory and Characteristics
An examination of the major theories related to etiology and treatment for specific learning disabilities. Familiarization with selected tests. Cr 3.

SED 536 Educational Strategies For Students with Severe Disabilities
Examines instructional strategies that have been effective in the education of students with severe disabilities. Emphasis on models of inclusive education; nonverbal communication strategies; and behavioral supports. Prerequisite: SED 401. Cr 3.

SED 545 Intervention for Reading Difficulties
Explores strategies for adapting reading instruction for students with reading difficulties. Topics include theoretical explanations of reading difficulties; approaches to reading intervention; and criteria for evaluating the efficacy of reading interventions. Prerequisite: SED 402 or permission. Cr 3.

SED 551 Methods and Curriculum for Students with Mild-to-Moderate Disabilities
A consideration of educational principles and practices essential to the development of effective instructional strategies for students with mild-to-moderate disabilities. Prerequisite: SED 402. Cr 3.

SED 552 Working with Families of Students with Disabilities
Models for consulting with families of children and youth with disabilities. Prerequisite: SED 402. Cr 3.

SED 553 Assessment in Special Education I
Develops knowledge of basic measurement concepts and principles and provides introductory experiences with procedures used to assess the educational performance of students with mild/moderate disabilities. Prerequisite: SED 402 and teaching experience or permission. Cr 3.

SED 554 Assessment in Special Education II
Develops skill in selecting educational measures to address assessment questions pertaining to students with mild-moderate disabilities; administering, scoring and interpreting norm-referenced, criterion-referenced, performance-based, and curriculum-based assessments of educational performance; and communicating assessment results. Prerequisite: SED 553 and enrollment in M. Ed. program in Special Education or permission. Cr 3.

SED 555 Transition Services for Students with Disabilities
Explores models of career preparation for students with disabilities, including postsecondary opportunities. Prerequisite: SED 402. Cr 3.

SED 556 Severe Disabilities: Assessment II
Provides advanced training in assessing individual learning needs of students with severe disabilities, emphasizing ecological inventories, person-centered planning and quality of life indicators. Cr 3.

SED 563 Positive Supports for Challenging Behavior
Knowledge and skills in positive behavioral support strategies to assist individuals with developmental disabilities and challenging behaviors to live and participate in inclusive community settings. For special educators and adult service providers. Prerequisite: SED 402. Cr 3.

SED 570 Technology for Individuals with Disabilities
Develops strategies for identifying and implementing adaptive and assistive technology in educational settings. Explores current technology available to assist students with disabilities. Prerequisite: EDT 520. Cr 3.

SED 572 Educational Needs of Students with Physical and Medical Disabilities
An overview of the physical and medical aspects of children and youth with severe and multiple handicaps. Course taught by skilled health, medical and special education professionals who work directly with students with severe handicaps. Course is appropriate for educators, therapists and other professionals who work directly with students with severe handicaps. Cr 3.

SED 575 Consultation, Collaboration and Teamwork in Special Education
Discusses background information and field-tested recommendations for helping teachers, parents, administrators and support personnel work together within their school context. Stresses the importance of word analysis and semantics, school context, processes and content. Cr 3.

Special Education-Early Intervention (SEI)

SEI 501 Typical and Atypical Development in Infancy and Early Childhood
Examines theories and processes of development from pre-birth through age 5 and the impact of at-risk and disabling conditions on development emphasizing a multicultural perspective and an integrative view. Cr 3.

SEI 502 Foundations of Early Intervention
Introduces early intervention for young children with disabilities, birth through five years of age, including history and rationale, legal foundations, theoretical perspectives, service delivery models, family-professional partnerships, assessment practices and curriculum development. Cr 3.

SEI 503 Assessment, Intervention and Program Planning for Early Intervention I
Examines child find and screening, eligibility and programmatic assessment, collaboration with families in the Individualized Family Services Planning (IFSP) process, designing developmentally appropriate learning programs, and principles and strategies of intervention. Corequisite: SEI 505. Cr 6.

SEI 504 Assessment, Intervention and Program Planning for Early Intervention II
Nontraditional/authentic assessment, design and evaluation of environments, curriculum development and adaptation, and instructional methods and materials for early care and education programs. Corequisite: SEI 506. Cr 6.

SEI 505 Early Intervention Practicum I
Planning, implementing and evaluating intervention for infants and young children with disabilities and their families. Requires participation as an early intervention team member. Corequisite: SEI 503. Cr 3.

SEI 506 Early Intervention Practicum II
Planning, implementing and evaluating developmentally appropriate curricula and interventions for inclusive early care and education programs, particularly for infants and young children with low-incidence disabilities. Requires participation on an early intervention team in a program or agency that serves young children and their families. Prerequisite: SEI 505. Corequisite: SEI 504. Cr 3.

SEI 507 Fostering Partnerships in Early Intervention
Develops knowledge, values and skills for building partnerships with families, collaborative teaming, consultative roles, service coordination, advocacy and professional ethics in early intervention. Emphasizes understanding of ecological systems, principles of family-centered care and development of cultural competence. Prerequisite: Experience in early intervention, early childhood or a related field. Cr 3.

SEI 509 Administration, Supervision and Public Policy in Early Intervention
Examines characteristics of effective leadership, managing components of early intervention programs, program evaluation, state and federal policies concerning early intervention, public policy and supervision and staff development in the field of early intervention. Cr 3.

SEI 510 Serving Infants and Toddlers in Natural Environments
Focuses on methods for providing early intervention services to infants and toddlers with disabilities or who are at risk for developmental problems and their families. Includes a practicum in which students will observe and participate in home-based settings and inclusive community early care and education settings. Prerequisite: SEI 501, SEI 502, SEI 507 or permission of the instructor. Cr 3.

Spatial Information Engineering (SIE)

SIE 211 Surveying
Procedures for angle, distances and elevation changes measurements. Use of total stations and levels in survey data collection. Coordinate computations. Closure and error propagation. Conversion of survey measurements and attribute information to digital map products. Route curve geometry and calculations. Automated survey layout procedures. Lec 3, Lab 3. Prerequisite: high school trigonometry. Cr 4.

SIE 331 Photogrammetry
Includes procedures and methods used for deriving metric information from photographs, analog processes for using aerial photographs in production of topographic maps, flight planning and cost estimation in aerial mapping work. Introduction to photocoordinate measurement devices and their calibration. Lec 2, Lab 3. Prerequisite: SIE 211. Cr 3.

SIE 412 Advanced Surveying
Advanced topics in route location, geometry and design; automated survey data collection procedures; digital terrain models; integration of total station and global positioning system (GPS) observations; surveying astronomy; analysis of survey observations; automated topographic data collection. Lec 3, Lab 3. Prerequisite: SVT 201. Cr 4.

SIE 432 Advanced Photogrammetry
Advanced topics in metric photogrammetry including advanced stereoscopic plotting instruments, analytical methods in stereoplotter orientation, aerial mapping control requirements, creation of digital data bases, design criteria in stereoscopic digital data collection, photogrammetric control extension, orthophotography. Lec 3, Lab 3. Prerequisite: SIE 331, SVT 201 or equivalent. Cr 4.

SIE 433 Remote Sensing
Provides definition and overview of remote sensing principles, sensors and interpretation techniques. Topics include: energy sources and interaction, photographic systems, airphoto interpretation, electro-optical sensors, non-imaging sensors, radar systems, space platforms, data processing, classification, application to spatial information engineering, term project. Lec 3, Lab 1. Prerequisite: MAT 228, PHY 122. Cr 4.

SIE 434 Digital Image Processing and Analysis
Introduction to image processing and analysis techniques suitable to the processing of remotely sensed data. Topics include elements of digital image processing and analysis systems; image digitization, quantization and sampling; image storage, display and image file management; geometric operations, rectification, registration and resampling techniques; image enhancements, point operations and filtering; transformations in spatial and frequency domains; image restoration and compression; image segmentation and feature extraction; automated interpretation and spatial information extraction; term project. Lec 2, Lab 1. Prerequisite: SIE 433. Cr 3.

SIE 441 Geodetic Models
Includes three dimensional geodesy, computations on the ellipsoid, conformal mapping, geometric properties of ellipsoids, normal sections, geodesics, geodetic datum definitions, direct and inverse solutions; adjusting networks on the ellipsoid, on the mapping plane and in space; reduction of observations and elements of physical geodesy; review of spherical trigonometry, differential geometry and complex variables. Lec 3, Lab 1. Prerequisite: SVT 201 or equivalent. Cr 4.

SIE 451 Engineering Databases and Information Systems
Theoretical foundation for representation of knowledge in information systems and logic based programming as a tool for fast prototyping and design of data structures. Database management systems and their suitability for engineering data, the structure of a network DBMS, physical data storage and basic datastructures (list, tree, hashing), transaction concept, design of database scheme for engineering application. Lec 3, Lab 1. Satisfies the General Education Writing Intensive Requirement. Prerequisite: COS 220 and ISE 201. Cr 3.

SIE 460 Spatial Information Systems Design
A capstone design course for seniors in Spatial Information Engineering. Integrates knowledge and skills acquired in previous courses and has a practical focus in which theory must be applied in a realistic problem solving environment. Students will function in the role of consultants and be responsible for the development of design options and solutions for a designated client. Students are required to work in groups to define project scope, conduct research and produce a final report. Satisfies the General Education Capstone Experience Requirement. Lec 2, Lab 2. Prerequisite: permission. Cr 4.

SIE 498 Selected Studies in Spatial Information Engineering
Topics in surveying, photogrammetry, geodesy, remote sensing, geographic information systems, land information systems and legal issues not covered in other courses. Content varies. May be repeated for credit, with departmental permission. Prerequisite: permission. Cr 1-3.

SIE 501 Introduction to Graduate Research
Covers process of successful graduate research from identification of a researchable question, preparation of a thesis proposal, to completion or the research and its publication. Focus on engineering research methods for spatial information. Cr 1.

SIE 502 Research Methods
Covers process of successful graduate research, including the written and verbal presentation of plans and results. Students formulate hypotheses, perform a literature search, write abstracts and introductions of research papers, learn about presentation styles and techniques, make two presentations (3-minutes and 10-minutes) about research proposals. Lec 1. Prerequisite: SIE 501 and students must have selected a thesis topic. Cr 1.

SIE 509 Principles of Geographic Information Systems
Covers foundation principles of geographic information systems, including traditional representations of spatial data and techniques for analyzing spatial data in digital form. Combines an overview of general principles associated with implementation of geographic information systems and practical experience in the analysis of geographic information. Not open to those who have taken ISE 201. Prerequisite: Graduate standing. Cr 3.

SIE 510 Geographic Information Systems Applications
Introduces both the conceptual and practical aspects of developing GIS applications. Covers issues from project planning through project implementation. Students will be

required to develop specific applications. Course grades will be based on class participation, completion of several exercises and satisfactory development and completion of a project. Exercises will be used to develop specific skills and will be completed individually. Projects will be implemented by groups and each group will be responsible for a final project report, an interactive demonstration and presentation to the class and outside agency representatives as appropriate. Lec 3, Lab 1. Prerequisite: ISE 201. Graduate Standing. Cr 4.

SIE 512 Spatial Analysis
Introduces students to techniques for spatial analysis. Covers methods and problems in spatial data sampling, issues in preliminary or exploratory analysis, problems in providing numerical summaries and characterizing spatial properties of map data and analysis techniques for univariate and multivariate data. Students will be responsible for completing several hands-on exercises. Prerequisite: an introductory statistics course. Cr 3.

SIE 521 U.S. Public Land Survey System
Historical basis of the U.S. Public Land Survey System. Original and dependent retracement surveys; geodetic aspects; proportioning; subdivision of sections; fractional survey problems; evaluation of field evidence; uniqueness with regard to particular states; land information systems within the U.S. P. L. S. S. Lec 3. Prerequisite: SVT 221 or permission of instructor. Cr 3.

SIE 522 Environmental Law and Resource Regulation
Selected topics in common law solutions to environmental problems, major statutes in air, water, solid waste, and coastal zone management, environmental litigation, land use controls, water rights. Lec 3. (Offered alternate years.) Prerequisite: permission. Cr 3.

SIE 525 Information Systems Law
Current and emerging status of computer law in electronic environments: rights of privacy, freedom of information, confidentiality, work product protection, copyright, security, legal liability; impact of law on use of databases and spatial datasets; legal options for dealing with conflicts and adaptations of law over time. Prerequisite: Graduate standing. Cr 3.

SIE 526 Cadastral and Land Information Systems
Colonial Spanish, English, French land records traditions and alternatives reviewed; goals and purposes of land tenure systems with attention to social, political, legal, economic, organizational, technical issues examined; U.S. modernization efforts and problems of developing countries explored. (Offered alternate years.) Cr 3.

SIE 531 Analytical and Digital Photogrammetry
Orientations, optimization of data collection for control extension by photogrammetry and semianalytical and analytical methods of aerotriangulation. Reliability considerations in large blocks of aerial photographs. Real-time and a posteriori blunder detection techniques including sparsity of equations in large blocks of photographs, recursive partitioning techniques, self-calibration in aerotriangulation. Digital cameras, matching techniques, automated digital photogrammetric processes. Digital orthophotography, automated GIS data capture. Lec 3, Lab 1. Prerequisite: SVT 201, SIE 432. Cr 4.

SIE 535 Motion Imagery Analysis
Topics covered include: video and still digital cameras; radiometric and geometric calibration; image and video compression; image and video indexing and retrieval; image queries; image sequence analysis; spatiotemporal trajectories and feature tracing; object modeling using video imagery; virtual modeling. Prerequisite: MAT 262, SIE 434 or equivalent or permission. Cr 3.

SIE 541 Satellite Geodesy
Topics include: stellar coordinate systems, precession, nutation, time systems, troposphere, ionosphere; satellite orbital theory, Global Positioning System (GPS), space segment, correlating receivers and code-less receivers; pseudo ranges; single, double, and triple difference phase processing; point positioning, relative positioning; dual frequency processing; code smoothing techniques; positioning of moving platforms; simultaneous orbital and baseline estimation; GPS vector adjustments and combination with terrestrial observations; astronomical azimuth, latitude and longitude determination; proper motion, aberration, parallax. Lec 3. Prerequisite: SVT 201. Cr 3.

SIE 550 Engineering Databases and Information Systems
Theoretical foundation for the representation of knowledge in information systems and logic-based programming as a tool for fast prototyping. Object-oriented modeling and database schema design for engineering applications. Database management systems and their suitability for engineering data, transaction concepts and query languages, including SQL. Graduate credit will not be allowed for both SIE 451 and SIE 550. Prerequisite: Graduate standing. Cr 3.

SIE 554 Spatial Reasoning
Qualitative representations of geographic space. Formalisms for topological, directional and metric relations; inference mechanisms to derive composition tables; geometric representations of natural language-like spatial predicates; formalizations of advanced cognitively motivated spatial concepts, such as image schemata; construction of relation algebras. Prerequisite: SIE 451 or SIE 550. Cr 1 or 3.

SIE 555 Spatial Database Systems
Covers internal system aspects of spatial database systems. Layered database architecture. Physical data independence. Spatial data models. Storage hierarchy. File organization. Spatial index structures. Spatial query processing and optimization. Transaction management and crash recovery. Commercial spatial database systems. Prerequisite: SIE 550 and programming experience in Java, C++ or C. Cr 3.

SIE 565 Reasoning With Uncertainty in Spatial Information Systems
Information systems and artificial intelligence approaches to uncertainty handling in spatial information systems. Typology of uncertainty: imprecision, inaccuracy and inconsistency. Representing and reasoning with spatial uncertainty in information systems. Logics of uncertainty, probabilistic and Bayesian approaches, Dempster-Shafer theory of evidence. Spatial vagueness. Handling conflicting information. Prerequisite: SIE 451 or SIE 550 or permission. Graduate Standing. Cr 3.

SIE 598 Selected Studies in Spatial Information Engineering
Topics in surveying, photogrammetry, remote sensing, land information systems and geodesy. Content varies to suit current needs. May be repeated for credit. Cr 1-3.

Marine Science (SMS)

SMS 100 Introduction to Ocean Science
A non-laboratory survey of the broad field of marine science, stresses the interconnections among aspects of oceanography, marine biology and ecology, living marine resources and human interactions with the marine environment. Practical applications of basic scientific principles are stressed. Satisfies the General Education Applications of Scientific Knowledge and Population and the Environment Requirements. Cr 3.

SMS 108 Beaches and Coasts
An introduction to coastal landforms, including beaches, salt marshes, tidal flats and sea cliffs, their origins, global distribution, and associated nearshore processes. Human

impacts to the coastal zone, including coastal erosion, land loss and management, and human responses to sea-level change are considered. One day field trip. Lec 3. Satisfies the General Education Applications of Scientific Knowledge and Population and the Environment Requirements. Cr 3.

SMS 110 Concepts in Oceanography
Basic concepts in physical, geological, chemical and biological oceanography will be discussed. Also includes an introduction to the relationship between the ocean and the atmosphere. Ends with a discussion of global change issues. Practical applications of basic scientific principles will be emphasized. May not be used for credit in the Marine Science major. (Offered at the Frederick Hutchinson Center, Belfast through the Continuing Education Division.) Satisfies the General Education Applications of Scientific Knowledge Requirement. Lec 3. Cr 3.

SMS 120 Introduction to Forensics
An overview of current concepts and techniques associated with the investigation of crime. Emphasis is placed on scientific methodologies and on issues associated with criminal justice. Focused examples highlight the limitations of investigative practices. Satisfies the General Education Application of Scientific Knowledge Requirement. Cr 3.

SMS 211 Introduction to Aquaculture
Principles and practices of aquaculture from international, national and local perspectives. Includes field trip. Satisfies the General Education Applications of Scientific Knowledge Requirement. Lec 3. Cr 3.

SMS 220 Introduction to Marine Resources
An overview of current issues and knowledge relating to marine resources including socio-legal concerns, resource utilization, environmental quality, and the impact of marine trades. Limited to first and second year students. Lec 2. Cr 2.

SMS 300 Marine Ecology
An introduction to fundamental ecological principles in the context of marine communities. Uses examples from marine ecosystems to illustrate general principles of general ecology such as predation, competition, and nutrient cycling. Focuses on the ecology of major marine ecosystems such as estuaries, sea shores and benthic communities and on aspects of applied ecology such as fisheries management. Includes two days of field work at the Darling Marine Center. Not open to students who have taken BIO 319. Prerequisite: BIO 200. Cr 3.

SMS 302 Oceanography
Introduces geological, chemical, physical and biological oceanography. Topics include plate tectonics and evolution of ocean basins, physical and chemical characteristics of sea water, atmosphere-ocean coupling, two- and three-dimensional oceanic circulation, waves and tides, sedimentation, marine organisms, productivity, marine ecosystems, biological-physical coupling, biogeochemical cycles. Two weekend field trips (required) introduce oceanographic methods and provide application of concepts. Lec 3. Prerequisite: CHY 122, PHY 112 or PHY 122, SMS 100. Cr 3.

SMS 306 Field Marine Ecology
An overview of the major coastal habitats and communities in Maine, including sand dunes, salt marshes, mud flats, sea grass meadows, exposed rocky shores, sheltered rocky shores, tide pools and estuaries. Emphasis will focus on distributions (including disjunct species), natural history, adaptation and ecology of important organisms occupying, influencing or regulating these communities. Note: Because of overlap, BIO/SMS 306 and BIO/SMS 475 cannot both be taken for degree credit. (This course is identical to BIO 306.) Satisfies the General Education Writing Intensive Requirement. Lec 2, Lab/field 4. Prerequisite: one year of biology or equivalent; recommended BIO 210, BIO 319, SMS 300 or WLE 200. Cr 4.

SMS 309 Techniques in Shellfish Aquaculture
Residential course taught at the University's Darling Marine Center. Explores the theory and practice of marine bivalve culture as conducted in the Northeastern U.S. Includes lectures, considerable "hands-on" experience, and field trips to commercial hatcheries and farms. Prerequisite: General knowledge in biology or relevant work experience. Cr 2.

SMS 321 Introduction to Fisheries Science
Introduction to the assessment, management, conservation and exploitation of fisheries resources of commercial and recreational importance. Lec 3. Prerequisite: SMS 100 or BIO 100 or permission. Cr 3.

SMS 322 Biology of Marine Vertebrates
The taxonomy, phylogeny and diversity of marine fishes, reptiles, birds and mammals. Comparative functional morphology, physiology, sensory systems, ecology, behavior and life history strategies in relation to characteristics of the diverse marine habitats occupied by vertebrate animals. Distributions, population trends and impacts of human exploitation. Prerequisite: BIO 200. Cr 3.

SMS 330 Descriptive Physical Oceanography
A comprehensive introduction to descriptive physical oceanography. Topics considered will range in scale from global to estuarine, and from decades to seconds. The course emphasis is the characterization of physical oceanic features and phenomena, how and why they arise and their practical importance. Prerequisite: PHY 121, PHY 122. Cr 3.

SMS 350 Undergraduate Seminar
Literature review of topics selected from the current marine literature leading to the preparation and presentation of written and oral papers. Emphasis on synthesizing information from other courses offered as part of the marine science degree to provide an overall appreciation of the field of marine sciences. Prerequisite: junior or senior standing. Cr 1-3.

SMS 352 Semester-by-the-Sea: Marine Ecology
Marine communities and ecological interactions are studied through lectures, field trips along the rocky shore of Maine and laboratories. Concepts of bio-diversity, the food web and the role of physical and biological limiting factors are developed. Critical and creative thinking and problem solving are enhanced by designing and conducting experiments to test hypotheses. Data analysis and report writing are emphasized. (Taught at the Darling Marine Center.) Lec 2, Lab 4. Cr 4.

SMS 400 Capstone Experience in Marine Science
A Capstone Experience for students obtaining the Bachelor of Science in marine science or in aquaculture. Students must complete four credits of SMS 400 in one or two semesters. Satisfies the General Education Writing Intensive and Capstone Experience Requirements. Prerequisite: 12 credit hours of SMS courses. Cr 2-4.

SMS 401 Critical Issues in Aquaculture
Current and historically important issues facing the development of the aquaculture industry. Issues related to aquaculture will be researched by students who will present the issues in a series of debates. Lec 1. Prerequisite: SMS 211, SMS 409 and SMS 420. Cr 1.

SMS 402 Advanced Oceanography and Marine Biology
Stresses the interdisciplinary nature of marine science by focusing on comprehensive oceanographic and marine biological processes that reinforce geological, chemical, physical and biological principles and their linkages. Variability in processes at a range of spatial and temporal scales are considered. Topics may include interplay of seasonal productivity and nutrient cycling, particle dynamics and sedimentation, hydrothermal vent systems, marine food webs, adaptations

of organisms to life in complex environments, upwelling systems and productivity, current systems and transport of biota, air-sea interactions and climate change. Lec 3. Prerequisite: SMS 302 or equivalent. Cr 3.

SMS 409 Shellfish Aquaculture
Examination of shellfish production methods (including hatchery, nursery and growout phases) and underlying biological principles. Lec 3. (Spring-odd years.) Prerequisite: BIO 100, SMS 211. Cr 3.

SMS 420 Fish Aquaculture I
Part I of a two semester sequence. A comprehensive examination of finfish production methods. Covers aspects of fish anatomy and physiological responses to intensive culture methods. Water sources and water quality parameters and their effects on fish health will be examined. Fish culture systems from extensive pond culture to intensive land based recirculation systems and their effects on the environment will be described. Aspects of fish production at all life stages, beginning with broodstock management in this course and ending with on-growing fish to market the following semester, will be studied. Students will participate in selected techniques in fish aquaculture, i.e., anatomy of fish species, live food production for larval fish, diagnostic procedures, drug residue testing, fish handling and anesthesia, spawning techniques, egg incubation techniques and computer applications during five weekday afternoon laboratories and two all day field trips. (This course is identical to AVS 420.) (Offered Fall-even years.) Lec 2, Lab/Field 4. Prerequisite: SMS 211. Cr 3.

SMS 421 Fish Aquaculture II
A continuation of SMS 420. A comprehensive examination of finfish production methods. Covers aspects of fish production at all life stages, beginning with broodstock management in the first semester course (AVS/SMS 420) and ending with on-growing of fish to market. Aspects of fish production to be studied will cover genetic selection, feeding, health management, fish farm structure, processing fish and environmental factors. Principles and examples of disease prevention and control, such as husbandry, treatment, vaccination, natural defenses and bio-security. Major diseases of farmed fish and control measures will be presented. Students will participate in selected techniques in fish aquaculture, i.e., anatomy of fish species, live food production for larval fish, diagnostic procedures, drug residue testing, fish handling and anesthesia, spawning techniques, egg incubation techniques and computer applications during five weekday afternoon laboratories and two all day field trips. This course is identical to AVS 421. Lec 2, Lab/Field 4. (Offered Spring-odd years.) Prerequisite: AVS/SMS 420. Cr 3.

SMS 422 Biology of Fishes
A comprehensive course in evolution, morphology, physiology, life histories and ecology of fishes. Emphasis will be integrating knowledge of functional and physiological design to understand how fish function and how they have adapted to diverse environments. Prerequisite: BIO 200. Cr 3.

SMS 425 Applied Population Genetics
Covers the biological, mathematical and statistical principles of population genetics. Topics include a discussion of the role of mutation, migration, selection and inbreeding in structuring the genetic variation for both Mendelian and quantitative traits in natural and artificial populations. Emphasis is placed on both the theoretical and experimental approaches to the study of population genetics and the application and importance of population genetics to disciplines such as marine science, wildlife and conservation biology, ecology and animal husbandry, including aquaculture. Prerequisite: BIO 100 or permission. Cr 3.

SMS 449 Engineering in Aquaculture
Introduction to the application of engineering principles and practices to the commercial culture of marine and freshwater plants and animals. No engineering or engineering technology majors. Rec 2, Lab 2. Prerequisite: SMS 211 and CHY 122 or permission. Cr 3.

SMS 450 Field Experience in Marine Sciences
An approved field, research or work experience that contributes to the academic major and for which academic credit is given. The program of study is agreed upon by the student and the faculty advisor and may include independent research or work experience in the public or private sector. May also be taken as a field or laboratory supplement to an SMS lecture course and as such is required for certain courses offered as part of the Semester-by-the-Sea program. A written report or reports are required. (Pass/Fail Grade Only.) Prerequisite: junior or senior standing. Cr 1-16.

SMS 467 Fish Nutrition and Feeding
Principles of nutrient requirements as they apply to fish. Feeding management of several commercially important species will be discussed. Prerequisite: BMB 208 or CHY 122. Cr 3.

SMS 473 Biology of Algae
Comparative morphology and reproduction, identification and classification of algae. Laboratory and field work emphasize study of living material and include techniques on algal culture, sexuality, microtechnique and preservation. Prerequisite: BIO 100 and BIO 200 or permission. Cr 4.

SMS 475 Field Marine Ecology
An overview of the major coastal habitats and communities in Maine including: sand dunes, salt marshes, mud flats, sea grass meadows, exposed rocky shores, sheltered rocky shores, tide pools and estuaries. Emphasis will focus on distributions (including disjunct species), natural history, adaptation and ecology of important organisms occupying, influencing or regulating these communities. Because of overlap, BIO/SMS 306 and BIO/SMS 475 cannot both be taken for degree credit. (This course is identical to BIO 475.) Satisfies the General Education Writing Intensive Requirement and may be used to satisfy the Capstone Experience Requirement in degree programs in the Department of Biological Sciences. Lec 2, Lab/field 4. Prerequisite: one year of biology or equivalent; BIO 319, SMS 300 or equivalent; recommended: a course in statistics. Cr 4.

SMS 480 Semester-by-the-Sea: Biology of Marine Invertebrates
Emphasis will be on body plan and design of marine invertebrates, including investigating how body design facilitates living in selected marine habitats. After a quick review of the marine phyla, lectures will discuss functional organization of invertebrates' bodies, including embryology and development. Emphasis in the lab sessions is on identification of coastal Maine invertebrates. Lectures, labs and field trips are integrated into a single class experience that is taught one entire day per week at the Darling Marine Center. (Note: Because of overlap, BIO 353 and SMS 480 cannot both be taken for degree credit.) Prerequisite: BIO 200 and SMS 100 or equivalent or permission. Cr 4.

SMS 481 Semester-by-the-Sea: Design of Marine Organisms: Momentum, Mass and Information Transfer
Students use flumes and other flow devices to gain an understanding of the principles of momentum and mass transfer and then to discover how they influence form and function in marine organisms. Lectures prepare students to conduct their own laboratory observations: abiotic flows and model living organisms interacting with flows. A final integration adds sensory ecology and unsteady flow behaviors. Applications range from bacteria to invertebrates and vertebrates. Lecture and laboratory are combined into a day-long class period. Taught at the Darling Marine Center. Prerequisite: BIO 200 (or equivalent) and PHY 112 or PHY 122 or permission. Cr 4.

SMS 482 Semester-by-the-Sea: Human Impacts on the Ocean
Examines the manner in which humans influence oceanic processes and the ways in which humans can assess these influences. Surveys various case examples of influences (both suspected and well-documented) such as alteration of river inputs to the oceans, contamination by toxic materials, eutrophication and habitat alteration. Focuses on how scientists determine whether or not a perturbation of normal oceanic process has occurred, what the pre-human condition might have been and how we predict future changes. Taught at the Darling Marine Center. Satisfies the General Education Population and the Environment Requirement. Lec 3, field trips. Prerequisite: SMS 302 or equivalent or permission. Cr 3.

SMS 485 Comparative Animal Physiology
A comparative approach to the functional adaptations of animals to diverse environments, with emphasis on underlying physiological and biochemical mechanisms. Lec 3. Prerequisite: BIO 200, a year of chemistry and junior standing. Cr 3.

SMS 486 Comparative Animal Physiology Laboratory
Laboratory study of the physiology of phylogenetically diverse animals. Lab 2. Together with SMS 485 this course satisfies the General Education Lab in the Basic or Applied Science Requirement. Prerequisite: SMS 485 or concurrently. Cr 1.

SMS 490 Semester-by-the-Sea: Special Topics
A lecture and/or laboratory course offered with a specific marine topic as part of the Semester-by-the Sea. Topics take advantage of the proximity of the coast of Maine. May be repeated for credit. (Taught at the Darling Marine Center.) Prerequisite: SMS 270 or permission. Cr 1-4.

SMS 491 Problems in Marine Science
Undergraduate studies of current problems in marine science directed by individual faculty. May be experimental or theoretical independent research or directed readings by an individual student. May be repeated for credit. Prerequisite: permission of instructor. Cr Ar.

SMS 497 Independent Study in Marine Science
A readings, lecture, laboratory or seminar study course arranged between instructor and individual students, covering selected topics or areas within the field of Marine Science. May be repeated for credit. Prerequisite: permission of instructor. Cr 1-4.

SMS 501 Biological Oceanography
Marine organisms and their interrelationships with chemical, geological and physical aspects of their environments. Prerequisite: BIO 319 or equivalent or permission. Cr 3.

SMS 514 Ecology of Marine Sediments
A multi-disciplinary examination of factors influencing ecological patterns and processes in marine sediments. Emphasis on recent research integrating biological, geological, physical and chemical aspects of marine sedimentary environments. Field trips and lab project required. Lec 2, Lab 4. Prerequisite: SMS 501 and permission. Cr 4.

SMS 516 Marine Phytoplankton
Biology and ecology of marine phytoplankton, (particularly of the Gulf of Maine), with emphasis on quantitative aspects of growth, production and distribution in space and time. Prerequisite: MAT 126, SMS 501 or equivalent. Cr 4.

SMS 520 Chemical Oceanography
Distribution and cycling of elements in the marine system with emphasis on geochemical and biochemical interactions. Prerequisite: CHY 121, CHY 123. Cr 3.

SMS 525 Marine Biogeochemistry
Biogeochemistry and benthic-pelagic coupling of nutrients, organic substances, and trace elements in the marine system. Emphasis on coastal and sedimentary regimes. Prerequisite: SMS 520. Cr 3.

SMS 528 Advanced Phycology
Current and classic discoveries including classification, the theories of primary and secondary endosymbiosis, toxic algae and circadian rhythms. Prerequisite or Corequisite: BIO/SMS 473 or equivalent or permission of instructor. Cr 3.

SMS 530 Physiology of Fishes
Analysis of the functional biology of fishes with emphasis on the mechanistic bases of physiological functions and their adaptive significance in a variety of environmental situations. Lec 3. Prerequisite: BIO 377 or equivalent or permission. Cr 3.

SMS 531 Coral Reefs
An exploration of the combined geological, physical, chemical and biological factors that make coral reefs among the most diverse and productive systems in the world. Examines biology, taxonomy and ecological interactions of dominant reef organisms. Explores modern reef processes such as primary productivity, competition, predation and herbivory along with some geological processes such as the role of sea level in reef formation and growth. Prerequisite: BIO 353 or SMS 480 or permission. Cr 3.

SMS 533 Quantitative Genetics
Covers the biological and statistical principles underlying the experimental approaches used to distinguish genetic and environmental sources of variation in quantitative traits. Topics include an intensive coverage of quantitative genetic theory, application of statistical methodologies for estimating the genetic contribution to quantitative traits, the application of quantitative genetic methodologies to studies in applied breeding and evolution and advanced topics, such as marker-based analysis and quantitative trait loci mapping. Prerequisite: BIO 462 or BIO 465 or SMS 425 or permission. Cr 3.

SMS 540 Satellite Oceanography
An overview of the use of remote sensing technologies for making measurements of the marine environment. Introduces the various sensors used by oceanographers, their background, the principles behind their operation and measurement retrieval. Emphasis will be placed on readings from the prime oceanography literature and biogeophysical applications of the data, their analysis, advantages and limitations rather than physical/optical theory. Prerequisite: SMS 501 and SMS 541 or permission. Cr 3.

SMS 541 (SMS, CIE) Physical Oceanography
Covers physical properties of sea water, waves and tides, distribution of variables, dynamics, water masses and the general circulation. Prerequisite: PHY 121, PHY 122, MAT 126 or permission. Cr 3.

SMS 545 Physiological Ecology of Marine Organisms
Functions and adaptive responses of organisms to environmental variables; emphasis on marine and estuarine invertebrates. Extensive readings in primary literature. Prerequisite: BIO 377, BIO 480 or BIO 485. Cr 3.

SMS 550 Fisheries Oceanography
The influences of physical and biological processes at various temporal and spatial scales on survival, growth, abundance, transport, and distribution of marine fishes and invertebrates are studies. Emphasis is on species of commercial or recreational importance. Lec 2, Rec 1. Prerequisite: SMS 501 or SMS 541. Cr 3.

SMS 551 Fisheries Management
Traditional biological/economic approaches to fisheries (and other renewable) resource management in a commercial context. Deals with the basic conceptual and analytical approaches used in management. Prerequisite: ECO 420. Cr 3.

SMS 552 Ecological Approaches to Fisheries Management
Addresses the theory and practical problems

of managing wild renewable resources. Theory is drawn from the fields of economics, ecology, population dynamics and anthropology. Emphasizes the State's decentralized governance approach to fisheries management. Prerequisite: SMS 551 or REP 471 and senior or graduate level standing. Cr 3.

SMS 553 Institutions and the Management of Common Pool Resources
Focuses on the various social science theories concerning the generation of institutions and rules including action theory, the IAD approach (Institutional Analysis and Development), rational choice theory and topics from political economy. Emphasis will be placed on the development of institutions governing the use of fisheries with some discussion of the management of other common pool resources such as forests, rangeland, air and petroleum reserves. Prerequisite: senior or graduate standing or permission. Cr 3.

SMS 554 Introduction to Bioeconomic Modeling
Deals with the modeling of basic ecological/human interactions and is intended as a prerequisite to higher level modeling courses. Prerequisite: senior or graduate standing. Cr 3.

SMS 555 Resource Management in Cross-cultural Perspective
Examines the institutions used to reduce risk and uncertainty in selected societies dependent on renewable resources. Emphasis on fishing societies around the world with some discussion of the utilization of forests and rangeland by different societies. Studies the governance structures used to manage common pool resources including state systems, local level management systems and co-management systems. Prerequisite: senior or graduate standing or permission. Cr 3.

SMS 557 Coastal Processes and Coastal Zone Management
Processes in specific near-shore environments like beaches, tidal flats, estuaries and shelves are discussed in terms of historic and encroaching human impacts. Case histories of successes and failures of attempts to live with coastal processes are presented. Prerequisite: permission of instructor. Cr 3.

SMS 558 History of Uses and Abuses of the Coastal Zone
Examination of human uses of the shore and near-shore in various parts of the world from prehistory to the present, including habitation, fishing, farming, industry, shipping and waste disposal. Emphasis on how societies have balanced divergent requirements of the coastal zone, long and short-term effects and results of various attempts to reconstruct and preserve the coastal zone. Prerequisite: senior or graduate standing. Cr 3.

SMS 559 Institutions and Resource Management
Examination and application of economic theory of institutions to the problems of natural resource management. Considers a broad range of resources with emphasis on fisheries. Prerequisite: ECO 420 or equivalent. Cr 3.

SMS 560 Marine Geology
Topics include current theories of the origin of the earth as a planet and the development of continents and ocean basins, morphology and structure of the sea floor, interpretation of geological and geophysical evidence relevant to the origin and evolution of major tectonic features of ocean regions. Lec 3. Prerequisite: GES 101, GES 102 or permission. Cr 3.

SMS 561 Marine Microbiology
A lecture and literature-based course focusing on microbiology and microbial ecology of marine environments, emphasizing prokaryote-prokaryote interactions, prokaryote-eukaryote interactions and prokaryotic diversity and distribution in marine environments. (This course is identical to BMB 561.) Prerequisite: BMB 300 or permission. Cr 3.

SMS 562 Fisheries Population Dynamics
Fisheries stock assessment theory and techniques with emphasis on estimating vital fisheries population parameters and biological reference points and conducting stock assessment for commercially exploited marine fisheries populations. Prerequisite: A course each in ecology, statistics and calculus. Cr 3.

SMS 568 Paleoceanography
A study of the geological history of the ocean basins, the oceanic circulation and the climate of the past as recorded in deep sea sediments. Courses in general biology and oceanography are strongly recommended. Prerequisite: permission. Cr 3.

SMS 585 Marine System Modeling
Covers ocean circulation models, coupled atmosphere-ocean models, sea ice models, modeling oceanic carbon and nutrient cycles, and marine ecosystem models: beginning with theory, followed by model development and the most recent research results. Examines model representation of interactions among physical, chemical and biological processes in the ocean. Term project required. Prerequisite: permission of instructor. Cr 3.

SMS 595 Spectral Analysis and Principal Component Analysis
Provides theoretical and computational guidance on techniques commonly used in the analysis of data arising from many of environmental sciences, emphasizing hands-on understanding of the methods and correct interpretation of results. Part one covers spectral analysis of time series: theoretical development analysis of real data. Part two covers analysis of time-space data, centered around Principal Component Analysis (PCA). Term project required. Prerequisite: calculus, probability theory and statistics. Cr 3.

SMS 597 Independent Study
A graduate-level readings course, lecture course, laboratory or seminar study course arranged between instructor and individual graduate students, covering selected topics or areas within the field of Marine Science. May be repeated for credit. Prerequisite: permission of instructor. Cr 1-3.

SMS 598 Special Topics in Marine Science
A graduate-level readings, lecture, seminar or laboratory course covering timely topics in Marine Science. May be repeated for credit. Prerequisite: permission of instructor. Cr 1-3.

Sociology (SOC)

SOC 101 Introduction to Sociology
Introduces the fundamental concepts, principles, and methods of sociology, analyzes the influence of social and cultural factors upon human behavior and evaluates effect of group processes, social classes, stratification, and basic institutions on contemporary society. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

SOC 110 Sociology of Popular Culture
A socio-historical exploration of the creation and social significance of non-elite cultural forms, such as television, movies, novels and music. Topics include the distinction between high culture and popular culture, the origins of popular culture, the role of popular culture in shaping conceptions of power and status (including issues of race, class, gender and sexuality), and recent debates about the relation between popular culture and social problems. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

SOC 120 Deviance and Social Control
The study of deviant behaviors, individuals and groups, with emphasis on social order, power and identity. Use of the sociological perspective to explore definitions of deviance, processes by which individuals become labeled as deviant, the nature of deviant

identities and societal consequences of constructions of deviance. Satisfies the General Education Social Contexts and Institutions Requirement. Cr 3.

SOC 201 Social Inequality
Structural analysis of social inequality within American society and the global community. Emphasis on the causes, extent and social consequences of inequality, especially those based on race, gender, social class and the level of economic development. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 or permission. Cr 3.

SOC 202 Social Problems
The social bases of social problems. Topics may include poverty, racism and other forms of discrimination, crime and justice, health care, environmental issues, violence and terrorism, and family issues. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 or permission. Cr 3.

SOC 205 The Sociology of Close Relationships
The study of informal, "primary" relations in modern societies, including intimate couples, friendships, close co-workers, and others. The content will focus on how dyads are shaped by the larger social structures within which they are embedded (e.g., "networks," nuclear families, extended families, organizations, and cultural value frameworks.) Attempts will also be made to identify gender, age, social class, and race differences, where appropriate. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SOC 208 Problems of Violence and Terrorism
The nature and causes of revolutionary and government-sponsored international terrorism. The future of terrorism and how to cope with it. The institutionalization of terrorism in pre-modern and contemporary totalitarian states. The social causes of war and social conflict. Social preconditions for the maintenance of a sustainable peace. An examination of the nature of human aggression. Satisfies the General Education Ethics, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 or permission. Cr 3.

SOC 214 Crime and Criminal Justice
The causes, extent and nature of crime in American society and the operation of the criminal justice system. Emphasis given to theories and dynamics of criminal behavior and to the efforts of police, courts and prisons to prevent and to control criminality. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SOC 240 Topics in Sociology
A second-level study of topics such as "Sociology of Youth. " "Sociology of Countercultures," "Sociology of Sport," and "Urban Sociology. " May be repeated for credit if the topics differ. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SOC 301 Social Organization: The Micro Picture
The study of social interaction in small social settings, with emphasis on power and status. The negotiation of identity as a social process. The impact group structures on the self. Rituals as building blocks of micro-structures. Conversations as constructions of social reality. Informal group structures in large organizations. Prerequisite: junior Sociology major and 6 hours of Sociology or permission. Cr 3.

SOC 302 Social Organization: The Macro Picture
An examination of the structure and dynamics of large scale social organizations. Particular emphasis on institutional, formal, or bureaucratic and community structures characteristic of the industrialized and post-industrialized world. Prerequisite: junior sociology major and 6 hours of sociology or permission. Cr 3.

SOC 304 Sociology of Lesbian and Gay Families and Relationships
Social, familial and legal issues surrounding the formation of lesbian and gay marriages, domestic partnerships and families that include children. Relationship dynamics, sexuality, and parenting among lesbian and gay partners, and differences (when present) from heterosexual experiences. Issues arising at the intersections of sexual orientation with gender, race, and social class. The shifting nature of lesbian and gay sexual identities in a postmodern world. (This course is identical to SOC 404.) Satisfies the General Education Ethics, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 or WST 101 or CHF 200 or CHF 351 or permission. Cr 3.

SOC 310 Quantitative Reasoning in Sociology
The use of statistical methods in sociological research. Topics include descriptive and inferential statistics and hypothesis testing. Special emphasis placed on sociological applications of statistical techniques, an understanding of when they are appropriate to use, and the information they yield. Satisfies the General Education Mathematics Requirement. Prerequisite: 6 hours of Sociology or permission. Cr 3.

SOC 312 Political Sociology
Applies sociological conceptual frameworks and theories to the interpretation and explanation of political phenomena such as voting behavior, power systems, and political processes and revolutions. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SOC 314 Law and Society
Presents a sociological perspective on law and the legal system in the United States and other societies. Topics include problems in defining law, sociological theories of the origins and consequences of law, international differences in modes of dispute resolution, the relation between law and social change, studies of the legal profession and legal discretion in the criminal justice system. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 and SOC 120, SOC 214 or POS 100 or permission. Cr 3.

SOC 316 Sociology of Aging
A multidisciplinary exploration of aging from young adulthood to old age. Special emphasis is given to mid-life issues for women and men as well as to the end of life, including research on the near-death experience. Cultural expectations and social policies for the elderly are examined with regard to race, class and gender with specific focus on the state of Maine. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirement . Also satisfies a requirement for the Certificate in Maine Studies. Prerequisite: SOC 101 or permission. Cr 3.

SOC 318 Sociology of the Family
Analysis of the modern family begins with a socio-historical examination of the effects of love, gender and poverty. Major topics include marriage and divorce, sexual behavior, family violence, parenting and ethnic families. Current families are analyzed from a social psychological viewpoint that includes the dynamic structure of relationships. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SOC 319 Domestic Violence and Social Structure
Examines domestic conflict and violence internationally, nationally and within the state of Maine. Emphasizes the social and political context of domestic violence including the ways in which a society's culture and social organization contribute to and reinforce this behavior. Incidence, processes and consequences of domestic violence are explored as well as strategies for social change. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: 6 hours of Sociology or permission. Cr 3.

SOC 320 Perspectives on Applying Sociology
Examines how sociology can be used in non-academic settings. Practice using research and presentation tools. Explores how sociological theories and methods can be applied to solve real life problems and contribute to social change in a variety of settings. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SOC 329 Sociology of Gender
Analysis of contemporary constructions of gender. Emphasis on the interpersonal and institutional dimensions of sexism and the prospects of social change. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: 6 hours of Sociology or WST 101 or permission. Cr 3.

SOC 330 Perspectives on Women
Multidisciplinary and international analysis of the personal, interpersonal and institutional dimensions of women's lives. Explores commonalties among women as well as differences based on race, social class, age, and sexual identity. Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 201 or WST 101 or permission. Cr 3.

SOC 337 Sociology of Mental Illness
Examination of the sociological concepts of mental illness. Analysis of the relationship between mental illness and the sociological factors responsible for these disorders. Cross-cultural examination of mental illness. The nature and structure of mental care institutions. Satisfies the General Education Ethics and Social Contexts and Institutions Requirements. Prerequisite: SOC 101 or PSY 100 or permission. Cr 3.

SOC 338 Race and Ethnicity
Explores dominant/subordinate relations nationally and internationally with emphasis on socially defined racial and ethnic groups. Origins, nature, and consequences of racial/ethnic oppression and inequality; historical and social contexts of intergroup relations and conflicts; implications of changing racial/ethnic diversity. (This course is identical to BLS 338.) Satisfies the General Education Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 and SOC 201 or permission. Cr 3.

SOC 339 Sociology of Health and Medicine
Explores issues of health, illness and medicine from a sociological perspective. Topics will include: the organization of U.S. health care; causes of, and possible solutions to, problems in the health care system; definitions of health and illness; social factors in illness and disease; history and dynamics of health care professions; the doctor/patient relationship; and gender, race and class inequalities in health care delivery. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SOC 340 Intermediate Topics in Sociology
An intermediate-level study of topics such as "Sociology of Emotions," "Sociology of Science and Technology," and "Modern Sociological Theory. " May be repeated for credit if the topics differ. Prerequisite: 6 hours of Sociology or permission. Cr 3.

SOC 365 Social Change
Review and analysis of major principles in social change such as social evolution and revolution and their relevance in understanding contemporary social processes in American, Western, Communist and former Communist, and developing societies. Considers problems of future society. Satisfies the General Education Social Contexts and Institutions Requirement. (Not offered every year.) Prerequisite: SOC 101 or permission. Cr 3.

SOC 369 Collective Behavior and Social Movements
Examines the causes, dynamics and consequences of crowds, mobs, riots, fads, mass hysteria and rumors. The impact of disasters on individual behavior and social structures is considered. Special emphasis placed on social movements as collective efforts to bring about or prevent social change. Prerequisite: 6 hours of Sociology or permission. Cr 3.

SOC 390 Logic of Sociological Inquiry
Explores the relationship between theory and research. Specific topics include the nature of scientific proof in the social sciences, measurements of variables, hypothesis and theory testing, sampling, research design, ethical issues in research, and the relationship between research and policy-making. Satisfies the General Education Writing Intensive Requirement. Prerequisite: junior Sociology major and 6 hours of Sociology. Cr 3.

SOC 404 Sociology of Lesbian and Gay Families and Relationships
Social, familial, and legal issues surrounding the formation of lesbian and gay marriages, domestic partnerships, and families that include children. Relationship dynamics, sexuality, and parenting among lesbian and gay partners, and differences (when present) from heterosexual experiences. Issues arising at the intersections of sexual orientation with gender, race, and social class. The shifting nature of lesbian and gay sexual identities in a postmodern world. (This course is identical to SOC 304.) Satisfies the General Education Ethics, Social Contexts and Institutions and Cultural Diversity and International Perspectives Requirements. Prerequisite: SOC 101 or WST 101 or CHF 200 or CHF 351 or permission. Cr 3.

SOC 442 Population and Society
Population processes in an international perspective and their effects on society. Includes fertility, migration, mortality; population, resources and technology; population, social change and economic development; family planning and population policy. Satisfies the General Education Social Contexts and Institutions and Population and the Environment and Writing Intensive Requirements. Prerequisite: SOC 101 and junior or senior standing or permission. Cr 3.

SOC 460 Major Ideas in Sociology
The sociological theories of Marx, Weber, Durkheim, Mead and others. Developments in sociological theory as related to methodology, social issues, and current trends in contemporary sociology. Prerequisite: junior standing and 6 hours of Sociology or permission. Cr 3.

SOC 482 The Sociology of Religion
Topics include: comparative religious cultures and beliefs; the social construction of religious beliefs; institutionalized religions and the resurgence of new sects and cults; major world religions and the way religion preserves and changes the social order; the encounter between religion and contemporary developments in science. Secularization and the future of religion. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 and junior or senior standing or permission. Cr 3.

SOC 493 Senior Thesis
The completion of a senior thesis on a topic of the student's choice under the supervision of a sociology faculty member. Encourages

excellent senior students to conduct a significant piece of sociological research. May be taken for only one semester, but normally students should plan to enroll for two semesters as a significant project usually cannot be completed in less than an academic year. May be repeated once for 3 additional credits. Prerequisite: permission; sociology major with senior standing and a minimum GPA in sociology courses of 3. 5; SOC 390, SOC 460 and statistics. Cr 3.

SOC 495 Internship in Sociology
A supervised internship providing practical experience in a field placement and requiring parallel readings and study. Emphasis on the guided application of concepts and principles from related courses and structured readings to applied situations in the field. Students may take 3-9 credits. Not more than 6 credit hours may be used toward the departmental major. Prerequisite: Sociology major; senior standing; GPA of at least 3. 0 and permission of instructor. Cr 3-9.

SOC 497 Departmental Projects I
Prerequisite: permission. Cr 1-3.

SOC 498 Departmental Projects II
Prerequisite: permission. Cr 1-3.

SOC 499 Senior Seminar
Selected theoretical and empirical topics in Sociology. Serves as the capstone course for Sociology majors and will assume a knowledge of and will build upon, the material presented in the other required courses in the major. The intent of the course is to help students integrate their Sociology knowledge and to apply it in dealing with fundamental questions of social life and social theory. Satisfies the General Education Capstone Experience Requirement. Prerequisite: major in Sociology with senior standing; SOC 301 and SOC 302 and SOC 390 and SOC 460 or permission. Cr 3.

Spanish (SPA)

SPA 101 Elementary Spanish I
A systematic study of the basics of the Spanish language. Equal emphasis on developing reading, comprehension, speaking and writing skills. For students with no previous study of Spanish or fewer than two years in high school. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 3-4.

SPA 102 Elementary Spanish II
A continued study of the basics of the Spanish language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of Spanish or fewer than two years in high school. Prerequisite: SPA 101 or equivalent. Cr 3-4.

SPA 199 Review Spanish
For students who have taken 2 or more years of high school Spanish, but do not feel ready to complete the SPA 203-204 sequence. Fast-paced review of basic grammar, pronunciation and vocabulary, with strong emphasis on oral communication. This is not the equivalent of SPA 203/204 level language courses. 2 class meetings per week, with substantial listening and writing assignments. Lec 2. Prerequisite: 2 years of high school Spanish or permission. Cr 2.

SPA 203 Intermediate Spanish I
An integrated approach. Reading texts as well as other materials will be employed to strengthen reading, writing and especially speaking and comprehension skills. Includes a systematic but gradual review of the essentials of Spanish grammar. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 102 or equivalent. Cr 3-4.

SPA 204 Intermediate Spanish II
A continuation of SPA 203 designed to strengthen reading, writing, speaking and comprehension skills. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 203 or equivalent. Cr 3-4.

SPA 206 Spanish Conversation and Composition
Develops proficiency in spoken and written Spanish through selected vocabulary and grammar exercises, discussion, skits, speeches, and compositions. Conducted in Spanish. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: SPA 204 or equivalent. Cr 3.

SPA 305 Applied Spanish
Intensive oral and written practice in real-life situations. Development of confidence, accuracy, fluency and communicative strategies in formal and informal modes of expression. Guided development of idiomatic expression and structures; development of self-correct in speech and writing. Reinforcement through interactive situations. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: SPA 204. Cr 3.

SPA 307 Readings in Peninsular Literature
An overview of Peninsular Spanish literature. Provides practice in reading and analyzing culturally important texts. Includes a selection of genres and periods will be included. May be taken either before or after SPA 308. Satisfies the General Education Cultural Diversity and International Perspectives, Western Cultural Tradition and Writing Intensive Requirements. Prerequisite: SPA 206 or permission. Cr 3.

SPA 308 Readings in Spanish American Literature
Emphasis on changes in the cultural phenomena, styles, themes and ideological position of texts from the beginnings of Hispanic American literature through romanticism, naturalism, the novel of the land, the "Boom" and avant-garde movements. May be taken before or after SPA 307. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 206 or permission. Cr 3.

SPA 401 Golden Age
A study of masterpieces of poetry and prose from the 16th and 17th centuries provides an overview of the period and critical abilities. Poetry by Garcilaso, Fray Luis, San Juan, Gongora, and Quevedo, etc. Prose readings include Lazarillo de Tormes, Diana, Suenos y discursos, and Novelas ejemplares etc. Satisfies the General Education Cultural Diversity and International Perspectives and Western Cultural Tradition Requirements. Prerequisite: SPA 307 or SPA 308 or permission of the instructor. Cr 3.

SPA 403 Cervantes
A careful reading of the Spanish masterpiece, Don Quixote, including its historical background and continuing influence. Satisfies the General Education Cultural Diversity and International Perspectives and Western Cultural Tradition Requirements. Prerequisite: SPA 307 or SPA 308 or permission. Cr 3.

SPA 405 Spanish Literature of the Nineteenth Century
Discussion of the novel from "costumbrismo" to "realismo," the compromise of Spanish naturalism, and the Romantic movements between tradition and revolt. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 307 or SPA 308 or permission of the instructor. Cr 3.

SPA 406 Spanish Literature of the Twentieth Century
Selections from the poetry, essays, and novels of the pre and Civil War period contextualized through readings in the history and thought of the times. Satisfies the General Education Cultural Diversity and International Perspectives and Western Cultural Tradition Requirements.

Prerequisite: SPA 307 or SPA 308 or permission of the instructor. Cr 3.

SPA 409 Contemporary Latin-American Short Story
A study of Latin-American short story writers including discussion of such significant contemporary concerns as poverty, politics and religion, and such themes as the interplay of fantasy and reality and the relativity of madness. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 307 or SPA 308 or permission. Cr 3.

SPA 411 Contemporary Latin American Theater
A study of the major Latin-American playwrights of the 20th century. Reading and analysis of plays, class discussion. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 307 or SPA 308 or permission. Cr 3.

SPA 412 Contemporary Peninsular Theater
A study of major Spanish playwrights of the 20th Century. Reading and analysis of plays, class discussion. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 307 or SPA 308 or permission. Cr 3.

SPA 420 Spanish Film
Areas covered may vary and could include the following topics: national cinemas; director of note; the social, political, historic and economic factors that influence both the creation and content of films; and an analysis of the components of cinematography. May be repeated for credit. Satisfies the General Education Social Contexts and Institutions and Artistic and Creative Expression Requirements. Prerequisite: A Spanish class at the 300 level or permission. Cr 3.

SPA 444 Theory and Techniques of Translation
Designed to develop awareness of linguistic styles and structures and emphasize the complex relationship between a language and its context. Taught as workshop, with regular assignments of texts for translation, comparison and evaluation. Selections from literature and general topics, although this is not a literature course. Attention given to theories of translation both past and present and how these theories respond to cultural and ideological perspectives; and relate to Spanish translation. Satisfies the General Education Cultural Diversity and International Perspective and Writing Intensive Requirements. Prerequisite: SPA 206 or equivalent. Cr 3.

SPA 490 Topics and Individual Authors in Spanish
Specific topic varies semester to semester. May be repeated for credit. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SPA 307 or SPA 308. Cr 1-3.

SPA 497 Projects in Spanish I
Independent study on topics selected by student and instructor. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Cr 1-3.

SPA 498 Projects in Spanish II
Independent study on topics selected by student and instructor. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: permission. Cr 1-3.

SPA 597 Projects in Spanish I
Specific projects vary from semester to semester depending on the needs of the graduate student and the skills of the faculty member. May be repeated for credit. Cr 3.

SPA 598 Projects in Spanish II
Specific projects vary from semester to semester depending on the needs of the graduate student and the skills of the faculty member. May be repeated for credit. Cr 3.

Student Teaching (STT)

STT 490 Full-Day Student Teaching (Elementary)
A full-day, off-campus internship program in a selected school. (Pass/Fail Grade Only.) Satisfies the General Education Capstone Experience Requirement. Prerequisite: Early application and permission. Cr 1-12.

STT 491 Full-Day Student Teaching (Secondary)
A full-day, off-campus internship program in a selected school. (Pass/Fail Grade Only.) Satisfies the General Education Capstone Experience Requirement. Prerequisite: Early application and permission. Cr 1-12.

STT 494 Student Teaching K-12 (Art or Music)
Observation and student teaching in selected elementary and/or secondary schools. (Pass/Fail Grade Only.) Satisfies the General Education Capstone Experience Requirement. Prerequisite: EDB 202, EDB 204, EDB 221 or their equivalents, methods course, and senior standing. Cr 1-12.

STT 496 Advanced Internship (Elementary)
A full-day, off-campus advanced internship, teaching in a selected school. Seminars and conferences. (Pass/Fail Grade Only.) Satisfies the General Education Capstone Experience Requirement. Prerequisite: STT 490 and permission of the Director of Educational Field Experiences. Cr 2-6.

STT 497 Advanced Internship (Secondary)
A full-day, off-campus advanced internship, teaching in a selected school. Seminars and conferences. (Pass/Fail Grade Only.) Satisfies the General Education Capstone Experience Requirement. Prerequisite: STT 491 and permission of the Director of Educational Field Experiences. Cr 2-6.

STT 498 Seminar for Interns
Students examine and reflect on their understanding about teaching and learning, apply integrated educational skills and knowledge and synthesize academic and professional experiences from their courses, field experiences and internships to develop and finalize their Teacher Candidacy portfolio. Prerequisite senior standing and com-pletion of all other program requirements or permission. Corequisites: STT 490, STT 491, STT 496, STT 497 and STT 499. Cr 1-3.

STT 499 Student Teaching K-12 (Kinesiology and Physical Education)
Observation and student teaching in selected elementary and/or secondary schools. Satisfies the General Education Capstone Experience Requirement. Prerequisite: EDB 202, EDB 204, EDB 221 or their equivalents, methods course, and senior standing. Cr 1-12.

Surveying Engineering Technology (SVT)

SVT 100 Introduction to Surveying Technology
Discussion of the major topics in surveying engineering technology including field instrumentation, boundary surveying, topographic surveying, computer-aided drafting, route surveying, global positioning system and geodesy, map projections, photogrammetry, remote sensing, and geographic information systems. Will include lectures from practicing professionals in their respective disciplines. Lec 1. Cr 1.

SVT 110 Instrumentation and Data Collectors
Instrumentation used in various aspects of surveying engineering technology and the systems that communicate with those systems (generically known as data collectors) will be discussed. Systems for processing, display, and presentation of results will also be demonstrated. Photogrammetric data collection will be examined as an alternative to direct field methods. Lec 1. Cr 1.

SVT 201 Adjustment Computations
Basic statistics as applied to surveying, error estimation, error propagation, basic matrix algebra, level network analysis, 3-D traverse analysis, GPS vector network analysis, combined traditional total station and GPS network analysis, blunder detection, positional tolerance, hypothesis testing. Lec 3. Prerequisite: CET 202, MAT 215, TME 253 and SVT 110 or equivalents. Cr 3.

SVT 221 Boundary Law
Covers historical to present United States land title conveyancing, historical surveying procedures, colonial and pre-colonial land grants, the United States public land survey system, rules of construction and procedures for boundary retracement, recording systems, interpretation and writing property descriptions, and professional responsibility. Lec 4. Prerequisite: CET 101. Corequisite: ENG 212. Cr 4.

SVT 322 Writing Effective Property Descriptions
Covers principles of interpretation, writing techniques, forms for descriptions and writing of land descriptions. The course is divided into several subsets. Successful completion requires the student take a pre-test, read the assignments, perform practical exercises, turn in assignments for grade, and pass an examination. Web-based. Lec 0. Cr 1.

SVT 325 Surveyors Ethics
Introduces students to ethics theory, general concepts and principles pertaining to surveying ethics and handling ethical situations in practice. Throughout the course, students will be presented with a combination of practical exercises, explanation and discussion narratives. Satisfies the General Education Ethics Requirement. Web-based. Lec 0. Cr 1.

SVT 326 Record Research
Covers the location of property records, general procedure for locating relevant records, differences between title and boundary research, overcoming typical problems in research, the preparation of title abstracts and research reports and the use and limitations of research. Throughout the course, students will be presented with a combination of practical exercises, explanation and discussion. Students who have taken SVT 221 cannot enroll in this course. Web-based. Lec 0. Cr 1.

SVT 329 Site Planning and Subdivision Design
Subdivision rules and regulations, creating lots of esthetic value, satisfying minimum lot requirements, acreage calculations, cul-de-sacs, integration of site features to optimum development, application of civil engineering principles to land development and land development software. Lec 1. Prerequisite: CET 332, MET 121, SVT 221 or equivalents. Cr 1.

SVT 341 Advanced Surveying
Geodetic horizontal and vertical datums, plane projection systems, localization of projection coordinates, datum transformations, astronomic observations, cadastral surveying as applied to the U.S. Public Land Survey System, creation of survey products in a computer-aided drafting environment, engineering related photogrammetry (job planning, control aspects, map collection and processing, and image based products). Lec 3. Prerequisite: CET 202, SVT 201 or equivalent. Cr 3.

SVT 352 Practical Field Operations
Making optimal use of a survey data collection system in creation of office survey products, building checks in survey collection, automated field techniques which create office linework, optimizing feature coding and descriptive abilities, deciding between use of GPS and optical survey devices for survey projects, optimization of stakeout and building checks in that process, surveying documentation and reporting. Lec 3. Prerequisite: CET 202, ENG 317 or equivalent. Cr 3.

SVT 418 Fundamentals of Surveying Exam Overview
A review of all elements of the "day #1" nationwide element of the examination which leads to licensure as a professional land surveyor. Practice examinations on all topics covered in this exam. Lec 1. Prerequisite: Junior standing or permission of instructor. Cr 1.

SVT 437 Practical GPS
Presentation of all types of GPS equipment with their uses and limitations, GPS observation planning based on satellite geometry and obstructions, review of geodetic coordinate systems and datums, the geoid and how it relates to the production of elevations from GPS, execution of all components (planning, field collection, downloading, processing, and adjustment) of a GPS survey where raw data is collected, real time kinematic (RTK) GPS filed execution and adjustment for control work, use of RTK GPS in collection of a topographic survey. Lec 2, Lab 2. Prerequisite: SVT 201, SVT 341 or equivalent. Cr 3.

SVT 475 Small Business Management
Provides a broad overview of the skills necessary to operate a small business. Focuses on teaching basic marketing, accounting and management skills with an emphasis on topics that impact the small business owner. Lec 3. (Fall.) Satisfies the General Education Writing Intensive Requirement. Cr 3.

Social Work (SWK)

SWK 101 Opportunities in Social Work
Introduces first-year and transfer students who have declared to the general resources of the University of Maine and the specific resources of the School of Social Work. Topics include overview of library and computer facilities, opportunities for travel/study, University graduation requirements, requirements for the BASW degree and exploration of volunteer opportunities, internships and social work future career opportunities. (Pass/Fail Grade Only.) Cr 1.

SWK 320 Values, History and Practice in Social Work and Social Welfare
Focuses on the history and development of social welfare and social work, the basic values and concepts of social work practice and the major fields of social work practice. Second semester students or sophomore level. Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SWK 330 Contemporary Issues in Diversity and Pluralism
Examines plurality and diversity from a standpoint of difference created by culture, race, social structure, religious affiliation, gender, age, sexual orientation and ability. Issues of prejudice and discrimination examined on an individual and societal level. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: SOC 101. Cr 3.

SWK 350 Human Behavior and the Social Environment I
Examines normative development, behavior, values and attitudes as influenced by age, cohort, gender, culture, social class, social structures, oppression and other environmental factors. Addresses the life span and attendant concerns from multiple theoretical perspectives within a systems person-in-environment framework. Considers implications for social work practice and social welfare policy. Prerequisite: PSY 100, SOC 101, and PSY 323 or permission. Cr 3.

SWK 351 Human Behavior in the Social Environment II
Examines research and traditional/alternative theories related to normative development of families, small groups and communities. Explores the impact of age, gender, social class, oppression and other environmental factors on that development. Examines the physical environment (nature and built), social

structure and contexts of organizations and institutions in interaction with families, groups and communities. Considers implications for social work practice and social welfare policy. Prerequisite: SWK 350 or permission. Cr 3.

SWK 361 Social Work Methods I
Explores the functions and roles of the social worker, the value base of social work practice, and the processes of providing service. Social Work majors only. Prerequisite: SWK 350 or permission. Cr 3.

SWK 365 Problems of Child Abuse and Neglect: A Multidisciplinary Approach
Examines the roles of the major disciplines, agencies and professions involved in the prevention, early detection, assessment, intervention, treatment and management of child abuse and neglect. Focus on victims and their families. (Continuing Education Only.) Satisfies the General Education Social Contexts and Institutions Requirement. Prerequisite: SOC 101 or permission. Cr 3.

SWK 395 Beginning Field Experience in Social Work
Preparation for field practicum, exploration of interest in professional social work and introduction to social welfare agency milieux through volunteer experience. Students must register for both fall and spring semesters. Prerequisite: Social Work majors or permission only. Cr 1 - 3.

SWK 397 Independent Projects in Social Welfare I
Content varies to suit needs of individual students or small groups. May be repeated for credit. Cr 1-3.

SWK 440 Social Welfare Policy and Issues
Provides an analytic perspective on the provision of social services and the interrelatedness of practice and policy analysis. The dimensions of choice in social welfare policy and major issues in provision of services are examined. Satisfies the General Education Social Contexts and Institutions and Writing Intensive Requirements. Prerequisite: SWK 320 or permission. Cr 3.

SWK 462 Social Work Methods II
Develops knowledge, values and skills necessary for provision of social services to individuals, families and small groups. Includes knowledge and skill building in interpersonal communication, planning and carrying out interventions, and evaluating interventions within the context of generalist social work practice. Integrates classroom and field instruction experiences. Limited to senior social work majors. Prerequisite: SWK 361. Cr 3.

SWK 463 Social Work Methods III
Explores the theory and practice of purposive social change in social agencies and communities, participation of social workers in politics, and social worker roles of advocate, resource mobilizer, program planner, and organizer. Integrates the classroom and field instruction experience. Limited to senior social work majors. Prerequisite: SWK 462. Cr 3.

SWK 465 Child Welfare Practice
Assessing child abuse and neglect, ethical issues in child welfare practice, permanency planning for children in care. Cr 3.

SWK 491 Methods of Social Work Research
Beginning methods of social work research. Strategies and methods of developing knowledge in the context of social work practice and social welfare. The place of theory in research, problem formulation, ethical concerns, research designs, including practice research and evaluation, methods of data collection, sampling, introduction to program evaluation, and basic procedures in data analysis and statistics. Cr 3.

SWK 495 Field Practicum in Social Work
Generalist social work practice in community agencies provides opportunities to apply social work knowledge and skills directed toward planned intervention and change efforts. Limited to social work majors who have completed at least 75 course credit hours. Satisfies the General Education Capstone Experience Requirement Prerequisite: SWK 361 and SWK 440. Taken concurrently with SWK 462 (fall semester) and SWK 463 (spring semester.) Twelve credit hours required; six per semester, variable by permission only. Cr 1-6.

SWK 497 Special Topics in Social Work
Content varies to suit needs of individual students or small groups. May be repeated for credit. Prerequisite: permission. Cr 1-3.

SWK 530 MSW Advanced Standing Bridging-Social Welfare Policy
Analysis of social welfare policies for social work practice. Prerequisite: Advanced Standing MSW student. Cr 2.

SWK 531 MSW Advanced Standing Bridging-Social Work Practice
Integration of generalist knowledge, values and skills with application to simulated and actual social work practice situations. Prerequisite: Advanced Standing MSW student. Cr 2.

SWK 532 Advanced Standing Bridging-Social Work Research
Review of investigative strategies used to answer questions and queries of concern to social workers. Review of research design from naturalistic to experimental-type. Prerequisite: Advanced Standing MSW student. Cr 2.

SWK 533 MSW Advanced Standing Bridging-Human Behavior and the Social Environment
Utilizes multiple theoretical approaches for understanding human behavior in the social environment. Prerequisite: Advanced Standing MSW student. Cr 2.

SWK 540 Social Welfare Policy and Issues for Generalist Practitioners
Analysis of the provision of social services and the interrelatedness of practice and policy analysis with emphasis on dimensions of choice in social welfare policy and major issues. Prerequisite: permission. Cr 3.

SWK 550 Human Behavior and The Social Environment I
Examines research and theories related to normative life span development as influenced by age, gender, social class, social structures oppression and other environmental factors. Uses systems theory and person-in-environment construct as the analytical framework. Considers implications for social work practice and social welfare policy. Prerequisite: MSW students or by permission. Cr 3.

SWK 560 Practice in Generalist Social Work I
Develops knowledge, values and skills necessary for direct practice of generalist social work with small systems, including individuals, small groups and families. Covers social systems and problem solving framework. Prerequisite: first year MSW students. Corequisite: SWK 595. Cr 3.

SWK 563 Practice in Generalist Social Work II
Topics include theory and practice of purposive social change in social agencies and communities, participation of social workers in politics, and social worker roles as advocate, resource mobilizer, program planner and organizer. Integrates classroom and field experience. Prerequisite SWK 560 or permission. Corequisite: SWK 595. Cr 3.

SWK 571 Assessment and Intervention of Trauma in Social Work Practice
Explains current research and controversies in the areas of psychobiology of trauma, memory, dissociation, developmental impacts, diagnosis and treatment. Prerequisite: MSW student or permission. Cr 3.

SWK 572 Program Planning and Grant Writing
Integration of research methods, evaluation,

policy analysis, advanced social work practice to develop, plan and pose strategies for social service program development and funding. Prerequisite: MSW student or permission. Cr 3.

SWK 573 Supervision in Human Services I
Knowledge, skills and values for supervision in human service agencies. Goal setting, personnel issues, models of social work supervision. Prerequisite: MSW student or permission. Cr 3.

SWK 574 Supervision in Human Services II
A continuation of SWK 573. Emphasis on power dynamics as related to diversity in gender, race, religion, age and position in the supervisory dyad. Supervisory skills for staff evaluation and feedback. Prerequisite: SWK 573 or permission. Cr 3.

SWK 575 Family Therapy in Social Work Practice I
Overview of models of family therapy for social work practice. Emphasis on assessment and intervention with families, children and couples. Prerequisite: MSW student or permission. Cr 3.

SWK 576 Family Therapy in Social Work Practice II
Emphasis on brief solution-focused and narrative models of family therapy in social work practice. Prerequisite: MSW student or permission. Cr 3.

SWK 577 Group Strategies in Health/Mental Health Settings
Group strategies for social work practice in health and mental health settings including team-meetings, psychoeducational issues in health care, workshops, communities, organizations, counseling and psychotherapy. Prerequisite: MSW student or permission. Cr 3.

SWK 580 Adult and Child Psychopathology
Overview of DSMIV, gender differences in mental illness, current conceptions of serious mental illness, impact of psychiatric labeling and stigma on individuals and families. Prerequisite: MSW student or permission. Cr 3.

SWK 591 Social Work Research I
Integration of social work theory, practice and research including problem formulation, research design, ethical concerns and protocols for protection of human subjects. Prerequisite: permission. Cr 3.

SWK 595 Field Practicum in Social Work
Supervised generalist social work practice in community agencies provides opportunities to apply social work knowledge and skills toward planned intervention and change efforts. Prerequisite: SWK 560 or SWK 563. Cr 4-6.

SWK 596 Social Work Skills Lab
Basic skills and understanding of professional ethics, professional relationships, written, oral and reciprocal communication skills and interviewing skills. (Pass/Fail Grade Only.) Corequisite: SWK 595. Cr 1.

SWK 597 Advanced Topics in Social Work
Content varies to suit student needs. May be repeated for credit. Prerequisite: permission. Cr 1-3.

SWK 597 Social Work Skills Lab
Basic skills and understanding of professional ethics, professional relationships, written, oral and reciprocal communication skills and interviewing skills. Corequisite: SWK 595 Cr 1.

Theatre (THE)

THE 100 Theatre Seminar
Weekly planning meetings required of all Theatre majors. Includes allocation of casting and crew assignments, safety training, career information and all other logistical communication necessary to the major. Also provides a weekly forum for student scene work and design presentations. Offered every semester. Cr 0.

THE 111 Introduction to Theatre
A basic appreciation course for the general student as well as prospective theatre majors that explores the process of theatrical expression throughout history and its relationship to culture. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

THE 112 Masterpieces of World Drama I
Survey of drama from its early development up to the present as literature and as theatre. Stress on dramatic form and content and on the uniqueness of the drama to reflect the philosophical, social and political environment. Satisfies the General Education Western Cultural Tradition Requirement. Cr 3.

THE 116 Play Production
Covers the basic principles of stage directing including choosing and analyzing plays, scheduling rehearsals, blocking action, and determining stage business. Backstage work on major and laboratory theatre production is recommended. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

THE 117 Fundamentals of Acting
Focus on the basic skills of acting, including internal preparation for playing a role, character analysis, vocal and physical development and techniques for projecting to an audience. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

THE 118 Stage Makeup
Study of principles and techniques of stage makeup including practical application in class and production experience opportunities. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

THE 119 Fundamentals of Theatre Practice
An examination of the world backstage. Team taught by design and production faculty and staff, this course provides the student with the knowledge and experience to perform comfortably backstage. Students explore the development of scenery, properties, costumes, lighting and sound and their relationship to the final product, the performance. Satisfies the General Education Artistic and Creative Expression Requirement. Cr 3.

THE 202 Script Analysis
Examines modern literature written for the theatre. Because the literature will be presented from a production perspective, this course is oriented for use by actors, directors and designers. The objective is to stimulate greater clarity, logic, depth and imagination of interpretation and to develop more effective preparatory techniques. Prerequisite: THE 112, THE 116, THE 117 or THE 119 or any English course beyond ENG 101. Cr 3.

THE 220 Introduction to Stagecraft
Designed to provide a foundation in the practice of technical theatre and preparation for work in scenery, lighting and sound. Emphasis is placed on procedures, practice and nomenclature. The required lab, that accompanies this course, provides hands-on experience, through special projects, designed to reinforce specific technical skills discussed and demonstrated in class. Corequisite: THE 221. Cr 3.

THE 221 Introduction to Stagecraft Lab
Provides hands-on experience, through special projects, designed to reinforce specific technical skills discussed and demonstrated in THE 220. Corequisite: THE 220. Cr 1.

THE 230 Introduction to Costume Construction
Basic processes of theatre costume construction. Includes measuring, building and fitting techniques, safety in the costume studio and fabric properties and selection. Skills are developed through construction of a personal project and participation in

building costumes for productions. Prerequisite: A lab in related production work, THE 231 is required for majors, optional for others. Cr 3.

THE 231 Introduction to Costume Construction Laboratory
Laboratory in costume production work. Required for theatre majors. Corequisite: THE 230. Cr 1.

THE 268 Theatre Practicum, Technical
Supervised experience in Theatre and Dance Division productions in the areas of stage managing, publicity, scenery, lighting, costumes and makeup. May be repeated for a maximum of six hours. Prerequisite: 6 hours of theatre courses and permission of the Director. Cr 1-3.

THE 269 Theatre Practicum in Acting
Laboratory work in acting. Credit assigned by agreement of advisor and show director, based on learning opportunities of role. May be repeated for a maximum of three hours. Prerequisite: 6 hrs of Theatre courses and permission of the director. Cr 1-3.

THE 301 Fundamentals of Characterization
Designed to help student actors develop a methodology and technique for analyzing character and performing scenes from the modern theatre repertoire. Prerequisite: THE 117 or permission. Cr 3.

THE 302 Movement Training for Actors
A studio course in movement training and development for actors. Focus is on the use of the elements of movement and laban's effort-shapes to explore text and its expression and to expand the movement vocabulary of the actor. Prerequisite: THE 117, DAN 101. Cr 3.

THE 310 Topics in Theatre Technology
An advanced study in specific areas of technical theatre. Subjects vary from year to year but may include lighting technology, sound, scenic painting and properties, costume pattern drafting, costume crafts or stage management. May be repeated for credit. Prerequisite: THE 220 or THE 230 or permission. Cr 3.

THE 320 Topics in Theatre Design
Study of the theatre design process in a specific area, including costume, lighting, scenic or sound design. Encompasses research, drafting or drawing, script analysis, budgeting and organizational skills required to design in the specified field. May be repeated for credit. Cr 3.

THE 340 Playwriting, Directing and Performing Lab
Performing a matrix for playwriting, directing and performing, this lab class affords the student an opportunity to work on a wide variety of original projects. Each student will create a traditional script or a nontraditional performance piece that will be written, analyzed and rewritten. There will be regular "Readers Theatre" style presentations of the material by members of the class. Satisfies the General Education Artistic and Creative Expression and Writing Intensive Requirements. Prerequisite: THE 116 or permission. Cr 3.

THE 400 Voice and Speech for the Actor
A studio course in the principles of voice production and speech for the stage. Focus is on the development of the actor's voice and speech through exercises that heighten awareness of breath, encourage freer expression and expand vocal range and clarity. Cr 3.

THE 403 Styles and Techniques of Comedy
Concentrates on the nature of comedy and comedic character addressing challenges such as timing, movement and relationship from all sources of dramatic literature from verse to modern comedy, from absurdism to tragic comedy. Prerequisite: THE 117, THE 301. Juniors and Seniors. Cr 3.

THE 405 Drama In Education
Designed to enable future teachers, therapists, care providers, or corporate social directors to enhance current curricula or activity with creative exercises and approaches which stimulate interest, focus and interpersonal relations. Offers opportunities to explore peer pressure, non-conforming behavior and social conflict honestly, with greater understanding of self and others. In addition, it will address creating an environment safe enough to allow uncensored imagination to flow. Satisfies the General Education Social Contexts and Institutions and Artistic and Creative Expression Requirements. Prerequisite: any introductory acting, directing or education course. Cr 3.

THE 415 Capstone Experience in Theatre
A synthesis of the major's knowledge in a selected area of interest within theatre or dance. Students develop a professional portfolio based on their cumulative experiences in Theatre or Dance while working with a faculty member. May include a research paper, design, direction, performance or choreography. Project must have been generated as part of a student's coursework or under the supervision of a faculty member. A final presentation of the Capstone project to Theatre/Dance faculty is required. Satisfies the General Education Capstone Experience and Artistic and Creative Expression Requirements. Prerequisite: senior standing. Cr 1.

THE 461 Theatre History I
The development of performance and its relation to culture, from the ancient origins of theatre through the Greek and Roman periods, to the Medieval and Renaissance eras. Examines the evolution of styles and modes of production through the major theatrical figures, performance events, and institutions of each period. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: Limited to juniors and seniors or by permission. Cr 3.

THE 462 Theatre History II
The development of performance and its relation to culture, from the Neoclassical through the Romantic to the Modern/ Postmodern era. Examines the evolution of styles and modes of production through the major theatrical figures, performance events and institutions of each period. Satisfies the General Education Cultural Diversity and International Perspectives and Writing Intensive Requirements. Prerequisite: Limited to juniors and seniors or by permission. Cr 3.

THE 466 Stage Directing
Studies the task of all aspects of the theatre production into an artistic unity with emphasis on theatre aesthetics. Provides practice in the directing of short plays, with particular attention to working with actors. Prerequisite: THE 116 . Limited to juniors and seniors. Cr 3.

THE 470 Women Playwrights
Reading and analysis of plays written by women throughout history. Development of a critical approach with which to examine the works; both within the context of their times, and within the larger context of women's perspectives, styles, ideas, and symbols as expressed in dramatic literature. Prerequisite: 3 credit hours of dramatic literature (THE 112 or ENG 447 or ENG 467) or permission. Cr 3.

THE 480 Topics in Theatre
Advanced study of selected topics in Theatre. Explores the particular approaches, thematic content or contemporary issues related to acting, performance theory. genre, directing, costume and make-up design, set and lighting design or other areas of technical theatre. Specific topics will vary from semester to semester. May be repeated for credit. Cr 3.

THE 497 Independent Study in Theatre I
Prerequisite: permission. Cr 1-3.

THE 498 Independent Study in Theatre II
Prerequisite: permission. Cr 1-3.

THE 501 Acting Styles
Topics course including: The Greeks and Shakespeare Class Comedy, Absurdism, Tragi-Comedy or Brecht, Ibsen, Sondheim depending on the needs and interests of students, the seasons and faculty expertise. May be repeated for credit. Prerequisite: graduate standing or permission. Cr 3.

THE 563 American Theatre
A study of the development of the American Theatre from its beginning to the present day. Prerequisite: permission. Cr 3.

THE 596 Field Services in Theatre Production
Provides experience in producing theatre in the field, through stage directing, designing scenery, costumes, and/or lighting, building scenery, stage managing, costuming, handling publicity, etc. at a local elementary or secondary school, community or professional theatre. Credit depends on length and complexity of assignment. Prerequisite: Senior theatre majors and graduate students with permission of the Director. Cr 1-3.

Technical Mathematics for Engineering (TME)

TME 151 Technical Mathematics I: Precalculus
Introductory mathematics course with engineering examples. Topics include exponents and radicals, operations with polynomials, linear and quadratic equations and inequalities, functions and graphs of linear, quadratic and higher degree polynomials; trigonometric functions and graphs; and triangle solutions. Problem solving techniques are emphasized. Satisfies the General Education Mathematics Requirement. Prerequisite: Engineering Technology majors or permission; also adequate performance on a departmental qualifying exam given during summer orientation and the first week of classes. Cr 3.

TME 152 Technical Mathematics II: Precalculus and Introductory Calculus
Calculus preparation and introduction with engineering examples. Topics include exponential and logarithmic functions, trigonometric identities and equations, inverse trigonometric functions, matrix algebra, determinants, method of least squares, sums of series, conic sections, limits and continuity and introductory calculus including derivative and its applications. The developed math skills are used to analyze engineering problems. Satisfies the General Education Mathematics Requirement. Prerequisite: Engineering Technology Majors; Grade of "C" or better in TME 151 or equivalent. Cr 3.

TME 253 Applied Calculus for Engineering Technology
Introduces fundamental concepts and applications of the derivative, as well as integration and its applications, derivatives of transcendental functions and a variety of integration techniques. Applications of these concepts to problems in science and engineering technology are stressed. Prerequisite: Engineering Technology Majors; Grade of "C" or better in TME 152 or equivalent. Cr 4.

TME 354 Ordinary Differential Equations With Engineering Applications
An introduction to linear and nonlinear ordinary differential equations, Laplace Transforms and their applications. Mathematical modeling of differential equations applicable to electrical and mechanical engineering and interpretation of the solutions are presented. A brief introduction to Fourier Series and partial differential equations is also included. Prerequisite: Engineering Technology majors; Grade of "C" or better in TME 253 or equivalent. Cr 3.

TME 355 Applied Statistics for Engineering Technology
Introduces basic concepts of probability and probability distributions, such as Gaussian distribution and the Poisson distribution. Emphasis on applications to engineering technology. Mathematical expectation, decision making, quality control, random processes and Monte Carlo methods discussed. Also covers inferences concerning means, variance and proportions. Prerequisite: Engineering Technology Majors; Grade of "C" or better in TME 253 or equivalent. Cr 3.

Technology and Society (TSO)

TSO 288 Issues in Environmental Pollution
Major air, water and solid waste pollution issues, toxicity and health risk assessment and control. Environment and the economy, environmental laws and ethics. Consumption and population issues. Satisfies the General Education Population and the Environment Requirement. Cr 3.

TSO 360 Engineering Ethics
Introduces students to ethics theory, general concepts and principles pertaining to engineering ethics and handling ethical situations in practice. Throughout the course, students will be presented with a combination of lecture, engineering ethical situations using a case or example approach and discussion sessions. Satisfies the General Education Ethics Requirement. Prerequisite: ENG 101 or equivalent and junior standing.

TSO 388 Understanding Environmental Sustainability
Examines environmental sustainability and its context within human needs and other social and economic factors. It looks at ecosystem services and human use of resources such as fresh water, fisheries, forests, materials and energy. Examines obstacles to sustainability including population growth and industrial and individual behavior. For each individual problem, scope, causes, future trends and what is needed to correct it is considered. Also examines the changes necessary to restructure industry to function more like an ecosystem, as well as needed changes in individual and social behavior. Satisfies the General Education Population and the Environment Requirement. Prerequisite: junior standing. Cr 3.

TSO 398 Special Topics in Technology and Society
Selected subjects in the field of technology and society studies and related areas not covered in other university courses. May be repeated for credit. Satisfies the General Education Ethics Requirement. Prerequisite: junior standing or permission. Cr 1-3.

TSO 516 Information Technology and Public Policy
Impact and design of information systems in public and nonprofit organizations. (This course is identical to PAA 516.) Prerequisite: Graduate students or permission. Cr 3.

University Studies (UST)

UST 100 Introduction to the Bachelor of University Studies
Introduces the student to the nature of higher education as a learning community. Particular emphasis given to academic resources, the learning process, academic skills, developmental advising and career counseling. Students participate in extensive reading and writing assignments relevant to their college transition and degree goals. (Pass/Fail Grade Only.) Prerequisite: B. U.S. major; others by permission. Cr 1.

UST 300 Topics in University Studies
Provides understanding and insight into a specific area of interest across disciplines. Emphasis on research analysis. Subjects vary by semester. Satisfies the General Education Writing Intensive Requirement. Prerequisite: junior standing, B. U.S. major; others by permission. Cr 3.

UST 499 Senior Capstone
Interdisciplinary team taught senior seminar. Senior students will use their areas of foci to

specific senior project or internship. Students will integrate program knowledge and demonstrate synthesis, analysis and evaluation of their specific project/internship. Satisfies the General Education Capstone Experience Requirement. Prerequisite: senior standing, B. U.S. major. Cr 3.

Wildlife Ecology (WLE)

WLE 100 Introduction to Wildlife Resources
A seminar introducing the opportunities, concerns, and professional responsibilities of the wildlife profession. Intended for first-year and transfer students interested in wildlife management. (Pass/Fail Grade Only.) Lec 1. Prerequisite: Majors only or permission Cr 1.

WLE 150 Wildlife Field Trip
A one-week field course to introduce wildlife ecology students to various aspects of fish and wildlife management. (Pass/Fail Grade Only.) Prerequisite: WLE 100; first-year wildlife ecology majors only. Cr 1.

WLE 200 Ecology
The relationships between living organisms and their environment. The ecosystem, ecological factors, succession, community distribution, populations and the role of ecology in natural resources. Together with WLE 201 Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Rec 3. Prerequisite: BIO 100. NSFA majors only. No first-year students. Cr 3.

WLE 201 Ecology Laboratory
A course emphasizing field and laboratory studies of plants and animals and their environments. A diversity of organisms and ecosystems will be investigated. Together with WLE 200, Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Prerequisite: Wildlife Ecology major or permission; an ecology lecture course (may be taken concurrently). NSFA majors only. Cr 2.

WLE 220 Introduction to Statistical Ecology
Statistical methods appropriate to ecological field measurements. Design of field experiments. Lec 3, Lab 2. Prerequisite: MAT 232 or equivalent. Cr 4.

WLE 230 Introduction to Wildlife Conservation
Basic principles of wildlife ecology and conservation are illustrated with examples from Maine and around the world. Satisfies the General Education Population and the Environment Requirement. Cr 3.

WLE 250 Wildlife Field Survey
Two week field course stressing the use and application of wildlife research and management techniques, collection and analysis of biological data and the recognition of wildlife species and their habitats. Prerequisite: WLE 100, WLE 200, WLE 201. Wildlife Majors Only. Cr 2.

WLE 260 Field Ornithology
A course stressing field identification of birds by sight and sound. Avian communities in a variety of aquatic and terrestrial habitats will be studied. Students will learn methods to quantitatively census bird populations. Museum specimens and tape recordings will be used as aids in identification. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Cr 3.

WLE 270 Wetlands Ecology
A field course emphasizing wetland classification, identification of plants and animals and their functional interrelationships, quantitative sampling methods, and marsh management. Daily field trips to representative wetlands in central and coastal Maine. Cr 1.

WLE 280 Winter Ecology
Adaptations of plants and animals and their interrelationships in winter. Field identification, sampling methods, impacts of forestry and properties of snow are highlighted as well as basic winter survival. Prerequisite: permission. Cr 1.

WLE 323 Introduction to Conservation Biology
Maintaining the diversity of life forms in the face of environmental degradation involves the study of population ecology, population genetics, and ecosystem ecology plus the socioeconomic and political matrix in which conservation problems must be solved. Satisfies the General Education Population and the Environment Requirement. Prerequisite: BIO 100. Cr 3.

WLE 410 Wildlife Population Dynamics and Conservation
Characteristics of wildlife populations, including principles of population dynamics and population interactions, with application in wildlife population conservation. Lec 3. Prerequisite: WLE 200 or equivalent ecology course. Cr 3.

WLE 435 Field Experience
A field experience in wildlife is a professional activity participated in by students under the supervision of a practicing professional in the field. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of a faculty member for academic credit for the learning involved in the experience. It may be paid or unpaid, it may last any length of time, and it may be repeated. Cr Ar.

WLE 440 Undergraduate Wildlife Seminar
Current topics of interest will be explored in a seminar format. Prerequisite: Wildlife majors or permission. Cr Ar.

WLE 445 Management of Threatened and Endangered Species
An advanced course in threatened and endangered plant and animal species management that will investigate modern solutions to the problem. Emphasis will be on the biological and political aspects of endangerment and will emphasize involvement in the recovery process, using the U.S. Endangered Species Act as a basis. Lectures, discussion and a required research project that will involve students working as teams to revise and present recovery plans for endangered plant or animal species. Note: WLE 445 and WLE 545 cannot both be taken for credit. (Alternate years - odd.) Prerequisite: WLE 200, BIO 319, SMS 300 or equivalent; WLE 410 or another upper level ecology course; or permission. Cr 3.

WLE 450 Wildlife-Habitat Relationships
A study of the interrelationships among wildlife species and their habitats stressing application to resource planning and management. Rec 3, Lab 2. Prerequisite: WLE 250 and WLE 410 or permission. Cr 4.

WLE 455 Wildlife-Habitat Evaluation
Focuses on field, analytical and laboratory techniques for evaluating habitat for wildlife. Students will be introduced to the applied approaches and techniques for evaluating habitats. Material is presented via lectures, reading, fieldwork and laboratory experience. Satisfies the General Education Writing Intensive Requirement. Lab 4. Prerequisite: WLE 250, WLE 410 or permission. Corequisite: WLE 450. Cr 2.

WLE 470 Wildlife Policy and Administration
Development and state and federal wildlife policy in the United States. Procedures for establishing and implementing policy and current policy issues. Satisfies the General Education Capstone Experience Requirement. Rec 3. Prerequisite: WLE 410 or WLE 450. Cr 3.

WLE 490 Special Problems
Original investigation in wildlife work, the subject to be chosen after consultation with the staff. Prerequisite: permission. Open to high-ranking juniors and seniors. Cr Ar.

WLE 520 Natural Resources Policy
Resource issues for managers of public and private lands and integration of wildlife management with land and resource use. (Alternate years.) Prerequisite: WLE 450, WLE 470 or permission. Cr 2.

WLE 540 Advanced Conservation Biology
A problem-solving approach to maintaining biological diversity through population and ecosystem management. Prerequisite: permission. Cr 3.

WLE 545 Management of Threatned and Endangered Species
Emphasizes the biological and political aspects of endangerment and involvement in the recovery process, using the U.S. Endangered Species Act as a basis. (Alternate spring semesters-odd years.) Note: WLE 445 and WLE 545 cannot both be taken for credit.) Prerequisite: graduate standing; an introductory and an upper level ecology course, or permission. Cr 3.

WLE 555 Landscape Ecology and Conservation
Principles and methods in landscape ecology and their application to description and analysis of human-modified environments and natural resource management. Prerequisite: 400-level course in habitat ecology. Cr 1.

WLE 580 Advanced Population Dynamics
Dynamics of animal populations as reflected in differential and difference equations including the analysis of density dependence and chaos, and the demographic and environmental conditions leading to these dynamics. (Alternate years.) Prerequisite: WLE 410 or equivalent. Cr 3.

Wood Science and Technology (WSC)

WSC 212 Introduction to Wood Science and Technology
All about wood; from the basics of how it is formed in the tree to the practical use of wood. Topics range from acoustical properties of wood to understanding why wood shrinks and swells. Practical aspects of use and production of wood products are also covered. Satisfies the General Education Applications of Scientific Knowledge Requirement. Lec 3. Cr 3.

WSC 213 Hand Lens Identification of Wood Laboratory
Cr 1.

WSC 314 Wood and Wood-Fiber Processing
An overview of the machinery and processes used for manufacturing wood-based composites, veneer, lumber, pulp and paper, etc. Timber defects and their effect on finished product quality. Methods of measuring process control. Satisfies the General Education Writing Intensive Requirement. Lec 3, Lab 3. Cr 4.

WSC 318 Wood and the Environment
Basic wood-moisture relationships and how they affect the strength and performance of wood products and structures. Drying systems for solid wood and wood products such as flakes, chips and poles. Recognizing and preventing defects that are caused by drying and shrinkage. Comparative energy savings using wood in construction. Lec 2, Lab 3. Prerequisite: permission. Cr 3.

WSC 319 Wood Deterioration and Protection
The study of the agents that cause weakening and failure of wood. Also taught are the basic science and technological applications needed to understand how wood can be protected from these agents of deterioration. Taught at a general level, the first portion covers basic wood properties and how these are affected by fungal decay, insect attack, marine borer damage, and non-biological agents (fire, weathering, etc.). The mechanisms of wood degradation are also discussed. The second portion covers methods for protection of wood from deterioration agents including the use of wood preservatives and the use of proper design techniques. It also covers the importance of wood degrading agents in the environment for carbon cycling and the concerns associated with the use of traditional wood preserving chemicals. Lec 3. Satisfies the General Education Lab in the Basic or Applied Sciences Requirement. Lec 2, Lab 3. Cr 3.

WSC 345 Special Problems
Original investigation in wood science and technology, the subject to be chosen after consultation with the staff. Prerequisite: Open to high-ranking juniors and seniors. Cr Ar.

WSC 395 Internship
A professional activity under the general supervision of an experienced professional with a high degree of responsibility placed on the student. Learning objectives are pre-established and agreed upon between the faculty coordinator and the placement supervisor. Not normally repeated. Prerequisite: permission. Cr Ar.

WSC 396 Field Experience
Practical experience for the undergraduate student, combining work in a business firm, industry or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Open to Wood Science students only. Cr Ar.

WSC 410 Mill Tour
One-week inspection trip (taken during the second week of spring break) to representative manufacturers of wood and forest products selected for demonstration of typical plant operations. A written report is required. Prerequisite: junior standing in Forest Resources programs. Cr 1.

WSC 416 Functional Structure of Woody Plants
Wood and bark are studied as a means to understanding tree physiology, phylogenetic relationships and taxonomic identification. (This course is identical to FES 416.) Lec 2, Lab 4. Prerequisite: FES 100 or permission. Cr 3.

WSC 425 Mechanical Properties of Wood
Principles of statics and mechanics of materials. The mechanical properties of wood and wood composites and their relationship to anatomy, physical properties and industrial processing procedures will be emphasized. Rec 3. Prerequisite: WSC 212 or permission. Cr 3.

WSC 430 Wood Composites and Adhesion
Principles of adhesion and evaluation of adhesive systems. Effect of process variables on physical and mechanical properties of oriented strand board, medium density fiber-board, particleboard, hardboard, plywood and wood/polymer composites. Lec 2, Lab 3. Prerequisite: WSC 314 or permission. Cr 3.

WSC 440 Adhesion and Adhesives Technology
Fundamentals of adhesion and adhesives including surface science, chemistry and properties of adhesives, adhesive bond evaluation and applications in composite materials. (Students registered for WSC 440 will not be eligible to register for WSC 540.) (This course is identical to WSC 540.) Lec 3, Lab 3. Prerequisite: senior standing or permission. Cr 4.

WSC 450 Wood Structural Applications
The selection of wood members and products for use in structural applications. Determination of vertical design loads and lateral forces, the design stresses, and allowable stresses based on species, grade, and other factors. Measurement of strength properties in the laboratory. Fundamentals of environmental control within building. The design of wood buildings and other structures with emphasis on structural integrity, economic material selection, and occupant thermal comfort. Lec 2, Lab 3. Prerequisite: WSC 212 and WSC 425 or permission. Cr 3.

WSC 519 Advanced Wood Deterioration and Protection
Covers basic wood properties and how these are affected by fungal decay, insect attack, marine borer damage, and non-biological agents (fire, weathering, etc.). Also, the

protection of wood from deterioration agents including the use of wood preservatives and the use of proper design techniques. Cr 3.

WSC 530 Wood Physics
Study and evaluation of non-mechanical physical properties of wood; response to liquids, vibrational stimulation, heat, electricity and ionizing radiation. Lec 2, Lab 2. Prerequisite: understanding of basic physics, wood anatomy or permission. Cr 4.

WSC 531 Mechanics of Wood and Wood Composites
Application of orthotropic and nonlinear constitutive relations, laminate theory, and failure criterion on the prediction of mechanical properties of solid wood, wood fibers, laminated, and other wood composite materials. Prerequisite: WSC 425 or equivalent or permission. Cr 3.

WSC 540 Adhesion and Adhesives Technology
Fundamentals of adhesion and adhesives including surface science, chemistry and properties of adhesives, adhesive bond evaluation and applications in composite materials. (Students registered for WSC 540 will not be eligible to register for WSC 440.) (This course is identical to WSC 440.) Lec 3, Lab 3. Prerequisite: Senior standing or permission. Cr 4.

WSC 550 Wood-Polymer Hybrid Composites
Fundamentals of fiber reinforced polymer (FRP) materials, manufacturing and performance characteristics. Addresses issues of combining wood with FRP's such as interfacial properties and durability of the resulting wood-polymer hybrid composite materials. Lec 3. Prerequisite: WSC 430 or permission. Cr 3.

Women's Studies (WST)

WST 101 Introduction to Women's Studies
Introduces the perspective and interdisciplinary nature of Women's Studies. Examines women's positions in Western culture and explores the genesis, development, and impact of our culture's assumptions about women's nature and women's roles. Satisfies the General Education Ethics, Social Contexts and Institutions, and Cultural Diversity and International Perspectives Requirements. Cr 3.

WST 201 Topics in Women's Studies
An interdisciplinary, second-level study of topics such as "Women in the Hispanic World," "Women and Aging," or "Lesbian Literature. " May be taken more than once for credit if the topic differs. Prerequisite: WST 101 or permission. Cr 3.

WST 230 Women, Health and the Environment
Examines the roles of women in shaping current practices and policies of the Western health care system and related environmental issues. It will draw on the work of Rachel Carson and modern women healers of the body and the ecosystem. Students are encouraged to be involved in transformational work at the local, personal or more global level. Satisfies the General Education Ethics and Population and the Environment Requirements. Prerequisite: WST 101 or permission. Cr 3.

WST 298 Directed Study in Women's Studies
Individual study, research, field experience and writing projects in Women's Studies and related areas, conducted under the guidance of a faculty member associated with the Women's Studies Program, arranged on request. (Contact the Women's Studies Office for an information sheet.) Prerequisite: WST 101 and permission. Cr Ar.

WST 301 Intermediate Topics in Women's Studies
An interdisciplinary, intermediate level study of topics such as "Women and the Legal System" or "Lesbians Through Three Lenses. " May be taken more than once if the topics differ. Prerequisite: Sophomore standing or above; WST 101 or permission. Cr 3.

WST 340 Women and Globalization
Constraints of geography on social and cultural arrangements are receding, a process with implications for the world's women. Topics investigated will include women's work in factories, maquiladoras, immigration, domestic work and sex tourism, to name a few. Satisfies the General Education Cultural Diversity and International Perspectives Requirement. Prerequisite: WST 101 or permission. Cr 3.

WST 401 Advanced Topics in Women's Studies
An advanced, interdisciplinary study of topics such as "Women and Science" or "Global Feminism. " May be taken more than once if the topics differ. Prerequisite: WST 101 and junior or senior standing or permission. Cr 3.

WST 410 Feminist Theory
An advanced, interdisciplinary, multicultural introduction to the main traditions of feminist theory. Satisfies the General Education Ethics Requirement. Prerequisite: 6 hours of Women's Studies, including WST 101 or permission. Cr 3.

WST 480 Senior Seminar in Women's Studies
This integrated, interdisciplinary, and multicultural course provides advanced study of a specific topic in Women's Studies, such as "Women's Spirituality," "Ecofeminism," or "Women in Education. "Satisfies the General Education Social Contexts and Institutions, Cultural Diversity and International Perspectives, Writing Intensive and Capstone Experience Requirements. Prerequisite: WST 101, WST 410 and senior standing or permission. Cr 3.

WST 498 Directed Study in Women's Studies
Advanced, individual study, field experience, research and writing projects in Women's Studies and related areas, conducted under the guidance of a faculty member associated with the Women's Studies Program, arranged on request. (Contact the Women's Studies Office for an information sheet.) Prerequisite: WST 101 and Junior or Senior standing and permission. Cr Ar.

WST 501 Graduate Topics in Women's Studies
A graduate-level interdisciplinary study of topics such as "Women's Health," "Women and Race," or "Multicultural Issues in Women's Studies. " Cr 3.

WST 510 Advanced Studies in Feminist Theory
An advanced introduction to major issues in contemporary feminist theory. Cr 3.

WST 520 Research Methodologies in Women's Studies
An interdisciplinary course that focuses on the visions and methods that feminist scholars use to study women and gender. Introduces students to pioneering critiques of various methodologies as well as recent developments in the field. Cr 3.

WST 580 Feminist Pedagogy and Women's Studies Practicum
A history of Women's Studies as an interdiscipline, a survey of feminist teaching strategies and an examination of the philosophies of education on which those strategies are based. A practicum applying the course material in a Women's Studies class, a departmental course or possibly in a K-12 school or other workplace setting will be included. Cr 3.

Academic Policies and Procedures

Academic Programs

Each student is responsible for knowing and following the policies governing his or her course of study and for fulfilling all academic requirements for the degree sought. The faculty and the staff of the University are available to advise and assist students to understand and to meet these requirements. Students should direct questions about academic policies and degree requirements to their academic advisor or to their academic dean or program director.

Academic Requirements

Degree requirements may change over time. Generally students are responsible for meeting the degree requirements published in the catalog in effect when they entered the university. Students who change to a different major, or who are absent from the university for two or more years, must meet the program requirements in effect at the time of program change or of their return to the university.

Program in General Education

The University of Maine seeks to prepare its students not only for rewarding careers, but also to be responsible citizens of the modern world. It does this by building each academic program on a required foundation of courses that taken together form the core of a liberal education. These courses, amounting to approximately a third of the undergraduate program, focus on:

- the natural sciences and quantitative reasoning
- effective communication skills
- the fine and performing arts
- cultural diversity and international perspectives
- western civilization
- ethics
- the human impact on ecological systems
- the social structure of civilizations.

The program in general education is completed by a capstone experience in the major. This experience, which may be something other than a formal course, seeks to draw together threads from many previous courses in an experience that mirrors careers typical of graduates in the discipline.

With the exception of the capstone experience, the courses fulfilling the requirements of the program in general education are the same for all colleges, enabling students to change colleges within the University of Maine without having to re-do parts of their general education curriculum.

Students completing more than one undergraduate major need complete the general education program only once, including only the capstone experience for the primary major. Exception: some departments may specifically require their writing intensive and capstone courses as part of the major, aside from their role in general education. In this case the double-major student must complete them, not because of general education policy, but because the major program requires them.

Academic Integrity

Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers or to submit papers written by another person, to "fake" experimental results, or to copy parts of books or articles into your own papers without putting the copied material in quotation marks and clearly indicating its source. Students committing or aiding any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University. Details concerning these policies and the avenues of appeal open to students are published in the online University of Maine Student Handbook.

Enrollment Status

Full-time undergraduate students are registered for sufficient credits each semester to complete their academic programs in four years (eight regular semesters). For most programs, this means students must average 15 credits per semester to earn the minimum of 120 credits required for graduation. A few programs require more than 120 credits.

The University treats undergraduate students registered for 12 or more credits as full-time students for purposes of calculating student financial aid, determining eligibility for campus housing, athletic eligibility, veteran's benefits, student fees, and for all other activities which vary according to enrollment status. Failure to register for at least 12 credits per semester will jeopardize eligibility for financial aid, athletic eligibility, veteran's benefits and campus housing.

Exception: The University may grant full-time privileges to students with documented disabilities who register for fewer than 12 credits but more than 6 credits per semester. This exception requires the positive recommendations of the University of Maine Coordinator of Services for Students with Disabilities and of the Special Student Services Advisory Committee, and must be approved by the Executive Vice President and Provost (or designee). Students requesting this accommodation must provide current, comprehensive evidence of a documented disability from a health care or psycho-educational professional, as well as a copy of their academic records from institutions attended prior to enrolling at the University of Maine. Eligibility of reduced-load students for certain benefits is contingent upon payment of appropriate fees.

The University of Maine considers students formally registered in courses in Cooperative Education, Field Experience, or Internships as part of their UMaine programs, to be full-time students. Also, graduating seniors who need less than 12 credits to complete requirements are considered full-time.

Non-Degree Students

Students wishing to take courses at the University of Maine but who are not working towards a University of Maine degree are non-degree students. These students typically register for classes through the University's Division of Lifelong Learning (DLL, located in Chadbourne Hall). Except for courses offered through Continuing Education/ Summer Session, the University allows non-degree registration in regular courses on a space-available basis.

Some non-degree students register and are advised through the appropriate academic colleges rather than through DLL. These include:

- Students holding a degree but who are pursuing a certificate (e.g., a teaching or professional certificate).
- Students who are degree students elsewhere but are attending the University of Maine under a formal student-exchange program (e.g., National Student Exchange, Canadian-American Exchange, New England Land-Grant University Student Exchange).

Non-degree students registered for 9 or more Orono campus credits per semester are eligible for campus housing on a space-available basis. The University of Maine does not normally award student aid to non-degree students.

Away Status

UMaine students temporarily registered for a semester or an academic year at another institution should fill out an "Away Registration" form. "Away" registration keeps the student as a fully enrolled University of Maine student while on Away status. This is important for student aid purposes and for maintaining enrollment in one's degree program at UMaine. Students seeking to register "away" must be in good academic standing. To ensure that the maximum number of credits transfer to the UMaine program from the "away" institution it is important that students plan "away" registrations carefully with their academic advisor and obtain the prior approval of the associate dean of their college. Grades earned while on "away" status normally do not appear on the UMaine transcript and do not affect the UMaine GPA.

Absence from the University

Leave of Absence

Undergraduate students in good academic standing and who have no financial indebtedness to the University may request a leave of absence from the University for up to two semesters. Students returning from leave normally are required to return to the college in which they were enrolled when leave began. Students must obtain approval for a leave of absence the semester prior to the desired leave. Students desiring a leave of absence should contact the associate dean of their college.

Withdrawal from the University

Students thinking about withdrawing from the university should consult the associate dean of their college for information about the correct procedure. Withdrawing officially is preferable to simply ceasing to attend because it may prevent the assignment of failing grades that then are forever part of one's transcript. If a student withdraws from the university during the first third of a semester, all courses will be deleted from the student's academic record. Withdrawal during the second third of a semester will cause a "W" to be assigned as the grade for each course. "W" grades will show on the academic record, but do not affect the GPA. Withdrawal during the final third of a semester will normally result in a grade of "WF" being assigned for all courses, unless extenuating circumstances prevail. "WF" grades show on the academic record and count in the GPA as if they were "F" grades.

Program Requirements for Returning Students

Students returning to the University after an absence of less than two full academic years may continue their programs under the requirements in effect at the time of their departure, even if program requirements changed during their absence. Students returning after an absence of more than two full academic years normally must meet the program requirements in effect at the time of their return, even if these are different from the requirements for the same program at the time of their departure.

Registration for Classes

Maine law prohibits students born after 1956 from registering for classes until they have filed proof of immunization against measles, rubella, tetanus, and diphtheria with the Cutler Health Center. New students will receive information about how to comply with this law upon admission to the University.

Students select and register for classes in consultation with an academic advisor.

Courses are numbered to indicate their level. Those numbered 000-099 are considered remedial and do not count towards a University degree. Courses numbered 100-299 are often introductory in nature and intended to be taken during the first two years of a baccalaureate degree program. The numbers 300-399 usually indicate advanced courses with prerequisites designed for the junior and senior years of the undergraduate program. Courses numbered 400-499 are advanced baccalaureate courses, but graduate students may take them for graduate credit with appropriate permission of their graduate committee. Courses numbered 500-599 are designed for students working for graduate degrees, but undergraduates may take them with the permission of their academic advisor and of the professor teaching the course. Courses numbered 600-699 are highly advanced courses for graduate students exclusively.

With advance request from a student and appropriate departmental and Graduate School permission, 400-level courses taken while an undergraduate can be transferred toward a graduate degree if the courses are not used to fulfill undergraduate degree requirements. They will be treated as graduate transfer credit and, as such, the grades will not be calculated into the graduate GPA.

Not every course is offered every semester. The Schedule of Classes lists the courses scheduled to be taught in a given semester, showing the days, times, and building locations where they meet. Students should use the Catalog and the Schedule of Classes to prepare a tentative class schedule before meeting with their academic advisors.

The University of Maine gives priority in registration to those students who are closest to graduation and therefore have the fewest semesters in which to complete all course requirements. Thus the registration priority is seniors (students having 84 or more degree credits), juniors (students having 54 or more degree credits), sophomores (24 or more degree credits), first-year students (less than 24 degree credits), and non-degree students.

The details of the registration procedure may vary depending upon which of the University's colleges, schools or departments offer the student's major program. In general, after meeting with an academic advisor, students are enabled to perform the actual registration using a personal computer or a telephone.

Continuing Education Registration

The Continuing Education Division (CED) schedules courses in the evenings and on weekends for the convenience of students who can attend the University only on a part-time and evening basis. The content of these courses is the same as that of the same courses offered during the regular daytime hours. Regular students may register for a CED-sponsored course during the first week of the semester if the course has met its minimum enrollment criteria and space is available. Special policies for CED-sponsored courses governing cancellation, adding and dropping, and obtaining refunds are published in the CED fall and spring course schedules and the Summer Session catalog. A complete listing of courses offered through CED is available from the CED Office, Division of Lifelong Learning, 5713 Chadbourne Hall. Students may call the Interactive Voice Response system, (207) 581-MAIN or use Web DSIS http: // www.maine.edu/dsis/ to determine if openings exist in specific CED-sponsored courses.

Grading Options

Students select one of three grading options for each course at the time of registration.

- A-F option. This is the option normally selected. It results in a grade (A-F) upon completion of the course. Courses in the major and courses meeting general education requirements must be taken for A-F grades.
- Pass/Fail option. Students may take a limited number of courses Pass/Fail. Students passing the course receive the P grade and degree credit; students failing the course receive the F* grade and no degree credit. Neither grade affects the student's grade point average. The purpose of the Pass/Fail option is to encourage students to take elective courses outside their area of expertise by allowing them to do so

without risk to their GPA. Students taking Pass/Fail courses may be ineligible for some forms of academic recognition, such as the Dean's List, the Presidential Pin, or for selection as Valedictorian or Salutatorian. The following restrictions apply to use of the Pass/Fail option:

- Students must have sophomore standing or higher and have a grade point average of at least 2.0 to register for a course Pass/Fail.
- No more than one course per semester may be taken Pass/Fail.
- The Pass/Fail option is not allowed for courses used to fulfill program requirements for the major, for the college, or for general education.
- Students normally select the Pass/Fail option when registering.
- Audit option. Students registered to audit a course attend class meetings but usually do not take exams or complete formal assignments. No grade is assigned and no degree credit is earned for an audited course, but full tuition is charged. The Audit option is appropriate only under special circumstances, and should only be used upon the advice of an academic advisor.

Schedule Changes after Registration (Add/Drop)

The University of Maine allows students to add courses, to drop courses, to change sections within a course or to alter the grading option for a course (see below) through the first five class days of each semester (the add/drop period).

Courses may be dropped over a much longer period, but students will receive no tuition refund for courses dropped after the tenth day of classes each semester.

- During the first ten days of the semester students may change the grading option for courses between the Grade option and the Pass/Fail option. No conversions between the Grade option and the Pass/Fail option normally are allowed after this period.
- During the first third of the semester, a student may drop courses without academic penalty. All such dropped courses are deleted from the student's academic record.
- During the second third of the semester, a student may withdraw from a course if the student's advisor and dean approve. Courses dropped will show on the student's academic record, with a grade of "W". The grade will not be computed into the semester average.
- Course registrations may be changed from the Grade or Pass/Fail option to the Audit option during the first two thirds of a semester, but changes during the second third can be made only with the approval of an academic advisor and the student's dean.
- During the final third of the semester, any courses dropped will normally carry a grade of "WF", unless extenuating circumstances prevail. This grade will show on the student's academic record and will be computed into the semester average as a failing grade.

Occasionally the University may cancel a class during the first week because of insufficient enrollment. Courses with numbers from 100 to 299 may be cancelled if fewer than 12 students enroll; those numbered from 300 to 499 may be cancelled if fewer than 8 students enroll (fewer than 12 students for courses offered through the Continuing Education Division).

Grades and Grading

The overall policy of the University is that students are responsible for attending all class meetings for courses for which they are registered. Each instructor determines the specific attendance policy for the course and makes it known to students through the course syllabus and in class during the first week of classes. Instructors may assign a lower letter grade for failure to adhere to the attendance policy.

Students sometimes miss classes because of ill health, family emergency, or other reason beyond their control. It is the student's responsibility to notify instructors of the reasons for missing class and to make arrangements for making up missed work. If absences are extensive, even for legitimate reasons, it may be impossible to meet the objectives of the course. In such instances the instructor may assign a grade of Incomplete.

Students occasionally miss a class because of participation in an authorized, off-campus official function of the university (e.g., varsity athletics, band, drama, etc.). Instructors should allow students the opportunity to make up work missed as a result of authorized absences. Students must notify instructors in advance of such absences, and should provide them authorized-absence slips signed by the appropriate academic dean.

Class Meeting/Cancellations

The University seldom cancels classes because of weather emergencies. When this does occur, announcements will be made over the greater Bangor-Orono area's radio and television stations. Students can also get information about the University's class schedule during inclement weather by calling 1-800-581-SNOW, first updated at 6:00 a.m. and continually throughout the day.

Examinations

During each semester two to four preliminary examinations are usually administered in every course. These "prelims" count heavily in the final grade. The final week of classes should be free of all types of exams whatsoever. Instructors may schedule exams during this period only with the express permission of the appropriate associate dean or program director.

At the end of each semester some courses hold comprehensive final examinations. These "finals" normally count for no more than one-third of the course grade, but instructors can weight them more heavily with the approval of the chairperson of the department offering the course.

The Office of Student Records schedules final examinations and publishes the exam schedule. Final examinations can be given only on the published date and time. Students scheduled for four or more final examinations on the same day may contact the Office of Student Records to have an examination rescheduled. Students who miss the scheduled final examination must contact the instructor to make arrangements to take the exam. Only truly extraordinary circumstances beyond a student's control will be sufficient reason for an instructor to allow a student to make up a missed final exam.

Athletic Events during Final Examination Period

The University of Maine will not schedule athletic events during final examination periods in December and May. The President, in consultation with the Executive Vice President and Provost, determines whether or not athletic teams will participate in post-season tournaments during final examination week.

Grading System

The University of Maine uses a letter-grade system ranging from A to F. Faculty members have the option of adding + (no A+) and - grades to the basic letter grades, but such fine distinctions may be inappropriate for many courses. Whatever the system used, it is important to understand that there is no University-wide equivalence between percentage grades (such as 80%) and letter grades (such as B). Each instructor makes these determinations according to the grading system described in the course syllabus.

The qualitative value of the five basic letter grades is defined as follows:

- A, Superior work
- B, Good work
- C, Satisfactory but undistinguished work;
- D, Poor work that does not adequately prepare students for more advanced work in the discipline. While some courses completed with D grades may contribute towards the total

credits needed for graduation, others may be unacceptable for certain specific requirements and within the academic major.

- F, Failure. No credit is earned for a failed course.

The grades A-F have the following numerical values used in calculating a student's Grade Point Average (GPA):

	A = 4.00	A- = 3.67
B+ = 3.33	B = 3.00	B- = 2.67
C+ = 2.33	C = 2.00	C- = 1.67
D+ = 1.33	D = 1.00	D- = 0.67
F = 0.00		

The University uses a variety of grades on undergraduate transcripts to designate special circumstances. These include:

- AU, assigned only for courses taken under the audit option
- DG, deferred grade. This is used only for courses that extend beyond a single semester
- F*, for a course failed on the pass/fail grading option. No credit is earned, but the GPA is not affected
- I, for "Incomplete." This grade means that the instructor has postponed the assignment of a final grade to allow the student to complete specific work not turned in before the end of the semester. Instructors assign the "I" grade only when they are persuaded that events beyond the student's control prevented the completion of assigned work on time. When used, the grade must be accompanied by an estimate of the likely course grade upon completion of all requirements: for example, a grade would be reported as "I" (probable C).

The faculty member assigning the "I" grade must file an Incomplete Grade Authorization form with the dean of the college, which must include:

1. The specific conditions that must be met in order to complete the course requirements and have the "I" replaced by a regular grade
2. A written statement from the student explaining the extenuating circumstances which justify the "I" grade.
3. The time allowed the student to complete all requirements. The maximum time allowed is to the tenth week of the following full semester, but instructors may specify a shorter time period on the form. Exceptions to this rule are rare and allowed only with the formal approval of the faculty member, the faculty member's department chairperson or school director, and the associate dean of the faculty member's college. All work must be submitted within one year of the end of the semester in which the course was taken. If the incomplete work is not submitted within the time allotted by the faculty member, the grade will automatically be changed to an "F." Students receiving an "I" grade are not allowed to re-register for the same course until the incomplete has been made up or converted to an "F". *It is not appropriate for a student receiving an "I" grade to make up missed work by sitting-in on the course the next time it is taught.*

A student is allowed to graduate with a "I" on the academic transcript only if all of the following conditions are met:

1. the course was taken no more than one academic year preceding graduation;
2. the student has at least 120 credits of graded work
3. all college, department, and general education requirements have been satisfied
4. the incomplete, when counted as an "F," does not reduce the accumulative grade point average below 2.0.

No incomplete grade remaining on the record at the time of graduation will subsequently be replaced by a regular grade on the official record. If the incomplete work is made up following graduation but within the regularly allowable time period, the grade(s) will be noted at the end of the transcript and will not affect the grade point average which was in effect at the time of graduation.

- L, Failure for lack of attendance. This grade indicates that a student stopped attending class, but did not formally withdraw from the course. This grade counts the same as an F.
- MG, no grade submitted by the instructor
- P, for a course passed on the pass/fail grading option. Credit is earned, but the grade point average (GPA) is not affected.
- T, final grade deferred. This is used only for the undergraduate theses.
- W, indicating that the student formally withdrew from the course during the second third of the semester.
- WF, indicating that the student formally withdrew from the course during the final third of the semester.

Grade Reports

Written grade reports are mailed only upon request. Students may access their course grades via the Internet using Web DSIS http://www.maine.edu/dsis/. Course grades may also be obtained by calling (207) 581-MAIN. Course grades are available as they are received from instructors and processed following final exams.

Considerable care is taken to ensure that all grades entered on a student's permanent record are accurate. Any student who suspects an error in a grade should contact the course instructor without delay. Records are considered to be correct if a student does not report errors to the Office of Student Records within six months of the completion of a course.

Appealing Grade Assignments

The University of Maine has formal procedures by which students may appeal the assignment of grades by an instructor, accusations of cheating or plagiarism, or certain aspects of classroom procedure. The details of these appeal processes can be found in the online Student Handbook.

Undergraduate Course Repeat Policy

A student may repeat a course regardless of the grade or grades previously earned in that course. However, full tuition is charged each time a course is repeated, but credit for a given course may be earned only once, even if the course is passed more than once. When a repeated course is failed, any previously earned credit for that course is lost. Only the most recent grade earned in a repeated course counts towards the accumulative grade-point average, even if the most recent grade is lower than one previously received for that course. The grades for all attempts of a course taken for credit appear on the student's transcript.

There may be limitations on the number of times that specific courses may be repeated in specific programs. Students should contact their academic advisor, the associate dean of their college or their program director about such limitations.

Academic Standing

A student's academic standing depends upon the number of degree credits completed and the accumulative Grade Point Average (GPA). Degree credits are the number of course credits completed in courses numbered 100 and above in which a passing grade was earned. The GPA is the overall numerical grade, which may range from 0.00 to 4.00. This is calculated for each semester (the semester GPA) and overall for all courses taken (the accumulative GPA).

The university calculates the GPA by multiplying the number of credits for each course by the numerical equivalent of the letter grade earned for that course (See "grading system") This calculation yields the

number of quality points earned for that course. The semester GPA is obtained by dividing the total quality points earned in a semester by the total number of credits for which the student was registered that semester, not counting courses from which the student withdrew with a passing grade or courses taken Pass/Fail. The accumulative GPA is the total number of quality points earned at UMaine divided by the total number of credits taken at UMaine. These calculations are carried to two decimal places.

Academic Honors

The University recognizes outstanding academic achievement in several ways. Two of the most prestigious are the Presidential Pin and the Dean's List.

Presidential Achievement Pin

Full-time and part-time students both are eligible for the Presidential Pin, which is awarded only once in a student's career at the University of Maine. Full-time students must attain a 3.0 GPA or better over two consecutive semesters (a minimum of 24 credits) of accumulated UMaine course work, and must also achieve a 3.5 GPA or better for the most recent semester (minimum of 12 credits. Part-time students must achieve a 3.0 GPA or better based on 30 credits of accumulated UMaine course work and a 3.5 GPA or better for the most recent 12 credits. No Pass/Fail courses may be counted towards the 30 and 12 credit minimum registrations for either full-time or part-time students, and no incomplete grades may be on the transcript for any semester used in the computations.

Dean's List Requirements:

To be eligible for Dean's List a student must

1. Be a degree seeking student in one of the five colleges, Academic and Career Exploration (ACE) or Bachelor of University Studies (BUS) programs
2. Have a semester grade point average of 3.3 or better
3. Have completed at the end of the semester a minimum of 12 degree credits taken for letter grades (exceptions: courses with a deferred grade for thesis and a maximum of 3 credits in courses restricted to the Pass/Fail grading option may count toward the 12 degree credits)
4. Have no incomplete or missing grades for the semester.

Academic Actions

The University takes a series of progressive academic actions when a student is failing to meet performance expectations and make continuous progress towards completing degree requirements.

The Faculty Senate recommends the standards to determine which students are making satisfactory progress toward their degree. Those students not fulfilling academic requirements are placed on probation, suspended or dismissed. The Academic Standing Committee administers academic standing policies.

Academic Probation

The minimum acceptable accumulative grade point average needed for graduation is 2.0. Therefore any GPA below 2.0 is a warning to a student that such work will not permit graduation. Students are placed on probation following a semester in which her or his accumulative grade point average falls below 2.0, and a student may be placed on probation following a semester in which he or she receives a semester grade point average less than 2.0.

A student on probation who does not improve her or his accumulative grade point average to a 2.0 may be continued on probation. A student continued on academic probation will be required to meet certain conditions defined by his or her college dean. These conditions will specify the level of coursework and academic achievement required to be removed from probation.

Academic Suspension

Academic suspension indicates that a student is separated from the University for a minimum of one semester. A student must file an application for readmission. Suspension is the usual action when a student fails to make normal progress toward graduation. Situations that lead to academic suspension are any one of the following:

a. Students receive a semester grade-point average at or below 1.0;
b. Students continued on academic probation fail to meet conditions as defined by the college dean, program director or school director;
c. First-year students (0-23 credits) acquire an accumulative average less than 1.5 at the end of the first two semesters; Sophomores (24-53 credits) acquire an accumulative average of 1.7 or less; Juniors (54-83 credits) acquire an accumulative average of 1.8 or less; Seniors (84+ credits) acquire an accumulative average of 1.9 or less.

Regulations under c. above also apply to transfer students. Exceptions may be made for students who have earned a semester average of at least 2.0 while on probation but who have not achieved the required minimum accumulative average.

Academic Dismissal

Dismissal is normally the final action taken when students are not making satisfactory progress toward a degree or when students readmitted after suspension show no improvement in their accumulative average or otherwise fail to meet conditions set by the college.

a. The student is not normally allowed to apply for readmission.
b. The action is posted to the official academic record.
c. A hold is placed on the student record to preclude enrollment as a student at all UMS institutions.

Provisional Continuation

First semester students who are experiencing academic difficulties may be placed in a provisional continuation status. This intermediate status requires the student to discuss his or her academic record with the associate dean of the college, program director or coordinator, or school director to determine whether the student will be placed on academic probation, suspension or dismissal.

Academic Activity during Suspension/ Dismissal

Students under dismissal or suspension may not be admitted as matriculated students within the University of Maine System. Students may request permission from their associate dean or program or school director or coordinator to take one or two courses as a non-degree candidate at any UMS institution while they are under suspension.

Summer Courses for Suspended and Dismissed Students

Students who receive notification of suspension or dismissal who are currently attending a summer session course will be allowed to complete that course for grade and credit. Students under suspension or dismissal will not be allowed to take any subsequent courses without the permission of the associate dean of their college.

Transcript Re-Evaluation

Once during a student's association with the university his or her transcript may be reevaluated if certain conditions are met. This can only occur following one of the actions listed below:

- Return to the University following suspension or dismissal
- Completing a successful semester on provisional continuation
- Changing academic colleges within the University
- Entering a transitional program
- Returning to the University after withdrawal from it

If one or more of these conditions is met, the student's dean may exclude from the calculation of the student's accumulative grade point average all grades (including passing grades) received during one or more semester(s) immediately prior to the qualifying program change. For purposes of

this policy, any courses taken outside normal term dates (running start or any course attached to a fall or spring semester) will be treated as part of a separate semester. When a transcript is reevaluated, the dean may waive required courses in which passing grades were received (so that students need not repeat them) but neither the grade(s) nor the credit(s) for those courses count toward graduation or the computation of the accumulative GPA.

Former students needing to complete at least 30 credits to qualify for graduation and who have been away from the University for at least five academic years may reapply as an external transfer student. The student's previous coursework at the university remains on the transcript, but previous grades do not count. Courses for which the student received a grade below C- are not accepted for degree credit. In effect, such students begin a new UMaine academic career upon their readmission.

Academic Standing Appeal Procedures

Students appealing a suspension or dismissal must do so in writing addressed to the associate dean of their college or, for nursing, engineering technology, Onward or ACE students, to their school or program director or coordinator. Appeals which explain extenuating circumstances (health problems, family emergencies, etc.) beyond the student's control and which affected academic performance will be brought to the Academic Standing Appeals Committee, which will decide upon them.

Students whose appeals are denied may appeal the decision of the Academic Standing Appeals Committee in writing to the Associate Vice President for Academic Affairs, whose decision is final. The Associate Vice President makes sure that the Appeals Committee properly considered the information provided to it and acted in accordance with university policy and practice in making its decision. The Associate Vice President is unlikely to overturn a decision of the Appeals Committee unless there were procedural irregularities or unless new information becomes available.

Awarding of Degrees

Celebration of Academia

The conferral of baccalaureate, masters, and doctoral degrees upon students is an important event in the life of the institution, one rich in tradition dating to medieval times. It is a celebration of student achievement in which the faculty, the family and friends of the students, and the graduates themselves together mark the end of a formal program of education and the commencement of a new stage in life. All faculty members and graduating students are encouraged to participate in the formal May ceremony each year.

Graduation Requirements

Candidates for baccalaureate degrees must meet all of the following requirements.

1. They must receive acceptable grades in all courses required by their academic major
2. They must accumulate the number of degree credits specified by the program in which they are registered (120 credits minimum)
3. They must achieve an accumulative average of not less than 2.0 in University of Maine courses.
4. A minimum of 30 credits originating from the University of Maine Campus is required for the attainment of any bachelor's degree. This regulation can be fulfilled in one of two ways: 1) by taking 30 credits in the senior year or 2) by taking 30 credits at the 300 to 400 level during any year of study. The Board of Trustees approved two exceptions to this regulation in 1978:
   - students who have already completed three or more years at the University of Maine when, in the opinion of the student's dean, there is sufficient and valid reason to complete the senior year elsewhere.
   - Students who have completed a minimum of three years of work at the University of Maine and who have been admitted to an accredited professional school of medicine, dentistry, veterinary medicine, or divinity. With the approval of their dean, these students may qualify for the appropriate bachelor's degree at the University of Maine upon receipt of the professional degree.

Double Degrees

Students may earn a second baccalaureate degree by completing at least 30 credits beyond the number required for the primary degree, and by completing all requirements of the second degree and, if the second degree is in a different college from the first, by completing all requirements of the second college.

Students intending to complete more than one degree are required to declare their intent to the dean of their college (or to the deans of both colleges, if the degree programs are in different colleges) in writing no later than first semester of the senior year. At that time the student must declare a primary degree. The student will receive two diplomas.

Students may also complete a second degree subsequent to graduation. Students selecting this option must apply for readmission, complete at least 30 credits beyond the minimum required for the first degree, and complete all college and major requirements for the second degree. If readmitted within two years of graduation, students may apply towards the 30-credit minimum any credits previously earned in excess of the minimum number required for the first degree. Students enrolling for a second degree two or more years after completing the first one must complete at least 30 additional credits, regardless of the number of credits earned previously.

Students readmitted after graduation begin a new grade point average: the original GPA is fixed at graduation and will not be adjusted subsequently. Students completing a second degree via this mechanism will receive a second diploma, and the second degree will also be noted on the transcript.

Double Majors

Double majors are possible within a single baccalaureate degree. Both majors may be within the same college, or they may be in different colleges. Students may complete two different majors simultaneously with no prescribed increase in total credits beyond those required to satisfy both majors.

Students intending to complete the requirements of more than one major are required to declare their intent in writing to the dean of their college (or to the deans of both colleges, if the majors are in different colleges) no later than the first semester of the senior year. At this time the student must declare a primary major. The baccalaureate degree granted will be that associated with the primary major, and the student is required to satisfy all of the requirements imposed by that college. To complete the second major, the student need only complete the specific requirements established for that major. The primary and secondary majors will be noted both on the diploma and on the transcript, worded according to the following example: Bachelor of Science in Biology, with a second major in Art, or Bachelor of Art in Studio Art, with a second major in Biology (depending upon which is designated the primary major).

Students may also complete a second major subsequent to graduation. Students selecting this option must apply for readmission, and are required to satisfy only the specific requirements for the chosen second major that are in force at the time of readmission. Students readmitted after graduation begin a new grade point average: the original GPA is fixed at graduation and will not be adjusted subsequently.

Students completing a second major via this mechanism will not receive a second, revised diploma, but the phrase "with a second major in X" will be added to the transcript to recognize the accomplishment.

Latin Honors, Honors

Degrees with Latin honors are conferred at commencement for the following attainments of rank:

- Summa cum laude: 3.70 GPA or the top 5 percent of graduates within each college.
- Magna cum laude: 3.5 GPA or the top 10 percent of graduates within each college
- Cum laude: 3.3 GPA or the top 20 percent of graduates within each college.

The University bases the GPA only on the student's work at the University of Maine, and that must amount to at least 60 credits or 50 percent of the total degree credits required in the student's program of study, whichever is greater.

Degrees designated with Honors, with High Honors, or with Highest Honors are awarded only to graduates successfully completing requirements in the University of Maine's Honors College.

Valedictorian/Salutatorian

At each May Commencement the two highest-ranking baccalaureate degree candidates are designated class valedictorian (highest) and salutatorian (next highest). Only students who have completed at least 90 credits of University of Maine coursework exclusive of pass/fail or incomplete grades are eligible for these honors. All credits counting toward the baccalaureate degree must have been completed within eight years immediately preceding graduation.

Application for Graduation

Graduation is not automatic upon completion of all program requirements. Candidates for degrees must submit an Application for Degree or Certificate Form to the Office of Student Records according to the following schedule:

- by February 15, for degrees to be awarded in May;
- By June 1, for degrees to be awarded in August.*
- by October 1, for degrees to be awarded in December;*

* August and December graduates planning to attend the May ceremony must apply by February 15.

Forms are available in the Office of Student Records or by Fax-to-Fax by dialing (207) 581-1285 and following the prompts.

Note: Students completing degree requirements during May Term are considered as August degree candidates.

Graduation Timeline

Each college performs final certification of degree completion according to the following timetable:

- December graduation: January 30
- May graduation: June 30
- August graduation: September 30

Students who apply for graduation but do not meet the minimum requirements will be notified of this fact by the Associate Director of Student Records. The Office of Student Records removes the names of such students from the graduation list.

Transfer Credit

University of Maine System Transfer Principles

The following general principles adopted by the University of Maine System govern transfer of courses from one institution to another.

- Grades in courses taken within the University of Maine System and accepted for transfer credit will be recorded on the student's transcript although not computed in the cumulative grade point average.
- All undergraduate courses successfully completed at one University of Maine System institution will transfer to another.
- Each student must meet the established requirements of the academic program or college into which he/she is transferring. Transfer credits do not necessarily count toward such requirements.
- Transferring students must consult the individual institution catalog to determine requirements regarding the number of degree credits that must be taken through the degree-granting institution.
- Transferring students will be expected to provide official transcripts reflecting all previous post-secondary coursework.
- Each accepted transfer student will receive a written evaluation of transfer credit. The transfer student should meet with program faculty/advisors at the receiving institution to review how the transfer credit will be applied.
- Course credit will be transferred only for coursework delivered by regionally accredited institutions, through AP or CLEP, or through prior learning or other learning such as military training, etc., when validated through the approved campus processes.
- Each University of Maine System institution determines its own policies for accepting credit from international institutions.

University of Maine Transfer Policy

The University of Maine is committed to accepting as much transfer credit as possible and endorses the University of Maine System Transfer Principles. Transfer students normally must complete the equivalent of the senior year at the University of Maine to be eligible for a UMaine degree. This normally means that the final 30 credits needed to complete the degree must be in University of Maine courses. An academic department may require that some minimum number of courses be completed within that department to earn a University of Maine degree in that discipline. These departmental residency requirements are noted in the description of each academic program elsewhere in this catalog.

Applicants must arrange for official college transcripts to be forwarded from previously attended colleges and universities to the Office of Admission, 5713 Chadbourne Hall, Orono ME 04469. This applies to students transferring within the University of Maine System as well as to students transferring from outside the system. Student copies of academic transcripts are not accepted as official documents. Veterans must submit a transcript of Military Studies for possible transfer credit, Form DD295.

Current UMaine students should send transcripts of courses completed elsewhere to the Office of Student Records, 5781 Wingate Hall, Orono, ME 04469.

The University of Maine accepts academic work completed with grades of "C-" or better at regionally accredited institutions of higher education towards meeting the requirements of a UMaine baccalaureate degree. The dean's office of the college to which the student is applying completes the official evaluation of transfer credit after admission to the university. Approved candidates will receive an evaluation along with their letter of acceptance. Transfer credit evaluations are usually not performed for non-degree students.

All students are also required to pass English 101 or an approved equivalent with a grade of C or better, and to complete UMaine's general education requirements. Transferred courses that have direct UMaine equivalents fulfill the same general education categories as their UMaine counterparts, except for "writing intensive" courses. Students may request approval of transferred courses for meeting the writing intensive requirement by submitting course materials (usually a syllabus) documenting the portion of the grade based on writing, and the opportunity to rewrite assignments. Transferred courses that do not have exact UMaine equivalents, but are accepted for elective credit, may meet general education requirements. The determination will be made by the dean's office of the appropriate

UMaine college. If the course title and description are insufficient to make the determination, the dean's office will request further materials from the student.

Departments offering the comparable courses at the University of Maine make the decisions about the course equivalency of transferred courses. Exceptions to equivalencies (different equivalents, waivers of curricular requirements based on transfer credit, or limitations on transfer credit applied to degree requirements) may be allowed and recorded at the college or department level, but will not appear on the official evaluation or University of Maine transcript.

Credit From Within the University of Maine System:

Normally all credit earned with passing grades at any University of Maine System institution, including through distance education, is accepted by the University of Maine. A few exceptions do exist, usually because a particular course is not applicable to any UMaine program of study. Grades and grade point averages do not transfer. Semester and cumulative grade point averages reflect only those courses taken at the home institution. Credit earned with lower than "C" grades may need to be repeated (as with ENG 101) or counted as elective courses. If courses in which grades of "C-" or lower must be repeated to count towards the major or as prerequisites for more advanced courses, credit for those repeated courses may be counted only once.

Credit from Regionally Accredited Institutions:

Credit from regionally accredited institutions with a letter grade of "C-" or above is usually accepted by all UMaine colleges. A few exceptions do exist, usually because a particular course is not applicable to any UMaine program of study. Correspondence and distance education courses are treated equally with traditional classroom courses. Credit earned with a "C-" grade (as with ENG 101) may need to be repeated or used as an elective. Grades and grade point averages do not transfer. Official transcripts are required from every institution.

Credit from International Institutions:

The University of Maine accepts credit from international institutions, both for international students and for domestic students participating in study abroad programs. The University of Maine awards credit to students who have earned the International Baccalaureate diploma and scored 5, 6, or 7 on the higher level examinations. Credit is granted through each dean's office. Grades and GPA do not transfer. Official transcripts and notarized translations of non-English originals are required.

Prior Learning Credit

Matriculated University of Maine students may be awarded credit for prior learning for subjects that are comparable or equivalent to UMaine courses. Academic departments decide individually whether or not to accept requests for prior learning credit. Students wishing to request credit for prior learning should consult their dean's office. Prior learning credit is evaluated through either an exam or portfolio review. The available exams are offered through the Office of Student Academic Services, reached at (207) 581-2320. There is a $125 fee for each exam. Portfolio review is initiated through the student's dean's office. There is a $50 fee for an initial review of a portfolio plus an additional $75 fee for each credit hour awarded from an analysis of the portfolio. No more than 15 credit hours can be earned through portfolio review.

Some Sources of Prior Learning Credit:

Credit from institutions lacking regional accreditation: Submit an official transcript and as much other documentation as possible, such as course descriptions and syllabi to the college office. Students may be required to validate their learning through exam, for which a fee will be assessed.

Credit by national examination: CLEP and AP tests are most widely recognized (for UMaine policy regarding these tests, see the Attending the University of Maine section of this catalog). Other tests may also be recognized (DANTES, PEP, etc.). If you have already taken the test, submit an official score report and as much information about the test as possible. If you are contemplating testing, please contact the Division of Student Academic Services. Such exams may not be allowed to substitute for certain courses in the academic major.

Credit for military experience or corporate training programs: Normally will be allowed according to the recommendations of the American Council on Education (ACE) and National Program on Noncollegiate Sponsored Instruction (PONSI). Credit allowed in this way normally counts for elective credit only.

Official Records

The Office of Student Records in Wingate Hall maintains the official academic record of each student in perpetuity. The office also maintains each student's accurate mailing address and contacts students regarding official academic actions taken by the University. Students living off-campus must report the address of their actual place of residence to Student Records, 100 Wingate Hall (telephone (207) 581-1290) and promptly notify that office whenever that address changes. The University accepts no liability for failure to communicate official academic information or for inability to contact students in an emergency if up-to-date address information has not been reported to the Office of Student Records.

The University gives each graduate one complementary official transcript with the diploma. Additional official copies may be obtained free of charge from the Office of Student Records. Written requests should be sent to: Office of Student Records, University of Maine, Room 100, 5781 Wingate Hall, Orono, ME 04469-5781. Official transcripts cannot be issued to any student indebted to the university. Current students may obtain an "unofficial" transcript at any time by visiting the Office of Student Records in person. No partial transcripts or copies of transcripts from other institutions are issued.

Policies and Practices in Handling Student Records

The Family Educational Rights and Privacy Act of 1974 protects the privacy of students. Under this Act, students have the right to inspect and review their education records and have the right to challenge records when they are inaccurate, misleading, or otherwise in violation of the student's privacy rights.

Application of the Act

This Act applies to students presently enrolled at UMaine, former students, and alumni, but not to applicants seeking admission to the institution.

Educational Records and Information Maintained at UMaine

The University does not maintain a single record or file consisting of all materials and information pertaining to students in any one location. Instead, various segments of the record are kept in a variety of offices. The types of records and the custodian of each record is outlined below:

The term "educational records" does not include:

1. Records of faculty and administration that are in the sole possession of the maker and are not accessible or revealed to any other individual except a temporary substitute.
2. Law enforcement records maintained by the campus Department of Public Safety which are kept separate from educational records and which are created by a law enforcement unit for a law enforcement purpose;

3. Medical, psychiatric, or psychological records created and used only for the care or treatment of a student. These records may be made available to other appropriate professionals at the written request of the student.
4. Employment records, except for records of students employed because of their status as students.
5. Records that contain information about a student which is obtained after she/he is no longer a student.

Directory Information

The University of Maine has designated certain information contained in the education records of its students as directory information for purposes of FERPA. Such directory information may be publicly shared by the University unless the student has taken formal action to restrict its release. Directory information includes; name, address, phone number, major and degree, participation in officially recognized activities and sports, weight and height of student athletes, most recent previous college or university attended, dates of attendance, degrees and awards received, photographs, enrollment status (full-time or part-time) and grade level. Students can make a request that their directory information not be released at any time while they are an enrolled student at the University. The Office of Student Records has a form to fill out for this request. The request will be honored until such time as the student requests otherwise in writing. In the event that such written notification is not filed, the University assumes that the student does not object to the release of the directory information. Once a student is no longer enrolled at the University s/he can no longer request that their directory information not be released.

Student Rights

The Family Educational Rights and Privacy Act (FERPA) gives students certain rights with respect to their education records. They are:

I. The right to inspect and review the student's education records.

1. A request by a student or agency to inspect a record shall be made in writing to the office which maintains the record. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student or agency of the correct official to whom the request should be addressed.
2. Every office is obligated to inform the student when the requested record will be made available. The office has up to 45 days to respond. In most instances, the response will be made promptly.
3. Students are obligated to properly identify themselves (Student I.D.) before being shown their record.
4. Students are obligated not to interfere with the normal operation of the office in which the record is being maintained.
5. Students are obligated to examine the record during regular hours maintained by the particular office.
6. Prior to giving a student his or her record for examination, all confidential data received prior to January 1, 1975, any information waived by the student, any information pertaining to other students and any financial records of parents will be removed.
7. The examination of the record shall be supervised.
8. Copies of records shall, upon request, be transmitted to the student after payment of established fees for such copies, unless payment of the fee prevents access.

II. The right to request the amendment of the student's education records that the student believes are inaccurate, misleading or in violation of the student's rights of privacy.

After reviewing a record, a student has the right to challenge the content of the record as being inaccurate, misleading, or in violation of the student's rights of privacy. For purposes of this policy, a student may not challenge the judgment of a grade which has been assigned to his or her performance in a course but may challenge the accuracy of the recording of a grade.

1. The student should discuss his or her objection (submitted in writing) with the designated person in the office where his or her records are maintained and try to resolve the problem through informal discussion.
2. If no agreement is reached through informal discussion the student should submit his or her objection in writing to the official to whom that person reports to be followed by further discussion.
3. If the student is still not satisfied, he or she should submit his or her objection in writing to the appropriate vice president or his or her designee.
4. If no satisfactory solution is forthcoming, the student should file a written request for a formal hearing with the Executive Vice President and Provost.
5. Upon receipt of a written request for a formal hearing, the Executive Vice President and Provost shall appoint a panel of three members to hear the objection and advise him/her. The Executive Vice President and Provost will appoint one of the panelists to serve as chairperson. Once appointed, the panel will hold a hearing within two calendar weeks. The panel must provide an opportunity for a presentation of evidence relative to the objection stated and must render a decision in writing to the Executive Vice President and Provost within one week following the conclusion of the hearing. The Executive Vice President and Provost will inform the student in writing within ten working days of any amendment made, or of the decision not to amend the record. If the decision is not to amend, the student has the right to place a statement in the record commenting on the contested information.

Type of Record	Office Address	Name of Official
Academic	Student Records, Wingate Hall	John S. Beacon
Admissions		
Undergraduate	Admissions, Chadbourne Hall	Jonathan H. Henry
Graduate	Graduate School, 2 Winslow Hall	Scott G. Delcourt
International Programs (undergrad)	International Programs, 100 Winslow Hall	Karen R. Boucias
Counseling/Mental Health	Counseling Center, Cutler Health Center	Douglas P. Johnson
Disciplinary	Judicial Affairs, Memorial Union	David J. Fiacco
Medical and Health	Student Health Services, Cutler Health Ctr	Mark Jackson
Placement	Career Center, Memorial Union	Patricia B. Counihan
Public Affairs	Public Affairs, Public Affairs Building	Joe Carr
Student Financial Aid	Student Financial Aid, Wingate Hall	Peggy L. Crawford
Substance Abuse Services	Center for Students and Community Life, Memorial Union	Robert Q. Dana

III. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent. The University of Maine will disclose information from a student's education records only with the written consent of the student, except for disclosures to the following:

1. To school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic, research, support staff (including Public Safety, Career Center and Student Health Services staff), or coaching position; a person or company with whom the University has contracted (such as an attorney, auditor, National Student Clearinghouse or collection agent); a person serving on the Board of Trustees; a University volunteer working under the supervision of another school official; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.
2. To authorized federal or state officials in connection with an audit or evaluation of federal or state supported educational programs.
3. To state or local officials pursuant to state statute concerning the juvenile justice system.
4. Records released in connection with the student's application for, or receipt of, financial aid.
5. Organizations conducting studies on behalf of educational agencies in connection with predictive tests, student financial aid programs, and the improvement of instruction provided that the identity of students is not revealed to other than representatives of such organizations. Such information will be destroyed when no longer needed for the purpose of which it is conducted.
6. Recognized accrediting organizations in order to carry out their accrediting functions.
7. Parents of a student who is dependent upon such parents for federal income tax purposes.
8. Records released on the basis of judicial order or lawfully issued subpoena and on condition that every effort is made to notify the student of the subpoena or order, except where a court or other issuing agency has ordered that there be no notification.
9. In an emergency, appropriate persons as determined by the custodian of the records, if the knowledge of information from the particular record is necessary to protect the health or safety of the student or other persons.
10. Disclosure to another educational institution where the student seeks or intends to enroll.
11. Disclosure of directory information.
12. Disclosure to the student.
13. Disclosure of the final results of a disciplinary hearing to a victim of an alleged crime of violence or non-forcible sex offense.
14. Disclosure of the final results of a disciplinary hearing involving an alleged crime of violence or non-forcible sex offense where a violation was committed.
15. Disclosure in a legal action between the institution and the student.

Records released to any individual or group shall be transmitted on condition that the individual or group is informed that they may not permit any other party to have access to such information without the written consent of the student. The recipient shall also be notified in writing that if compliance with this requirement is not acceptable, all records shall be returned, unused, to the institution. The prohibition on the re-release of records does not apply in the case of disclosures of directory information; disclosures pursuant to a subpoena, court order or litigation; disclosure to the parents of a dependent student; disclosures to the student; or disclosures of the final results of a disciplinary hearing involving an alleged crime of violence or non-forcible sex offense where a violation was committed.

Each office that maintains educational records shall maintain a record for each student with that student's education record. The record shall list all individuals (except institution officials and court or law enforcement officials described above), agencies or organizations which have requested or obtained access to and each disclosure of the student's education record.

IV. The right to file a complaint with the U.S. Department of Education concerning alleged failures by The University of Maine to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is:

Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, S.W.
Washington, DC, 20202-4605

Expunging Records

The official academic record of a student is maintained in perpetuity by the institution. The Student Records Office is the custodian of this record. No other record is officially designated as a permanent record. Other records can be expunged at the discretion of specific department heads wherein a record resides. For example, the undergraduate Admissions Office expunges records of applicants who do not enroll after two years, while records of applicants who do enroll are maintained in perpetuity. The Office of Student Financial Aid expunges records five years after the student's last academic year of attendance. It should be noted that access rights shall be honored prior to the destruction of records where the student has requested such access.

Departments and offices which maintain educational records may have specific policies regarding access to and retention of such records which are consistent with this Policy and FERPA. Students seeking information about those specific policies should contact the particular department or office which is the custodian of the record.

Officers and Faculty

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Mr. Lydel J. Wishcamper
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Named Professorships and Chairs

American Congress of Surveying and Mapping Professorship in Land Information Studies, vacant

Mark and Marcia Bailey Professorship of Speech and Theatre, Dr. Kristin M. Langellier

Bath Iron Works Professorship in Structural Engineering, Dr. Habib-J. Dagher

Adelaide C. Bird and Alan L. Bird Professor of American History, Dr. William J. Baker, Dr. Richard D. Blanke, Dr. Richard W. Judd, Dr. Howard P. Segal

Henry R. and Grace V. Butler Professorship of Electrical Engineering, Dr. John C. Field

Louis Calder Professor of Pulp and Paper Technology, Dr. Joseph M. Genco

Roger Clapp Castle and Virginia Averill Castle Distinguished Professorship in Electrical Engineering, vacant

Agatha B. Darling Professorship in Oceanography, Dr. Lawrence M. Mayer

Clare S. Darling Professorship in Oceanography, Dr. Gary M. King

Lloyd H. Elliott Professorship in English, visiting scholars

Edwin L. Giddings Professor of Forest Policy, Dr. David B. Field

Robert N. Haskell '25 Power Engineering Professorship, Dr. James B. Patton

Richard C. Hill Professorship in Mechanical Engineering, Dr. Donald Grant

Curtis Hutchins Professor of Forest Ecosystems Management, Dr. Robert S. Seymour

Ruth Hutchins Professor of Forest Tree Physiology, Dr. Michael S. Greenwood

Irving Chair for Forest Management, Dr. Jeremy S. Wilson

Libra Professorship in the College of Business, Public Policy and Health, Dr. Lenard W. Kaye

Libra Professorship in the College of Education and Human Development, vacant

Libra Professorship in the College of Engineering, Dr. Max J. Egenhofer

Libra Professorship in Conservation Biology, Dr. Malcolm L. Hunter, Jr.

Libra Professorship in Environmental Economics, Dr. Kevin Boyle

Libra Professorship in Geological Sciences, Dr. George H. Denton

Libra Professorship in History, Dr. Scott W. See

Malcolm G. Long Professorship in Civil Engineering, Dr. Dana Humphrey

John M. Murphy Chair in Business in the MBA, Dr. John F. Mahon

J. Larcom Ober Research Chair in Chemical Engineering, Dr. Adriaan van Heiningen

Nicolas M. Salgo Professor of Business Administration, vacant

Henry W. Saunders Professor of Hardwood Silviculture, vacant

Mark R. Shibles Distinguished Visiting Professorship, visiting scholars

Edmund Styrna Coachship of Track, James O. Ballinger

Frank M. Taylor Distinguished Professorship in Civil Engineering, vacant

University of Maine Libra Professorship, Dr. William Kuykendall

University of Maine Pulp and Paper Foundation Professor of Chemical Engineering, vacant

University of Maine Trustee Professorship, vacant

Visiting Libra Professorship in Diversity, visiting scholars

Arthur O. Willey Professor of Mechanical Engineering, vacant

Alumni Association Distinguished Maine Professor Award Recipients

2002 James W. Warhola
2001 Keith Hutchison
2000 Douglas M. Allen
1999 Brenda M. Power
1998 Fred H. Irons
1997 Irving Kornfield
1996 Malcolm L. Hunter, Jr.
1995 Habib J. Dagher
1994 Dana N. Humphrey
1993 George H. Denton
1992 Raymie E. McKerrow
1991 Stephen A. Norton
1990 Alan J. Kimball
1989 Fred B. Knight
1988 Dana W. Birnbaum
1987 Brian Green
1986 Anne P. Sherblom
1985 John A. Alexander
1984 John W. Toole
1983 Martin R. Stokes
1982 Eugene A. Mawhinney
1981 Mary S. Tyler
1980 Malda Brandt
1979 Michael H. Lewis
1978 Charles W. Smith
1977 Melvin Gershman
1976 Donald A. Grant
1975 Erling R. Skorpen
1974 William G. Valleau
1973 John H. Dearborn
1972 Constance H. Carlson
1971 Douglas A. Gelinas
1970 Joseph Scimecca
1969 Robert Thomson
1968 Jonathan Biscoe
1967 David W. Trafford
1966 Richard G. Emerick
1965 Vincent A. Hartgen
1964 Benjamin Speicher
1963 Walter S. Schoenberger

Presidential Outstanding Teaching Award Recipients

2002 Eric N. Landis
2001 Constance M. Perry
2000 Owen F. Smith
1999 Keith W. Hutchison
1998 Sandra L. Caron
1997 Fred H. Irons
1996 Paul B. Roscoe
1995 Barbara J. W. Cole
1994 William E. Glanz
1993 Saundra L. Gardner
1992 Christina L. Baker
1991 Kristin M. Langellier

Presidential Public Service Achievement Award Recipients

2002 Sandra L. Caron
2001 Ann Schonberger
2000 Walter G. McIntire
1999 George L. Jacobson, Jr.
1998 Dana N. Humphrey
1997 Sheila J. Pechinski
1996 Alfred A. Bushway
1995 James H. Breece
1994 Ray B. Owen
1993 Edward D. "Sandy" Ives
1992 Lucille A. Zeph
1991 William H. Whitaker
1990 Herbert Hidu
1989 David F. Wihry
1988 Robert C. Bayer
1987 James A. Wilson
1986 Vaughn H. Holyoke
1985 Barbara A. Barton
1984 Richard J. Campana
1983 Patricia M. Pierson
1982 Richard C. Hill

Presidential Research and Creative Achievement Award Recipients

2002 Max J. Egenhofer
2001 Kevin Boyle
2000 Janice V. Kristo
Rosemary A. Bamford
1999 Charles T. Hess
1998 Douglas M. Allen
1997 Gary M. King
1996 Burton N. Hatlen
1995 Erdogan Kiran
1994 C. Stewart Doty
1993 William N. Unertl
1992 J. Malcolm Shick
1991 Merrill F. Elias
1990 Stephen A. Norton
1989 William J. Baker
1988 Michael D. Bentley
1987 John H. Dearborn
1986 Colin E. Martindale
1985 Richard D. Blake
1984 Harold W. Borns,
David C. Smith
1983 No Award
1982 Bruce L. Nicholson
1981 Carroll F. Terrell
1980 John F. Vetelino
1979 James D. McCleave
1978 Peter Csavinszky
1977 William Pease, Jane Pease
1976 Robert J. Jensen
1975 George H. Denton
1974 Geddes Simpson

Correspondence with the University

Inquiries should be directed as indicated below.

Chancellor: Joseph W. Westphal, 107 Maine Avenue, Bangor, ME 04401 (207) 973-3205

Officers of the University of Maine

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Vice President for Administration: Janet Waldron, 5703 Alumni Hall, Room 118, Orono, ME 04469-5703, (207) 581-1541. E-MAIL: Janet.Waldron@umit.maine.edu

Vice President for Research: vacant, 5703 Alumni Hall, Room 209, Orono, ME 04469-5703, (207) 581-1506.

Vice President for Student Affairs: Richard D. Chapman, 5703 Alumni Hall, Room 218, Orono, ME 04469-5703, (207)581-1430. E-MAIL: richard.chapman@umit.maine.edu

Vice President for University Advancement: Jeffery N. Mills, Buchanan Alumni House, 1 Alumni Place, Orono, ME 04469, (207) 581-1138. E-MAIL: JMILLS@pluto.caps.maine.edu

College of Business, Public Policy and Health and Director of the Maine Business School: Daniel E. Innis, Dean and Director of The Maine Business School, 5723 Donald P. Corbett Business Building, Room 211, Orono, ME 04469-5723, (207) 581-1968. E-MAIL: daniel.innis@umit.maine.edu

College of Education and Human Development: Robert A. Cobb, Dean, 5766 Shibles Hall, Room 151, Orono, ME 04469-5766, (207) 581-2441. E-MAIL: RACOBB@maine.edu

College of Engineering: Larryl Matthews, Dean, 5708 Barrows Hall, Room 101, Orono, ME 04469-5708, (207) 581-2216. E-MAIL: larryl.matthews@umit.maine.edu

College of Liberal Arts and Sciences: Gordon Kulberg, Interim Dean, 5754 Stevens, Room 105, Orono, ME 04469-5754, (207) 581-1954. E-MAIL: gordon.kulberg@umit.maine.edu

College of Natural Sciences, Forestry, and Agriculture: G. Bruce Wiersma, Dean, 5782 Winslow Hall, Room 105, Orono, ME 04469-5782, (207) 581-3202. E-MAIL: WIERSMA@maine.edu

Division of Lifelong Learning: Robert C. White, Assistant Provost and Dean, 5713 Chadbourne Hall, Room 122, Orono, ME 04469-5713, (207) 581-3113. E-MAIL: rwhite@maine.edu

Academic and Career Exploration Program: Ann Maxim, Coordinator, 1577 Dunn Hall, Room 108, Orono, ME 04469-5774, (207) 581-1831. E-MAIL: MAXIM@maine.edu

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Gilmore, Carol B. (1977). BA Connecticut College, New London 1962; M.Ed. Keene State College, Keene 1973; MS University of Massachusetts, Amherst 1974; Ph.D. University of Massachusetts, Amherst 1979; Professor of Management

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Handley, David T. (1983). BS University of Massachusetts, Amherst 1980; MS University of New Hampshire, Durham 1983; Ph.D. University of New Hampshire, Durham 1993; Vegetable and Small Fruit Specialist; Extension Professor; Cooperating Professor of Horticulture

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Hardy, Sandra E. (1987). BA Central Connecticut State College, New Britain 1959; MA Fairfield University, Fairfield 1971; Ph.D. New York University, New York 1982; Associate Professor of Theatre

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Harrison, Daniel J. (1988). BS University of Wyoming, Laramie 1980; MS University of Maine, Orono 1983; Ph.D. University of Maine, Orono 1986; Professor of Wildlife

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Ingalls, Wayne C. (1980). BS Husson College, Bangor 1967; MBA University of Wisconsin, Madison 1968; Lecturer in Accounting

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Jacobs, Naomi (1982). BA Luther College, Decorah 1975; MA University of Missouri, Columbia 1977; Ph.D. University of Missouri, Columbia 1982; Professor of English and Graduate Coordinator

Jacobson Jr., George L. (1979). BA Carleton College, Northfield 1968; Ph.D. University of Minnesota, Minneapolis 1975; Professor of Botany and Quaternary Studies; Presidential Liaison; Cooperating Professor of Wildlife

Jadallah, Edward (1997). BA Malone College, Canton 1974; MA Bowling Green State University, Bowling Green 1981; Ph.D. Ohio State University, Columbus 1984; Associate Professor of Education

Jagels, Richard (1979). BS Syracuse University, Syracuse 1962; MS Syracuse University, Syracuse 1965; Ph.D. University of Illinois, Urbana 1968; Professor of Forest Biology; Cooperating Professor of Biological Sciences

Jellison, Jody (1993). BS University of New Hampshire, Durham 1977; MS Oregon State University, Corvallis 1980; Ph.D. Oregon State University, Corvallis 1983; Professor of Molecular Plant Pathology; Cooperating Professor of Forestry and Microbiology

Jemison Jr., John M. (1991). BS University of Montana, Missoula 1983; MS Southern Illinois University 1986; Ph.D. Pennsylvania State University, University Park 1991; Water Quality and Soil Specialist; Extension Professor; Cooperating Professor, Plant Soil and Environmental Science

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Johnson, Steven B. (1988). BS University of Wisconsin, Madison 1977; MS University of Maine, Orono 1979; Ph.D. University of Florida, Gainesville 1982; Crops Specialist, Aroostook County; Extension Professor

Jones, Nory B. (2001). BA University of Colorado, Boulder 1976; MS University of Idaho, Moscow 1979; MBA University of Massachusetts, Amherst 1984; Ph.D. University of Missouri, Columbia 2001; Assistant Professor of Management Information Systems

Jones, Ronald S. (2001). BS Brigham Young University, Provo 1972; MS Utah State University, Logan 1973; Ph.D. University of Sarasota, Sarasota 1977; Extension 4-H Youth Development Specialist; Associate Extension Professor

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Jumars, Peter A. (1999). BA University of Delaware, Newark 1969; Ph.D. Scripps Institute of Oceanography, La Jolla 1974; Professor of Marine Sciences and Oceanography

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Kelley, Joseph T. (1999). BA Boston University, Boston 1973; MA Lehigh University, Bethlehem 1976; Ph.D. Lehigh University, Bethlehem 1980; Professor of Marine Geology

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King, Roger J. H. (1992). BA University of Kansas, Lawrence 1976; BA Oxford University, Oxford 1978; MA Oxford University, Oxford 1982; MA Boston University, Boston 1982; Ph.D. Boston University, Boston 1985; Associate Professor of Philosophy

Kinnison, Michael T. (2002). BS University of New Hampshire 1993; MS University of Washington 1997; Ph.D. University of Washington, 1999; Assistant Professor of Biological Sciences

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Kornfield, Irving L. (1977). AB Syracuse University, Syracuse 1968; MA State University of New York, Stony Brook 1972; Ph.D. State University of New York, Stony Brook 1974; Professor of Zoology; Cooperating Professor of Biological Sciences

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Lambert, David H. (1986). BA Lehigh University, Bethlehem 1968; BS University of Pittsburgh, Pittsburgh 1970; MS Pennsylvania State University, University Park 1973; Ph.D. Pennsylvania State University, University Park 1979; Associate Professor of Plant Soil & Environmental Sciences; Associate Professor of Biological Sciences

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Shepard, Robert K. (1975). BS University of Michigan, Ann Arbor 1963; MF Duke University, Durham 1964; Ph.D. University of Michigan, Ann Arbor 1970; Professor of Forest Resources

Sherblom, John C. (1980). BA Bates College, Lewiston 1972; MA Oklahoma State University, Stillwater 1979; Ph.D. University of Maine, Orono 1986; Professor of Communication and Journalism; Chairperson of Communication and Journalism

Shick, J. Malcolm (1974). BS William and Mary, Williamsburg 1969; MA William and Mary, Williamsburg 1971; Ph.D. Texas A&M University, College Station 1974; Professor of Oceanography and Zoology; Cooperating Professor of Biological Sciences

Shipps, Therese (1989). BSN Saint Anselm College, Manchester 1966; MS Boston University, Boston 1974; D.N.Sc. Boston University, Boston 1988; Director and Associate Professor, School of Nursing

Sidell, Bruce D. (1977). AB Boston University, Boston 1970; MS University of Illinois, Urbana 1972; Ph.D. University of Illinois, Urbana 1975; Professor of Marine Sciences; Cooperative Professor of Zoology and Biochemistry

Sigmon, Sandra T. (1991). BA University of North Carolina, Greensboro 1980; MA University of North Carolina, Greensboro 1985; Ph.D. University of North Carolina, Greensboro 1989; Associate Professor of Psychology; Director of Clinical Training

Silver, Phillip A. (1998). BM New England Conservatory of Music, Boston 1977; MM New England Conservatory of Music, Boston 1979; D.MA University of Washington, Seattle 1992; Assistant Professor of Music

Singer, John T. (1985). BA Denison University, Granville 1975; Ph.D. University of Georgia, Athens 1983; Professor of Microbiology; Chairperson, Department of Biochemistry, Microbiology and Molecular Biology; Cooperating Professor of Marine Sciences

Skonberg, Denise I. (1997). BS University of California, Davis 1986; MS University of Washington, Seattle 1992; Ph.D. University of Washington, Seattle 1997; Associate Professor of Food Science and Human Nutrition; Cooperating Assistant Research Professor in Lobster Institute

Slott, Kathryn E. (1982). BA University of Pennsylvania, Philadelphia 1970; MA University of Pennsylvania, Philadelphia 1972; ML Université De Bordeaux, Bordeaux 1976; Ph.D. University of Pennsylvania, Philadelphia 1980; Associate Professor of French

Smagula, John M. (1973). BS Rutgers University, New Brunswick 1965; MS University of Massachusetts, Amherst 1967; Ph.D. University of Massachusetts, Amherst 1973; Professor of Horticulture

Small, William (1972). BA Bowdoin College, Brunswick 1961; MA Middlebury College, Middlebury 1966; Ph.D. University of Connecticut, Storrs 1972; Professor of German

Smith, Charles W. (1968). BS Allegheny College, Meadville 1962; Ph.D. Ohio University, Athens 1968; Professor of Physics; Cooperating Professor of Engineering

Smith, Dana J. (2000). BS University of Florida, Gainesville 1998; Assistant Women's Basketball Coach; Lecturer in Physical Education

Smith, Debra J. (1995). BS University of Maine, Orono 1994; Head Softball Coach; Lecturer in Physical Education

Smith, Jane S. (1994). BA State University of New York, Oswego 1977; MA George Washington University, Washington D.C. 1980; Ph.D. University of Washington, Seattle 1994; Assistant Professor of French

Smith, Laurence D. (1982). BA Indiana University, Bloomington 1972; MA Indiana University, Bloomington 1975; MA University of New Hampshire, Durham 1979; Ph.D. University of New Hampshire, Durham 1983; Associate Professor of Psychology

Smith, Maureen E. (1997). BS University of Wisconsin, Oshkosh 1980; MS University of Wisconsin, Oshkosh 1982; Ph.D. University of Wisconsin, Milwaukee 1993; Director of The Native American Studies Program; Associate Professor of Interdisciplinary Studies; Director of Diversity Across the Curriculum

Smith, Owen F. (1991). BA University of Washington, Seattle 1980; MA University of Washington, Seattle 1983; Ph.D. University of Washington, Seattle 1991; Associate Professor of Art

Smith, Robert W. (2002). BA Allegheny College, Meadville 1997; Assistant Football Coach / Defensive Assistant II; Lecturer in Physical Education

Smith, Rosemary L. (2003). BS University of Rhode Island, Kingston 1977; MS University of Utah, Salt Lake City 1979; Ph.D. University of Utah, Salt Lake City 1982; Research Professor of Electrical and Computer Engineering and Laboratory for Surface Science and Technology

Smith, Stewart N. (1991). BA Yale University, New Haven 1959; MS University of Connecticut, Storrs 1974; Ph.D. University of Connecticut, Storrs 1977; Professor of Sustainable Agriculture Policy; Undergraduate Coordinator

Snider, Davida J. (1981). BA Virginia Polytechnic Institute and State University, Blacksburg 1973; MFA Memphis State University, Memphis 1976; Associate Professor of Theatre/ Dance; Costume Design

Snyder, William M. (1977). BA University of Maine, Orono 1968; MA University of Maryland, College Park 1972; Ph.D. University of Maryland, College Park 1977; Professor of Mathematics

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Thomas, Andrew C. (1996). B.Sc. McGill University, Montreal 1979; M.Sc. University of British Columbia, Vancouver 1982; Ph.D. University of British Columbia, Vancouver 1988; Associate Professor of Oceanography

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Vollmers, Gloria L. (1992). AB Brown University, Providence 1973; MM University of North Texas, Denton 1983; MS University of Texas, Dallas 1985; Ph.D. University of North Texas, Denton 1994; Associate Professor of Accounting

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Walker, Judy P. (1997). BS Southern Illinois University, Carbondale 1979; MA University of Houston, Houston 1985; Ph.D. University of Massachusetts, Boston 1994; Assistant Professor of Communication Sciences and Disorders

Wallace, Charles R. (1987). BS Michigan State, East Lansing 1977; MS University of Georgia, Athens 1981; Ph.D. University of Florida, Gainesville 1986; Associate Professor, Animal and Veterinary Sciences

Warhola, James W. (1983). BA Ohio Northern University, Ada 1976; MA Ohio State University, Columbus 1982; Ph.D. Ohio State University, Columbus 1983; Professor of Political Science

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Weber, William J. (1978). BA Oglethorpe College, Atlanta 1967; MA University of Maine, Orono 1970; Youth Development and Resource Management Specialist; Associate Extension Professor

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Weeks, Sherrie L. (1995). BS Castleton State College, Castleton 1989; M.Ed. University of Virginia, Charlottesville 1995; Instructor in Curriculum; Director of Athletic Training Program

Weiner, Marli F. (1988). BA Johns Hopkins University, Baltimore 1974; MA Sarah Lawrence College, Bronxville 1976; Ph.D. University of Rochester, Rochester 1986; Professor of History

Welcomer, Stephanie Austin (1998). BA Pennsylvania State University, University Park; MS Lehigh University, Bethlehem; Ph.D. Pennsylvania State University, University Park 1997; Assistant Professor of Management

Weller, Herman G. (1993). BS Stanford University, Stanford 1966; MAT Michigan State University, East Lansing 1971; MS Michigan State University, East Lansing 1974; Ed.D. Virginia Polytechnic Institute and State University, Blacksburg 1990; Associate Professor of Science Education

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Wells, Mark Lovell (1998). BS University of British Columbia, Vancouver 1979; MS University of British Columbia, Vancouver 1982; Ph.D. University of Maine, Orono 1989; Associate Professor of Marine Sciences

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Werrbach, Gail B. (1988). BS University of Vermont, Burlington 1975; MSW Simmons College, Boston 1980; Ph.D. University of Texas, Austin 1988; Director and Associate Professor of Social Work

Wertheim, Frank S. (1986). AA North Shore Community College, Beverly 1976; BS University of Massachusetts, Amherst 1980; MS University of Massachusetts, Amherst 1986; Extension Educator; Associate Extension Professor

Wheeler, M. Clayton (2001). BS University of Texas, Austin 1992; MS University of Texas, Austin 1996; Ph.D. University of Texas, Austin 1997; Assistant Professor of Chemical Engineering

Wheeler, Thomas J. (1999). BA Lasalle University, Philadelphia 1966; BSEE Monmouth College, West Long Branch 1971; MS Fairleigh Dickson, Rutherford 1975; Ph.D. Stevens Institute of Technology, Hoboken 1988; Professor of Computer Science

Whelan, Robert E. (1983). AB Bowdoin College, Brunswick 1962; MA University of Massachusetts, Amherst 1971; Lecturer in English; Associate Chairperson

White, Adrienne (1988). BS University of Tennessee, Martin 1968; Ph.D. University of Tennessee, Knoxville 1988; Associate Professor of Human Nutrition and Food Science

White, Alan S. (1986). BA Williams College, Williamstown 1973; MS University of Montana, Missoula 1976; Ph.D. University of Minnesota, Saint Paul 1981; Professor of Forest Resources

White, Gregory K. (1976). BA Vanderbilt University, Nashville 1968; MBA University of Alaska, Fairbanks 1973; Ph.D. Washington State University, Pullman 1976; Professor of Resource Economics and Policy

White, Jefferson A. (1972). BA Baylor University, Waco 1952; MA Yale University, New Haven 1961; Ph.D. Yale University, New Haven 1964; MS Yale University, New Haven 1981; Professor of Philosophy

Whitehead, Timothy J. (2001). BA Hamilton College, Clinton 1985; MA University of Maine, Orono 1992; Head Men's Ice Hockey Coach; Lecturer in Physical Education

Whitehouse, Joshua P. (1997). BA Curtis Institute of Music, Philadelphia 1995; MA University of Maine, Orono 1997; Assistant Professor of Music: Maine Summer Youth Music Camp Director

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Wiemann, Beth A. (1997). BA Oberlin College, Oberlin 1981; MFA Princeton University, Princeton 1983; Ph.D. Princeton University, Princeton 1994; Associate Professor of Music

Wihry, David F. (1969). AB Merrimac College, North Andover 1964; Ph.D. Syracuse University, Syracuse 1972; Chairperson and Associate Professor of Economics

Wilder, Robert (1992). B.S.Ed. University of Maine, Orono 1988; M.S.Ed. University of Maine, Orono 1990; Assistant Football Coach; Offensive Coordinator; Lecturer in Physical Education and Athletics

Wilhelm, Jeffrey D. (1995). BA Baldwin Wallace College, Berea 1982; MAT Brown University, Princeton 1983; Ph.D. University of Wisconsin, Madison 1994; Associate Professor of Education

Williams, Edward C. (2000). AS DeVry Institute of Technology, Chicago 1970; BS University of Maine, Orono 1998; Lecturer in Electrical and Computer Engineering

Williams, Matthew S. (1985). BS University of Connecticut, Storrs 1972; BS University of Connecticut, Storrs 1975; MS University of Connecticut, Storrs 1978; Extension Educator; Aroostook County; Associate Extension Professor

Wilson, James A. (1968). BA Lake Forest College, Lake Forest 1962; Ph.D. University of Wisconsin, Madison 1971; Professor of Marine Sciences; Cooperating Professor of Resource Economics and Policy; Cooperating Research Professor in Lobster Institute; Program Coordinator of Marine Policy

Wilson, Jeremy S. (2001). AB Bowdoin College, Brunswick 1987; MF Yale University, New Haven 1993; Ph.D. University of Washington, Seattle 1998; Assistant Professor of Forest Resources; Irving Chair for Forest Ecosystem Management

Wilson, John R. (1969). AB Bates College, Lewiston 1963; MA University of Kansas, Lawrence 1967; Ph.D. University of Kansas, Lawrence 1969; Associate Professor of English

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Wittmann, Michael C. (2001). BS Duke University, Raleigh 1993; MS University of Maryland, College Park 1996; Ph.D. University of Maryland, College Park 1998; Assistant Professor of Physics; Cooperating Assistant Professor of Education

Wohlgemuth, Andrew R. (1969). AB University of Pennsylvania, Philadelphia 1959; MA Syracuse University, Syracuse 1966; Ph.D. Syracuse University, Syracuse 1969; Professor of Mathematics

Wood, Carol L. (1987). BSN University of Illinois, Chicago 1975; MSN University of Illinois, Chicago 1977; Ed.D. University of Maine, Orono 1992; Associate Professor of Nursing; Graduate Program Coordinator

Woods, Stephen A. (1992). BS University of Massachusetts, Amherst 1976; MS Washington State University, Pullman 1980; Ph.D. University of Massachusetts, Amherst 1989; Associate Professor of Entomology; Coordinator of Graduate Program for the Ecology and Environmental Sciences

Woodward, Theodore W. (1996). BA Bucknell University, Lewisburg 1986; MA University of Connecticut, Storrs 1989; Assistant Basketball Coach; Lecturer in Physical Education and Athletics; Golf Coach

Worboys, Michael F. (2001). BS University of Reading, Reading 1968; MS University of Bristol, Bristol 1969; Ph.D. University of Birmingham, Birmingham 1980; Professor, National Center for Geographic Information and Analysis and Spatial Information Science and Engineering

Wren, Jeffrey (1975). BS William and Mary College, Williamsburg 1971; M.Ed. University of Maine, Orono 1974; Aquatics Director; Swim Coach; Lecturer in Physical Education

Xue, Huijie (1994). BS Shandong College of Oceanology, P.R. China 1984; MA Princeton University, Princeton 1988; Ph.D. Princeton University, Princeton 1991; Associate Professor Marine Science

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Zeph, Lucille A. (1979). BS Boston State College, Boston 1970; M.Ed. Boston College, Chestnut Hill 1976; Ed.D. Vanderbilt University, Nashville 1983; Director, Center for Community Inclusion-University Affiliated Program; Associate Professor of Education

Zhang, Donglin (1997). BS Central South Forestry University, Zhuzhou 1983; MS Central South Forestry University, Zhuzhou 1989; MS University of Georgia, Athens 1994; Ph.D. University of Georgia, Athens 1998; Assistant Professor of Horticulture

Zielinski, Gregory A. (2000). BS Pennsylvania State, University Park 1977; MS Idaho State University, Pocatello 1980; Ph.D. University of Massachusetts, Amherst 1987; Research Associate Professor of Quaternary & Climate Studies; Cooperating Research Associate Professor, School of Geological and Marine Science

Zollitsch, Reinhard (1969). BA University of Kiel, Kiel 1962; MA University of Maine, Orono 1964; MA University of Massachusetts, Amherst 1969; Ph.D. University of Massachusetts, Amherst 1971; Associate Professor of German

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Benjamin, Elliot. (1996). BS State University of New York, Stony Brook, 1971; MS University of Houston, Houston 1971; M.Ed. Boston State College, Boston 1977; Lecturer II in Mathematics and Statistics

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Blitz, Sanford (1994). BA City College of New York, New York City 1963; MPA University of Maine, Orono 1992; Assistant Professor of Public Administration

Bouchard, Joan (2002). BS Millersville University, Millersville 1976; M.Ed. University of Maine, Orono 1981; Instructor in Education

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